



LIFO: Location Interoperability Framework Observatory

2020 COUNTRY FACTSHEET

DENMARK



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 ISA² Programme.

The publication date is December 2021. The factsheets are published on the Joinup platform and are accessible [here](#).

The monitoring information for Denmark has been provided by the *Styrelsen for Dataforsyning og Effektivisering (SDFE – Agency for Data Supply and Efficiency)*.

The information and views set out in this publication are those of the author(s) and do not necessarily reflect the official opinion of the European Commission. The European Commission does not guarantee the accuracy of the data included in this study. Neither the European Commission nor any person acting on the European Commission's behalf may be held responsible for the use which may be made of the information contained therein.

© European Union 2021



The reuse policy of the European Commission is implemented by the Commission Decision 2011/833/EU of 12 December 2011 on the reuse of Commission documents (OJ L 330, 14.12.2011, p. 39). Except otherwise noted, the reuse of this document is authorised under the Creative Commons Attribution 4.0 International (CC BY 4.0) licence (<https://creativecommons.org/licenses/by/4.0/>). This means that reuse is allowed provided appropriate credit is given and any changes are indicated. For any use or reproduction of photos or other material that is not owned by the EU, permission must be sought directly from the copyright holders.

All images © European Union 2021, except cover image © dbrnjhrj - stock.adobe.com

Contents

1. Introduction	2
2. Structure of the document	5
3. Location Interoperability State of Play	6
3.1. Overview.....	6
3.1.1 2020 Results	6
3.1.2 2019/2020 Comparison	8
3.2. Policy and Strategy Alignment	11
3.2.1 2020 Results	11
3.2.2 2019/2020 Comparison	13
3.3. Digital Government Integration.....	14
3.3.1 2020 Results	14
3.3.2 2019/2020 Comparison	17
3.4. Standardisation and Reuse.....	18
3.4.1 2020 Results	18
3.4.2 2019/2020 Comparison	22
3.5. Return on Investment.....	23
3.5.1 2020 Results	23
3.5.2 2019/2020 Comparison	25
3.6. Governance, Partnerships and Capabilities	26
3.6.1 2020 Results	26
3.6.2 2019/2020 Comparison	28
4. Best Practices	29
List of abbreviations and definitions.....	36
List of figures.....	40
List of tables.....	41
Annex 1: LIFO 2020 Scoring methodology	42
Annex 2: LIFO 2020 Indicators	43
Annex 3: LIFO 2020 Additional information: Denmark	50

1. Introduction



The Location Interoperability Framework Observatory (LIFO¹) 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) Blueprint² (see [Figure 1](#) ~~Figure 1~~).

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

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

LIFO is coordinated by the European Location Interoperability Solutions for e-Government (ELISE)⁵ action in the Interoperability Solutions for European Public Administrations, Businesses and Citizens (ISA²)⁶ programme.



Figure 1 - EULF Blueprint focus areas

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

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

³ https://ec.europa.eu/isa2/eif_en

⁴ https://ec.europa.eu/isa2/solutions/nifo_en

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

⁶ https://ec.europa.eu/isa2/home_en

The LIFO data collection is carried out through an online questionnaire sent to country representatives for digital government in the geospatial domain. The questionnaire is based on the LIFO analytical model⁷. 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 Directive⁸. 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 Directive⁹, obligations under the General Data Protection Regulation (GDPR)¹⁰, approaches under the Public Procurement Directive¹¹, and factors relevant to the EIF¹².

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

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

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



Figure 2 - LIFO online resources

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

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

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

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

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

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

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

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

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

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

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

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

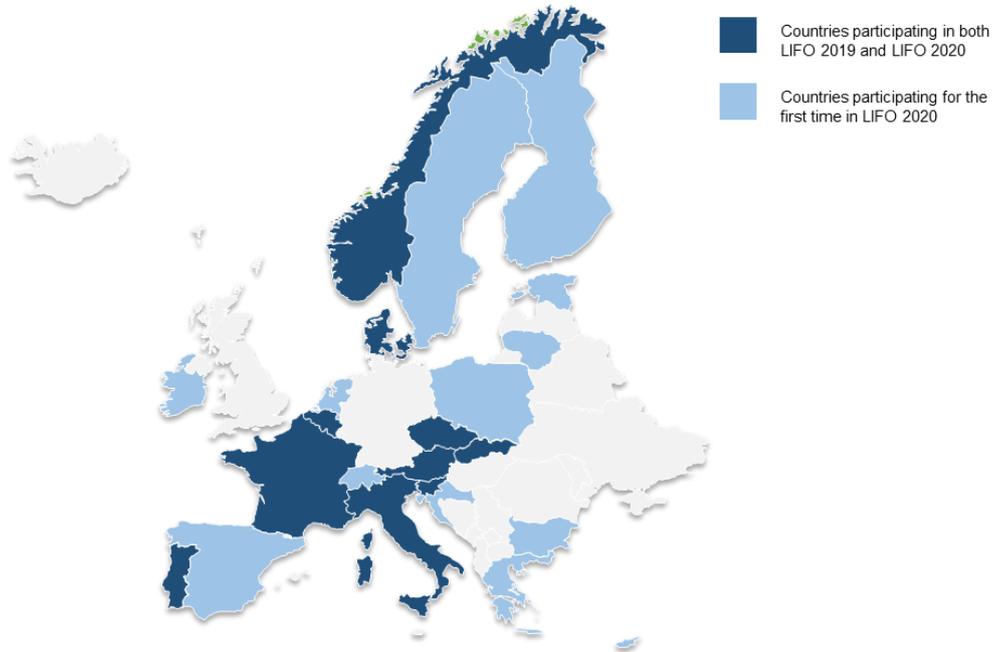


Figure 3 - LIFO participating countries in 2019 and 2020

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

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

2. Structure of the document

This factsheet provides an overview of the information collected on location interoperability in Denmark in 2020. 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 in the country across all five focus areas, together with a summary chart and a table with the main strengths and weaknesses;
 - [2019/2020 comparison](#): compares the overall results between 2019 and 2020 across the five focus areas for the country and in relation to European trends; these comparisons are displayed in a comprehensive chart;
- **Detailed results by focus area**, organised in five sections, each with the following:
 - **2020 results**: 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](#).
 - **2019/2020 comparison**: compares the results between 2019 and 2020 for each recommendation in the focus area, with a chart and explanatory text.
- [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 Denmark comprising the questionnaire response, scores and charts from the response, and a 2019/2020 comparison table.

The 2020 LIFO monitoring information for Denmark has been provided by the *Styrelsen for Dataforsyning og Effektivisering (SDFE – Agency for Data Supply and Efficiency)*.

3. Location Interoperability State of Play

3.1. Overview

3.1.1 2020 Results

According to the location interoperability state of play identified through the implementation of the EULF Blueprint recommendations, Denmark has performed better than the European average of 23 surveyed countries in all focus areas (see [Figure 4](#) ~~Figure-4~~).

In the “Policy and Strategy Alignment” focus area, Denmark’s strengths include the alignment between digital and location policies, the country’s full preparedness for the GDPR under a location data perspective and the widespread exploitation of location-based evidence and analysis to support relevant topics.

In the “Digital Government Integration” focus area, the main factors that have contributed to Denmark’s high score are the significant number of key digital public services that use location information as an important feature in performing the service and the very extensive use of the public sector SDI in the private sector (e.g. insurance and banks) and other organisations (e.g. NGOs) for the delivery of new and innovative applications, products and services. On top of this, Denmark also implements several actions for the integration of location and statistical information in the production of location-based statistics.

As for the “Standardisation and Reuse” focus area, the high score is primarily due to the adoption of the EIF principles and to the availability of APIs for all high-value datasets. Moreover, a consistent set of standards necessary for the INSPIRE implementing rules and technical guidelines have been adopted, and several actions have been implemented to assure data quality. On a negative side, no specific framework is used for the analysis of data quality, nor are data quality standards linked to data standards.

In the “Return on Investment” focus area, the strategic approach to funding of location information and location-based services, joined with strong communication of the availability and benefits of location data and location-enabled digital public services, is what has contributed to position Denmark well above the European average. An opportunity for improvement is the lack of use of the monitoring information to prioritise investments in location-enabled services, or of a common maturity assessment method to benchmark service performance with other EU Member States.

Finally, in the “Governance, Partnership and Capabilities” focus area, the factors that contributed to the good score are the adoption of an integrated and effective governance of location information processes and the organisation of a number of initiatives to raise awareness and develop geospatial skills. On the other hand, public-private partnerships and cross-border agreements for the development and operation of location-enabled services are not widely exploited.

The LIFO index for Denmark combining the scores for all focus areas is 0.73, which confirms the good performance of Denmark in terms of location interoperability. This compares with a European average of 0.55.

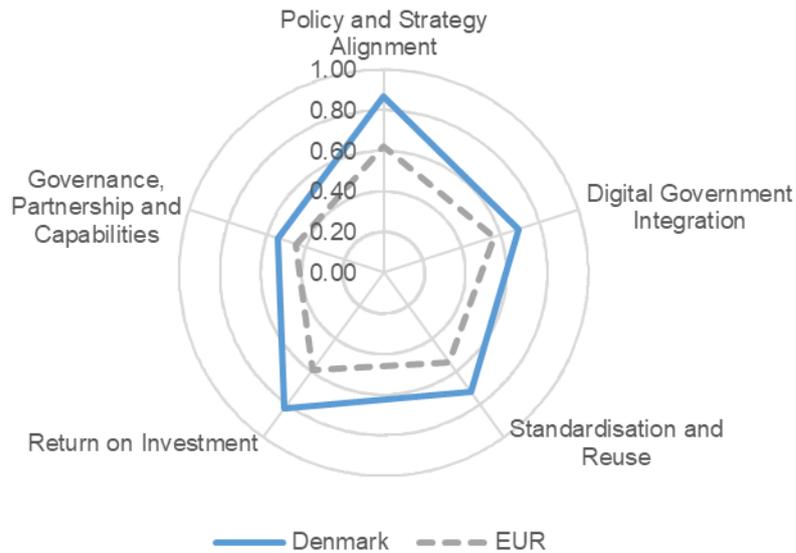


Figure 4 - Overall EULF Blueprint implementation

The following table summarises the main strengths and weaknesses of Denmark across the five focus areas:

Focus Area	Strengths	Weaknesses
 Policy and Strategy Alignment	<ul style="list-style-type: none"> • Full and consistent alignment between digital and location policies • Full preparation in terms of compliance with GDPR for location data • Significant exploitation of location-based evidence and analysis to support relevant topics 	<ul style="list-style-type: none"> • Location data tends to be available through different licensing arrangements from different data providers
 Digital Government Integration	<ul style="list-style-type: none"> • Significant number of key digital public services that use location information as an important feature in performing the service • Public sector SDI used very extensively by the private sector and other organisations for the delivery of new and innovative applications, products and services • Several actions implemented for the integration of location and statistical information in the production of location-based statistic 	<ul style="list-style-type: none"> • Collaborative models for the development and delivery of location-based digital public services are not adopted at local or sub-national level, and do not rely significantly on public-private partnerships or civic hacking

Focus Area	Strengths	Weaknesses
 Standardisation and Reuse	<ul style="list-style-type: none"> • Architecture approach based on EIF principles • Available APIs for all high-value datasets • Several standards necessary for the INSPIRE implementing rules and technical guidelines adopted • Several actions implemented to assure data quality 	<ul style="list-style-type: none"> • No specific framework is used for the analysis of data quality, nor are data quality standards linked to data standards
 Return on Investment	<ul style="list-style-type: none"> • Strategic approach to funding of location information and location-based services • Strong communication on the availability and benefits of location data and location-enabled digital public services 	<ul style="list-style-type: none"> • Impact-based improvement actions do not take in consideration the use of the monitoring information to prioritise investments in location-enabled services or the use of a common maturity assessment method to benchmark service performance with other EU Member States
 Governance, Partnerships and Capabilities	<ul style="list-style-type: none"> • Integrated and effective governance of location information processes • Several initiatives organised to raise awareness and develop geospatial skills 	<ul style="list-style-type: none"> • No formal cross-border agreements exist for the development and operation of location-enabled services • Public-private partnerships are exploited only to a limited extent for the development and operation of location-enabled services

Table 1 – Strengths and Weaknesses by Focus Area

3.1.2 2019/2020 Comparison

Denmark is one of the countries that has participated in both LIFO 2019 and LIFO 2020 data collections. Comparisons over the two years can be made both with the results for the country itself and with European averages (see [Figure 5](#)).

As the number of participants has increased significantly from 10 in 2019 to 23 in 2020 (including the 10 from 2019), the figure 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.

The structure of the EULF Blueprint (and therefore of LIFO) in terms of focus areas and recommendations has remained the same over the years, allowing valid comparisons at these levels. However, changes were made in 2020 to a small number of specific indicators to reflect

learning from 2019 and latest developments impacting location interoperability in Europe. Further details are available in [Annex 2](#).

Between 2019 and 2020, the LIFO index for Denmark has increased from 0.67 to 0.73. This is due in a large part to the positive variations in the following focus areas:

- “Policy and Strategy Alignment” thanks to the adoption of new cross-sector legislation, to the improvements made in terms of GDPR and to the step forward made in terms of location-based evidence and analysis;
- “Digital Government Integration” thanks to the new uses made of the SDI and to the implementation of several actions for the integration of location and statistical information in the production of location-based statistics;
- “Standardisation and Reuse” thanks to the more extensive uses made of geospatial domain standards along with the new approach for combining spatial and non-spatial metadata. On top of these improvements, further actions have been implemented to assure of location data quality and governance.

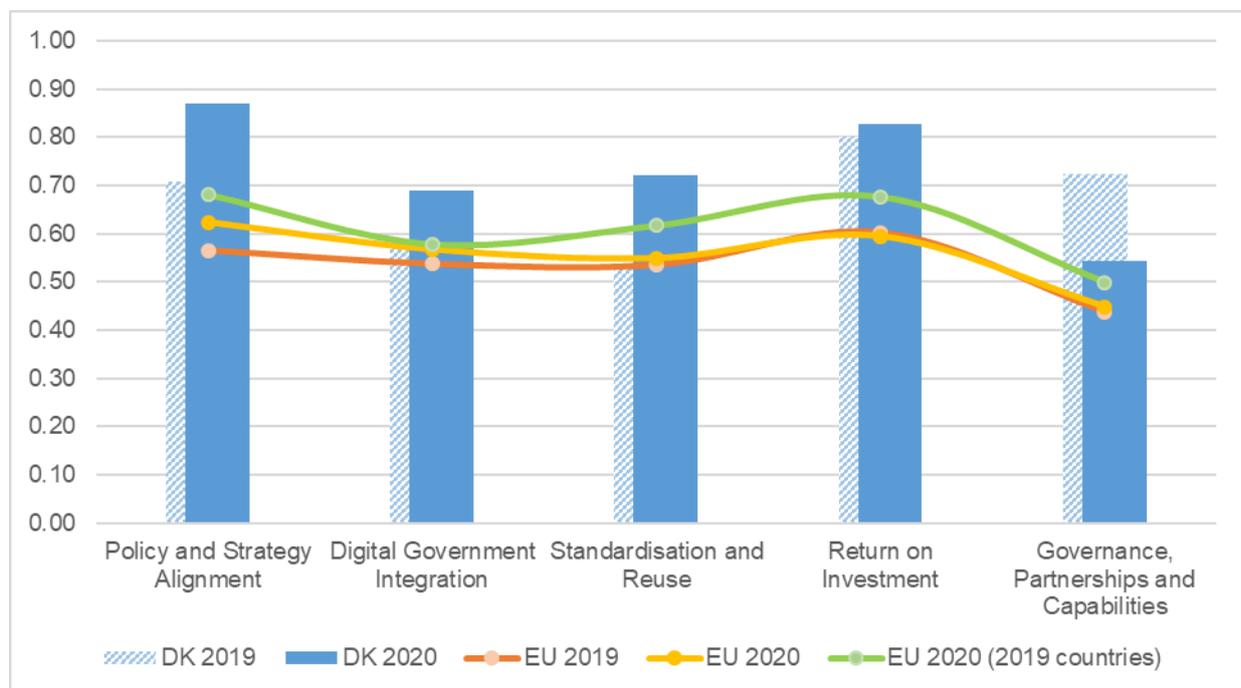


Figure 5 - Comparison between LIFO 2019 and LIFO 2020 – Denmark

All focus areas, except for “Governance, Partnerships and Capabilities” stand out as a point of strength for Denmark, both compared with the entire 2020 set of countries – “EUR 2020” and with the other countries that also participated in 2019 – “EUR 2020 (2019 countries)”. However, as mentioned above, “Policy and Strategy Alignment”, “Digital Government Integration” and “Standardisation and Reuse” are the focus areas that contributed the most to the overall progress of the LIFO index.

In the “Policy and Strategy Alignment” focus area, there has been a significant increase by 0.16 (from 0.71 in 2019 to 0.87 in 2020), far exceeding the growth of the European average that has seen an increase by only 0.05 and above the increase achieved by the average of the countries participating in LIFO 2019 (the green line in [Figure 5](#)) which has been 0.11. This step forward is linked with the reinforcement of [Recommendation 1](#), [Recommendation 3](#), [Recommendation 4](#) and [Recommendation 5](#). As for [Recommendation 1](#), the use in digital government of authoritative location datasets and services, which is now mandated by cross-sector legislation, is one of the contributing factors that helped Denmark in raising its score. As for [Recommendation 3](#), this is due to the fact that all organisations are now fully aware of

and prepared for potential location data privacy issues. Considering [Recommendation 4](#), the improvement in the positioning is given to the fact that the use of location-based evidence and analysis to help developing relevant policies is now done in all relevant policy topics. Concerning [Recommendation 5](#), Denmark made a step forward as now it makes reference to standards-based architecture documents describing where and how the requested components fit.

The “Digital Government Integration” focus area has also seen a significant improvement, with its index increasing by 0.12 (from 0.57 in 2019 to 0.69 in 2020), outgrowing the European average that has seen an increase by only 0.03 for the average of all participating countries and by 0.05 for the sub-set of countries having participated in both years. The factors mostly impacting the positive evolution between 2019 and 2020 relate to [Recommendation 7](#) and [Recommendation 9](#). As for [Recommendation 7](#), the public sector SDI is now used in some cases for delivering cross-border digital public services while concerning [Recommendation 9](#), Denmark increased its score significantly through starting to implement several actions for the integration of location and statistical information in the production of location-based statistics.

The “Standardisation and Reuse” focus area reports the highest index increase (+0.19, from 0.53 in 2019 to 0.72 in 2020), outgrowing the European average that has increased by 0.01 for all participating countries and by 0.08 for the subset of countries having participated in both years. The steps forward in this focus area are linked to the improvements made under [Recommendation 10](#), [Recommendation 12](#) and [Recommendation 13](#). In particular, under [Recommendation 10](#), the very good scores obtained for the two additional indicators on the availability of APIs for high-value datasets have determined an increase of this recommendation’s index. On [Recommendation 12](#), it must be noted that there is a difference in terms of questions proposed in the survey. In 2020, the participants had to answer one more question, in addition to a substantial change in the existing question. Still, the strengths of Denmark’s practices are due to the fact that several types of geospatial domain standards are used, along with the fact that there is a standardised approach for combining spatial and non-spatial metadata. As for [Recommendation 13](#), additional actions in terms of measurement to assure quality of location data, and actions relating to location data quality governance are now implemented.

The “Return on Investment” focus area index has increased by 0.03 (from 0.80 in 2019 to 0.83 in 2020). There have been some improvements under [Recommendation 14](#), as Denmark now implements a slightly more extended approach for impact-based improvement in location-enabled processes and services, and to assess the efficiency and effectiveness of location-based services. Further to this, an additional measure to make the process of searching, finding and accessing location data and web services as easy as possible has been implemented ([Recommendation 16](#)).

Finally, “Governance, Partnerships and Capabilities” is the only focus area that has seen a negative trend, with its index decreasing by -0.18 (from 0.72 in 2019 to 0.54 in 2020). This is however exclusively due to the changes made to some questions and the consequent modifications of the scales of the respective indicators, particularly concerning the governance and the partnerships domains.

3.2. Policy and Strategy Alignment

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

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

3.2.1 2020 Results

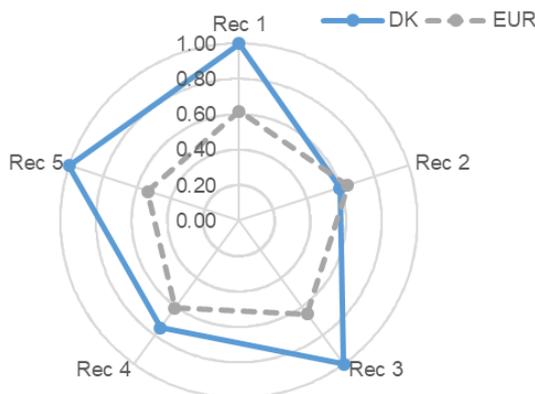


Figure 6 - Policy and Strategy Alignment – scores by recommendation

The scores for each recommendation in the “Policy and Strategy Alignment” focus area are shown in [Figure 6](#) and the underlying indicator scores for each recommendation are shown in [Figure 7](#). In both cases, the country scores are compared with the European averages.

The “Policy and Strategy Alignment” focus area index for Denmark is 0.87, well above the European average of 0.62. This area represents the main strength of Denmark’s location interoperability practices. In particular, the country is positioned consistently above the European averages for [Recommendation 1](#), [Recommendation 3](#) and [Recommendation 5](#).

[Recommendation 1](#) is a solid strength for Denmark, due to the fact that the location strategy is fully embedded in the digital government strategy¹⁸. The use of spatial data both as the enabler and the foundation for an efficient and reliable digital public administration is established by the Basic Data Programme¹⁹, in which several spatial data sets are identified among basic data essential for eGovernment. Some of the Basic Data Programme’s initiatives are documented in the digital government strategy. An example is initiative 2.2, “Better use of data and quicker case processing - Progress with good basic data”, which aims to improve the

¹⁸ See respectively https://digst.dk/media/16165/ds_singlepage_uk_web.pdf (English), https://en.digst.dk/media/14139/grunddata_uk_web_05102012_publication.pdf (English) and <https://digst.dk/media/12811/strategi-2016-2020-enkelt-tilgaengelig.pdf> (Danish)

¹⁹ See <https://en.digst.dk/data-and-it-architecture/basic-data/>

quality of existing basic data. Spatial data is considered a foundation for the realisation of initiative 6.1 of the digital government strategy, namely “An efficient utilities sector - Common data on topography, climate and water”.

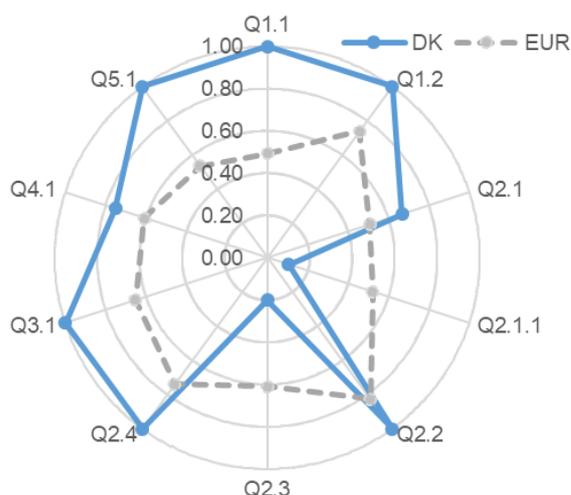


Figure 7 - Policy and Strategy Alignment – scores by indicator

The initiative aims to provide consistently up-to-date data on topography, climate and water across sectors and ultimately to support effective handling of the frequent emergency situations connected with extreme weather events and to promote the development of new products and technologies exploiting that data.

The use in digital government of basic data is mandated by the agreement on “Aftale om gode grunddata til alle – en kilde til vækst og effektivisering²⁰” (Good basic data for all - a source of growth and efficiency).

All controllers and processors of public sector location data are fully prepared for the GDPR, specifically on the awareness of potential location data privacy issues and implementation of processes to comply with the rights of data subjects ([Recommendation 3](#)). The Nordic GDPR Working Group has specifically explored the legal and practical issues of disseminating geospatial data such as addresses, buildings and oblique images, in regard to the GDPR²¹.

Public procurements of location information and services refer to a standards-based architecture framework describing where and how the requested components fit and to the applicable parts of the INSPIRE Directive and other national standards ([Recommendation 5](#)). The architecture framework is unfolded through a number of subset reference architectures that designate and define relevant architectural and solution building blocks. These are²²:

- reference architecture for user management;
- reference architecture for self-service;
- reference architecture for sharing data and documents;
- reference architecture for cross-cutting digital overview.

The use of the European Single Procurement Document (ESPD) further supports the standardisation of information exchange in procurement processes, including location information²³.

As a result of the Basic Data Programme, all core location datasets are available free of charge under an open licence, without restrictions ([Recommendation 2](#)). The Basic Data Programme also includes citizen data, business data, real property data, address data, geographic data, and income data²⁴.

Location data tends to be available through different licensing arrangements from different data providers. For example, the Agency for Data Supply and Efficiency applies the “Vilkår for brug af frie geografiske data (the terms of use of free geospatial data)”²⁵.

²⁰ See <https://digst.dk/media/12881/grunddata-aftaletekst.pdf>

²¹ See <https://norden.lmi.is/wp-content/uploads/2020/03/Report-on-geodata-Nordic-GDPR-working-Group-March-2020.pdf>

²² See <https://arkitektur.digst.dk/rammearkitektur/referencearkitekturer>

²³ See <https://udbudsportalen.dk/>

²⁴ All these datasets are available on <https://datafordeler.dk/>

²⁵ See https://sdfc.dk/media/2916594/vilkaar-for-brug-af-frie-geografiske-data_2016.pdf

The pan-government guidelines on the publication of public sector data specifically cover location aspects. These guidelines are available on “Datafordeler”²⁶ (Data Distributor) and “Fællesoffentlig Digital Arkitektur” (Common Digital Architecture)²⁷. The aspects covered are data modelling, distribution, standardisation and metadata.

Location-based evidence and analysis is used to help in developing relevant policies and monitoring outcomes in most relevant topics ([Recommendation 4](#)), such as:

- climate changes²⁸;
- public easement²⁹;
- data of real estate³⁰;
- data for nature and environment³¹.

3.2.2 2019/2020 Comparison

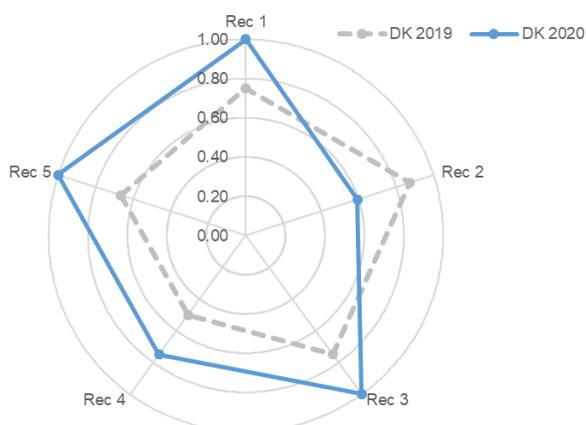


Figure 8 - Policy and Strategy Alignment – 2019/2020 comparison

As per [Figure 8](#), compared to the previous year, the improvement in this focus area is in all recommendations, with the exception of [Recommendation 2](#).

Under [Recommendation 1](#), the score has increased in 2020 because the use in digital government of authoritative location datasets and services is now mandated by cross-sector legislation. This compares to 2019 when no relevant legislation was reported.

Concerning [Recommendation 3](#), in 2020 all public organisations are now reported as fully aware of and prepared for potential

location data privacy issues and necessary processes. This has seen an improvement compared to the previous year, when not all organisations were reported as fully prepared.

For [Recommendation 4](#), the improvement is due to the fact that in 2020 the use of location-based evidence and analysis to help developing relevant policies has been done in all relevant policy topics, while in 2019 this was limited only to some of them.

Concerning [Recommendation 5](#) on the public sector procurements of location information and services, the step forward consists in the reference in public procurements to standards-based architecture documents describing where and how the requested components fit. This compares to 2019 when the country made specific reference to relevant standards but did not at the time report the reference to a standards-based architecture.

Under [Recommendation 2](#), the score decreased because in 2019 many location datasets were available under the same licensing conditions but not as part of a national licensing framework, while in 2020 it has been reported that location data tends to be available through different licensing arrangements from different data providers.

²⁶ See <https://datafordeler.dk/>

²⁷ See <https://arkitektur.digst.dk/>

²⁸ See <https://www.klimatilpasning.dk/> and <https://kamp.test.miljoportal.dk/>

²⁹ See <https://kort.matrikel.dk/spatialmap>

³⁰ See <https://www.ois.dk/>

³¹ See <https://miljoportal.dk/om-danmarks-miljoportal/>

3.3. Digital Government Integration

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

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

3.3.1 2020 Results

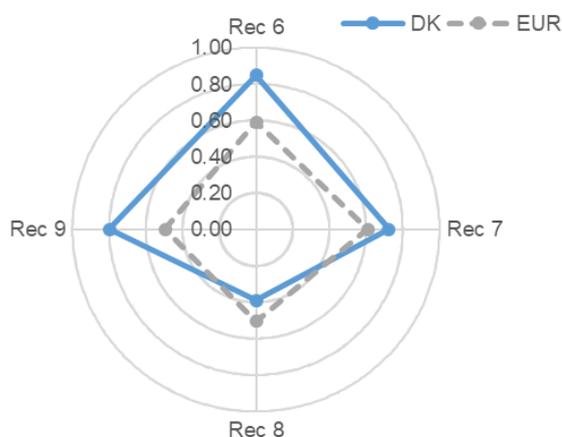


Figure 9 - Digital Government Integration - scores by recommendation

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

The “Digital Government Integration” focus area index for Denmark is 0.69, well above the European average of 0.57. The reasons for this positive deviation can be attributed to the use made of location data for optimising digital services and to the actions implemented for the integration of location and statistical information in the production

of location-based statistics.

The optimisation of key digital public services in their use of location information is pursued through a rigorous approach to both service improvement and take-up of opportunities for new business or delivery models ([Recommendation 6](#)).

Key digital public services in various sectors (business, civil registry, energy, environment, health, property and land administration) use location information as an important feature in performing the service. For example:

- in the energy sector, energinet³² provides on a map information on historical and current flows of energy (electricity and gas) to and from Denmark and neighbouring countries;
- for property and land administration, the Digital Land Registry³³ offers a central point for registration, verification and publication of rights over land; the Land Register³⁴ offers the possibility to dynamically retrieve cadastral information through a map that can be navigated using a number of parameters.

The public sector SDI is used extensively by the private sector (e.g. insurance and banks) and other organisations (e.g. NGOs) for the delivery of new and innovative applications, products and services ([Recommendation 7](#)). Some examples are:

- Septima³⁵, a firm that offers consulting, system development, services and products relying on the optimal utilisation of geodata. The organisation aims to help companies, public authorities and private organisations get the most out of free data;

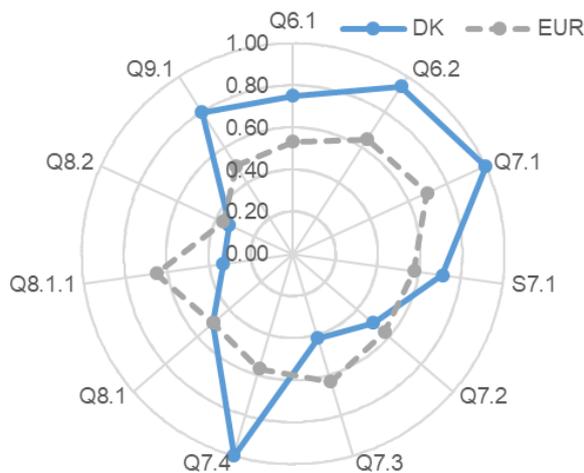


Figure 10 - Digital Government Integration - scores by indicator

- Scalgo³⁶, a provider of digital tools which has developed a sensor and mapping technology giving the opportunity to create high-resolution 3-dimensional maps of the surface of the Earth. Its mission is to develop innovative digital tools and custom analysis based on cutting edge algorithm technology.
- DinGeo³⁷, a solution that collects geodata and presents it in an easy and clear format. DinGeo retrieves geodata from inaccessible archives intended exclusively for data experts and releases them to citizens. With DinGeo, house owners can learn more about their own home and local area. The overall goal of the solution is the “democratisation of geodata and geoinformation”;

- Boliga³⁸, a platform that harvests more than 465 data sources to offer more opportunities for buying and selling properties.

The public sector SDI is also extensively used for delivering digital public services across government (for example borger.dk³⁹, a common public sector portal providing a single point of access to digital self-service solutions and information about public authorities and services) and cross-border digital public services (e.g. Energynet⁴⁰, an independent public enterprise owned by the Danish Ministry of Climate, Energy and Utilities that owns, operates and develops the transmission systems for electricity and natural gas in Denmark and neighbouring countries). Both for domestic and cross-border services, the datasets used are only rarely conformant with the INSPIRE Directive.

³² See https://energinet.dk/energisystem_fullscreen

³³ <https://www.tinglysning.dk/tinglysning/landingpage/landingpage.xhtml>

³⁴ <https://kort.matrikel.dk/spatialmap>

³⁵ See <http://septima.dk/>

³⁶ See <https://scalgo.com/en-US/>

³⁷ <https://www.dingeo.dk/>

³⁸ See <https://www.boliga.dk/>

³⁹ See <https://www.borger.dk/>

⁴⁰ See https://energinet.dk/energisystem_fullscreen

Sector-specific SDIs are used in the disaster management and civil protection⁴¹, environment⁴², marine⁴³, as well as property and land administration⁴⁴ sectors. In the energy⁴⁵ and agriculture⁴⁶ sectors, application-specific spatial data are mostly used.

The country shows an advanced implementation status of the INSPIRE Directive (the corresponding indicator, based on the INSPIRE country fiche, scores above the European average).

The country implements a wide range of actions for the integration of location and statistical information in the production of location-based statistics⁴⁷ ([Recommendation 9](#)), namely:

- 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 are 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 geostatistical analysis;
- relevant private sector data are included in the statistical information infrastructure;
- the location intelligence infrastructure is continuously upgraded to meet growing and evolving needs based on a regular quality assessment of whether the infrastructure is fit for purpose;
- contribution to European projects aiming at establishing a data and production infrastructure for location-based statistics (e.g. GEOSTAT).

Examples of solutions integrating statistics with the spatial dimension are:

- Geographical Grid System⁴⁸: a system that virtually divides the country into thousands of cells, which can be filled with relevant statistical data; users can analyse and aggregate the information that is linked to specific cells;
- Datafolder⁴⁹: Denmark's Administrative Geographical Division (DAGI) is a standardised reference dataset that shows the country's administrative divisions; the DAGI dataset doesn't include pre-set map themes, but can be used together with other data to create maps in other products or services;
- Municipal maps⁵⁰: maps that provide an overview of municipal statistics offering the opportunity to compare municipalities and their efforts on a number of selected topics such as unemployment, childcare and income.

Finally, the country adopts an open and collaborative methodology, through consultations, user groups, feedback requests and iterative development which is applied in several cases to design and improve location-enabled digital public services in specific initiatives, at a national level but not at a local or sub-national level ([Recommendation 8](#)). Public authorities involve external parties in the delivery of location-based digital public services by:

⁴¹ See <https://kamp.test.miljoportal.dk/> and <https://www.112app.dk/> and <https://data.virk.dk/aabne-data/inspiration/cases/intelligent-skybrudsalarm>

⁴² See <https://www.miljoportal.dk/> and <https://arealinformation.miljoportal.dk/>

⁴³ See <http://kort.msdi.dk/spatialmap>

⁴⁴ See <https://www.tinglysning.dk/tinglysning/landingpage/landingpage.xhtml> and <https://webmatriklen.gst.dk/>

⁴⁵ See <https://energinet.dk/>

⁴⁶ See <https://tastselv.fvm.dk/Pages/Entrance/Entrance.aspx>

⁴⁷ For further information go to the Danish "[Bank of Statistics](#)" where more statistics products are released as open data and where spatial data is a parameter in many of the inventories / visualizations.

⁴⁸ See <https://www.dst.dk/da/TilSalg/produkter/geodata/kvadratnet>

⁴⁹ See <https://sdfe.dk/hent-data/danmarks-administrative-geografiske-inddeling>

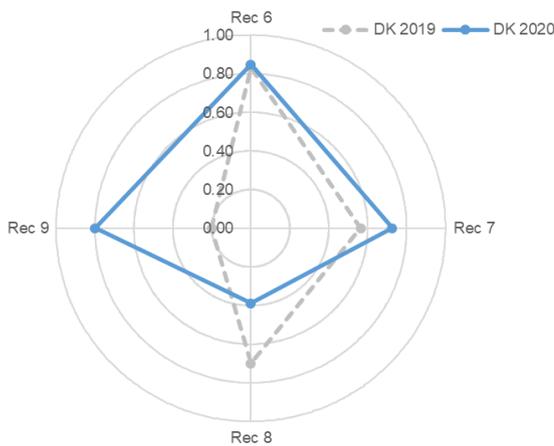
⁵⁰ See <https://www.dst.dk/da/Statistik/kommunekort>

- making the data openly available for external parties to develop their own products and services;
- using location data from external parties (e.g. businesses, citizens, NGOs) in their digital public services.

On the other hand, public-private partnerships and civic hacking are not widely adopted as collaboration models.

3.3.2 2019/2020 Comparison

Compared to the previous year, as shown in [Figure 11](#), the improvements of the index for this focus area are mainly linked to the higher score obtained under [Recommendation 9](#) and, to a lesser extent, under [Recommendation 7](#).



[Figure 11 - Digital Government Integration - 2019/2020 comparison](#)

On [Recommendation 9](#), Denmark significantly increased its score thanks to the much wider span of actions taken for the integration of location and statistical information in the production of location-based statistics compared to 2019.

As for [Recommendation 7](#), the main clear progress reported is that the public sector SDI is now used in some cases for delivering cross-border digital public services, while such use was not reported in 2019.

Under [Recommendation 6](#), Denmark confirmed its positioning compared to

2019, where the use of location data in digital public services is almost always optimised in an innovative way.

Finally, on [Recommendation 8](#), the score has decreased noticeably due to the joint 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 change in the indicators.

3.4. Standardisation and Reuse

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

Table 4 - Focus Area “Standardisation and Reuse” - vision and recommendations

3.4.1 2020 Results

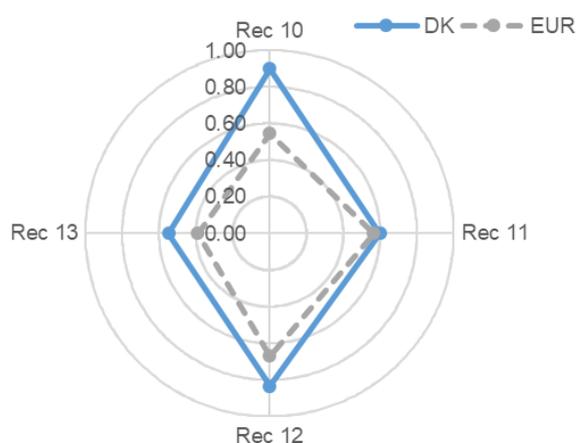


Figure 12 - Standardisation and Reuse – scores by recommendation

The scores for each recommendation in the “Standardisation and Reuse” focus area are shown in [Figure 12](#) and the underlying indicator scores for each recommendation are shown in [Figure 13](#). In both cases, the country scores are compared with the European averages.

The “Standardisation and Reuse” focus area index for Denmark is 0.72, well above the European average of 0.55. This improvement comes from a combination of the adoption of a common architectural approach, the use of location data and emerging technologies in digital public services, as well as the approaches

undertaken to improve data quality governance and ensure better data quality.

An approach based on the EIF principles is widely adopted in the design and development of location-based digital public services, fitting within a broader national ICT architecture approach, for the design, re-engineering, interconnectivity and reuse of ICT and data in digital public services ([Recommendation 10](#)).

Moreover, the approach to discover, explore and incorporate new technological features or emerging technologies is well organised. APIs are available for all high value public sector datasets including location datasets as part of a national strategy. The steps taken to stimulate take-up and ensure that APIs are as useful as possible are:

- APIs are based on recognised standards (e.g. OGC API - Features, OGC SensorThings API);
- APIs are documented in open specifications (e.g. through OpenAPI specifications);
- API design best practices are used (e.g. REST APIs);
- APIs are discoverable in both public sector catalogues/portals and external catalogues (alongside non-public sector APIs);
- APIs have published service level agreements which support required use (e.g. availability, data quality, timeliness, and response times).

Most high value location data sets can be accessed using APIs, namely: addresses, administrative units, air quality, buildings, cadastral parcels, elevation, geographical names, health statistics (illness and cause of death), hydrography, land cover, land use, population distribution and demography, protected sites, statistical units, transport networks, transport timetables, water quality and weather observations.

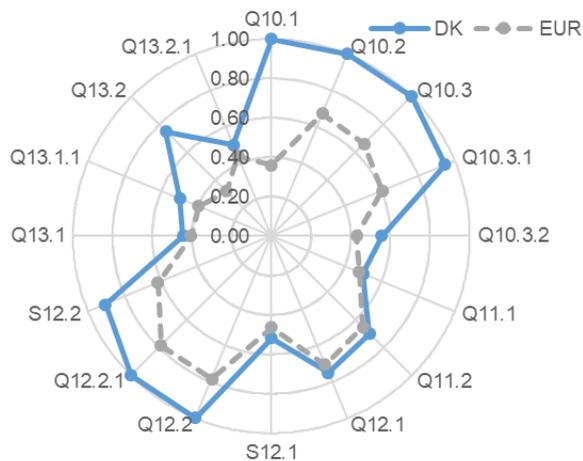


Figure 13 - Standardisation and Reuse – scores by indicator

APIs are available for:

- Danish core data⁵¹;
- Statistical data⁵²;
- The Danish Meteorological Institute's (DMI) Open Data⁵³;
- Addresses, through the Denmark Addressers Web API (DAWA)⁵⁴.

Generic ICT solutions from national or international catalogues are reused in the SDI ([Recommendation 11](#)). An example is the “joint public dataset catalogue⁵⁵” which provides an overview of which public data sets are available and where they are located. The dataset catalogue contains only metadata, i.e. a description of the

dataset, and does not contain raw data.

Denmark has implemented various registers⁵⁶ of location information, i.e.:

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

A significant number of spatial data sets are in conformity with Regulation (EU) No. 1089-2010; the country also boasts one of the highest rates of network services conformity to Regulation (EC) No. 976-2009 ([Recommendation 12](#)).

⁵¹ See <https://datafordeler.dk/dataoversigt/>

⁵² See <https://api.statbank.dk/>

⁵³ See <https://dmigw.govcloud.dk/v2/oceanObs/swagger-ui/index.html?configUrl=v2/oceanObs/api/swagger-config> and <https://dmigw.govcloud.dk/v2/lightningdata/swagger-ui/index.html?configUrl=v2/lightningdata/api/swagger-config>

⁵⁴ See <https://dawa.aws.dk/dok/api/generelt>

⁵⁵ See <https://datasets.catalogue.data.gov.dk/>

⁵⁶ See <https://datafordeler.dk/dataoversigt>

The following geospatial domain standards are used:

- International Standards (like ISOTC211, OGC, IHO, GDF);
- Adaptations of International Standards (e.g. INSPIRE);
- Stand-alone domestic standards.

Examples of these standards are:

- DS / ISO 19103: 2015, Geographical information - Conceptual modelling language;
- DS / EN ISO 19107: 2019, Geographical information - Geometry model;
- DS / ISO 19111: 2019, Geographical information - Spatial orientation via coordinates;
- DS / EN ISO 19112: 2019, Geographical information - Orientation via geographical identifiers.
- DS / EN ISO 19161-1: 2020, Geographical information - Geodetic references - Part 1: ITRS (international terrestrial reference system);
- DS / EN ISO 19115: 2005 Geographical information - Metadata;
- DS / EN ISO 19119: 2006 Geographical information - Services;
- DS / ISO / TS 19139: 2007 Geographic information - Metadata - Implementation of XML schema;
- DS / EN ISO 19157: 2014 Geographical information - Data quality;
- OGC 06-103r4, OpenGIS Implementation Standard for Geographic Information Simple feature access - Part 1: Common architecture;
- OGC 06-104r4, OpenGIS Implementation Standard for Geographic Information Simple feature access - Part 2: SQL option;
- OGC 10-129r1, OGC® Geography Markup Language (GML) — Extended schemas and encoding rules;
- ISO/IEC 13249-3:2016, Information technology — Database languages - SQL multimedia and application packages — Part 3: Spatial;
- OGC 18-010r7, Geographic information — Well-known text representation of coordinate reference systems;
- OGC 07-036r1, OpenGIS® Geography Markup Language (GML) Encoding Standard;
- OGC 12-128r15, OGC® GeoPackage Encoding Standard - with Corrigendum;
- OGC 18-139r3, PDF Georegistration Encoding Best Practice;
- OGC 09-025r2, OGC® Web Feature Service 2.0 Interface Standard – With Corrigendum;
- OGC 06-042, OpenGIS® Web Map Server Implementation Specification;
- OGC 07-057r7, OpenGIS® Web Map Tile Service Implementation Standard;
- OGC 07-006r1, OpenGIS® Catalogue Services Specification;
- OGC API - Features - Part 1: Core;
- Technical Guidance for the implementation of INSPIRE dataset and service metadata based on ISO/TS 19139:2007;
- Technical Guidance for the implementation of INSPIRE Download Services;
- Technical Guidance for the implementation of INSPIRE View Services;
- Technical Guidance for the implementation of INSPIRE Data Specifications;
- GeoDanmark Specification (Base map).

Denmark also adopts a standardised approach for combining spatial and non-spatial metadata, through the adaptations and/or extensions of national and international specifications and tools such as:

- Geodata Info⁵⁷, the Danish geoportal that allows professional users and citizens with an interest in geodata to search for geodata sets and services; it includes the Danish search service in accordance with the INSPIRE Directive;
- Joint public dataset catalogue⁵⁸, which provides an overview of which public data sets are available and where they are located (it only contains metadata);
- The Open Data DK⁵⁹ portal, created through the collaboration of an association of Danish municipalities since 2016.

The country adopts a number of actions to assure data quality ([Recommendation 13](#)). In terms of design, the different dimensions of data quality are included in the standards adopted, such as timeliness, accuracy, completeness, integrity, consistency, compliance to specifications / standards/legislation; no specific framework is used for the analysis of data quality, nor are data quality standards linked to data standards. In terms of measurement, the actions implemented consist in the measurement of conformance of data to quality parameters set out in the data policy on an agreed frequency, the ex-post evaluation of existing data quality issues and the assessment of the business value of the current data quality level.

The data quality standards applied to location data are:

- SO 19157 - Geographic information - Data quality;
- W3C Data Quality Vocabulary (DQV).

The actions implemented for location data quality governance are:

- definition of data quality responsibilities;
- existence of a cross-unit or cross-organisation special interest group for data quality;
- definition of a data quality review process⁶⁰;
- creation of a regular data quality bulletin to enhance the improvement⁶¹;
- use of artificial intelligence (AI) and machine learning techniques to make suggestions for improving data quality⁶²;
- collection of feedback from users to report problems and help improve data quality.

For example, the Specification Forum⁶³ continuously updates and edits data specifications, supporting the use of GeoDenmark data as administrative basis across the public and private sectors in Denmark. An example where users are involved for improving data quality is the Danish Place Names Reporting Portal⁶⁴. The portal contains all place names of interest for public and private sector organisations. Danish Place Names contain both names that can be seen on a map and names that are only used when searching (e.g. by route calculation). If users know a place name that cannot be found on the spatial map of the Agency for Data Supply and Efficiency⁶⁵, they can report it on the Danish Place Names reporting portal. Moreover, they can also report information about place names that are incorrect or deleted.

⁵⁷ See <https://www.geodata-info.dk/srv/dan/catalog.search#/home>

⁵⁸ See <https://datasets.catalogue.data.gov.dk/>

⁵⁹ See <https://www.opendata.dk/search>

⁶⁰ Initiative 2.2 of the the digital government strategy: "Better use of data and quicker case processing - Progress with good basic data" which aims to improve the quality of existing basic data

⁶¹ A [common public framework](#) for the evaluation and communication of data quality has been developed. Moreover, the Agency for Data Supply and Efficiency is working on a geospatial specific framework for the evaluation and declaration of data quality.

⁶² The Agency for Data Supply and Efficiency has carried out pilot projects to identify opportunities for faster update frequency and improved data quality through the use of AI. Moreover, there has been a hackathon involving SDFE and the Danish Business Agency to investigate the potential of AI, namely [Hackathon 2021 | Kortomatic ApS](#)

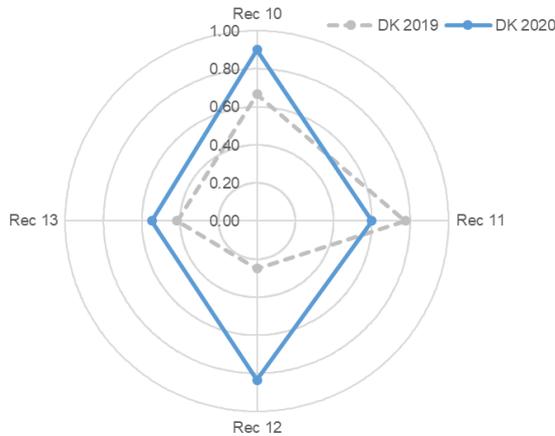
⁶³ See <https://www.geodanmark.dk/om-geodanmark/organisation/spec-forum/>

⁶⁴ See <https://indberetning.sdfe.dk/stednavn/>

⁶⁵ <https://sdfekort.dk/spatialmap>

For collecting feedback, the approach taken includes a collaborative platform that enables stakeholders to provide feedback and collaborate to improve the SDI, a community/discussion forum, and traffic and the analysis of usage statistics used to improve the SDI.

3.4.2 2019/2020 Comparison



[Figure 14 - Standardisation and Reuse – 2019/2020 comparison](#)

Compared to the previous year, as shown in [Figure 14](#), the country has improved its score in all recommendations except for [Recommendation 11](#).

The significant improvement under [Recommendation 12](#) is mostly due to the two new indicators on joint discoverability of spatial and non-spatial data where, in both cases, Denmark obtained the maximum score. It must also be reported that the percentage of datasets compliant with Regulation (EU) No 1089/2010 and the percentage of network services compliant with Regulation (EC) No 976/2009 have increased significantly (respectively from

0.10 to 0.52 and from 0.65 to 0.91).

Under [Recommendation 13](#), a wider range of actions to assure location data quality and apply more effective data quality governance, were implemented in 2020, compared with 2019.

On [Recommendation 10](#), Denmark confirmed its positioning with regard to the common architectural approach for location data and services in the SDI, on the approach to discover, explore and incorporate emerging technologies, and on the development of APIs for INSPIRE / SDI datasets, which have remained the same since 2019. However, the very good scores obtained for the two additional indicators on the availability of APIs for high-value datasets have determined an increase of this recommendation's index.

The result for [Recommendation 11](#) must be seen in the light of the changes to the indicators under this recommendation. However, it has also been reported that there is one less location information register available compared to 2019 (a roadmap for the actual entry in production of the code list registry will be defined only once a proof of concept and a minimum viable product of the EU Re3gistry are implemented by the end of 2021).

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>
Recommendation 14	Apply a consistent and systematic approach to monitoring the performance of location-based services
Recommendation 15	Communicate the benefits of integrating and using location information in digital public services
Recommendation 16	Facilitate the use of public administrations' location data by non-governmental actors to stimulate innovation in products and services and enable job creation and growth

Table 5 - Focus Area “Return on Investment” - vision and recommendations

3.5.1 2020 Results

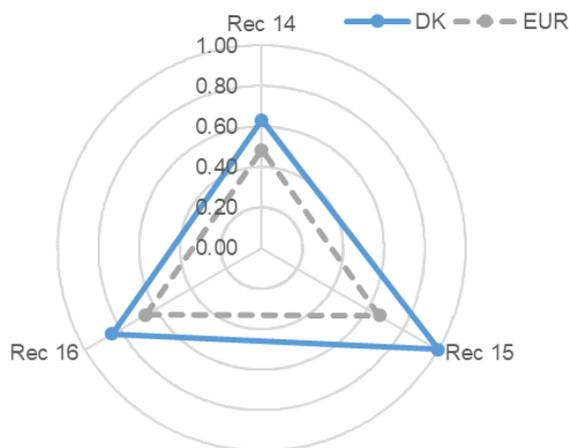


Figure 15 - Return on Investment – scores by recommendation

The scores for each recommendation in the “Return on Investment” focus area are shown in [Figure 15](#) and the underlying indicator scores for each recommendation are shown in [Figure 16](#). In both cases, the country scores are compared with the European averages.

The “Return on Investment” focus area index for Denmark is 0.83, consistently well above the European average of 0.58, with higher scores for all recommendations.

[Recommendation 15](#) reaches the best results in this focus area. The communication of availability and benefits of location data and location-enabled

digital public services to raise awareness and understanding of such benefits is performed regularly throughout and in a convincing way using, for example, factsheets, news articles, web-based communication, videos, and events. Twitter⁶⁶ and LinkedIn⁶⁷ are also employed to strengthen the communication.

The assessment of the efficiency and effectiveness of location-based services is done at project, organisation and national levels under several dimensions ([Recommendation 14](#)), namely:

- return on investment;

⁶⁶ See <https://twitter.com/Kortforsyningen?s=20> and https://twitter.com/DK_DHM?s=20

⁶⁷ See @SDFE on LinkedIn

- total cost of ownership;
- reduction in administrative burden;
- simplification of administrative processes;
- enhanced business opportunities;
- user satisfaction;
- user-centricity.

Documented benefits of address data, measured over a series of dimensions, have been reported, for example, concerning the use of Danmarks Adressers Web API (DAWA)⁶⁸.

The actions implemented for impact-based improvement in location-enabled processes and services include the identification and monitoring of the benefits of location information (carried out by the BA and BI units of the SDFE and via user tests) and the regular monitoring of “upstream” (i.e. production and dissemination) and “downstream” (i.e. use) aspects of location data and services. For this latter purpose, Control group design⁶⁹, a statistical tool that identifies the causal relationship between geodata, makes it possible to compare the actual development of users’ data with the counterfactual situation where they did not use geodata.

The process of searching, finding and accessing location data and web services for companies, research institutions, citizens and other interested parties is facilitated through several means ([Recommendation 16](#)), namely:

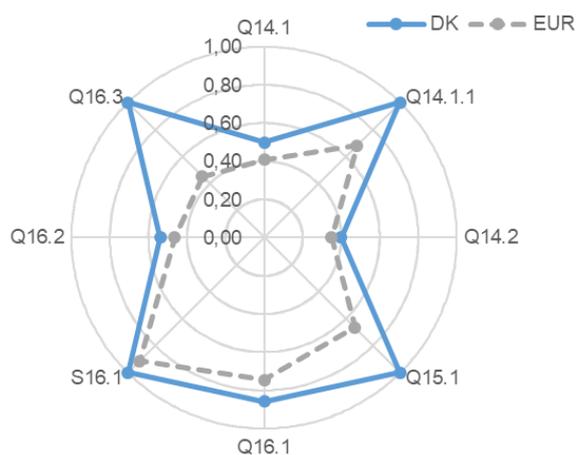


Figure 16 - Return on Investment – scores by indicator

- a national data portal (such as Open Data portal) merging location data and non-location data. An example is provided by the “Open Data DK⁷⁰”;
- a national discovery (geo)portal integrating INSPIRE and non-INSPIRE data, the “Joint public dataset catalogue⁷¹”;
- the geoportal being harvested by the European Data Portal. is provided by Geodata-info.dk⁷²;
- thematic portals complementing general search facilities with “specialist” search. An example is provided by the Miljøportal⁷³;

- Websites with exposition of data⁷⁴;
- Availability of spatial data sets on web search engines⁷⁵.

Moreover, a wide range of actions are implemented to actively support private, non-profit and academic actors in the development of new products, services or research using public sector location data. Such actions include:

- an open data policy;
- 'Innovation labs' or 'Innovation hubs';
- inclusion of non-government actors in the governance framework for public sector data;

⁶⁸ See best practice [DK7DK7](#)

⁶⁹ See best practice [DK8DK8](#)

⁷⁰ See <https://www.opendata.dk/>

⁷¹ See <https://datasets.catalogue.data.gov.dk/>

⁷² See <https://www.geodata-info.dk/srv/dan/catalog.search#/home>

⁷³ See <https://www.miljoportal.dk/>

⁷⁴ See <https://dataforsyningen.dk/data>

⁷⁵ Ibidem

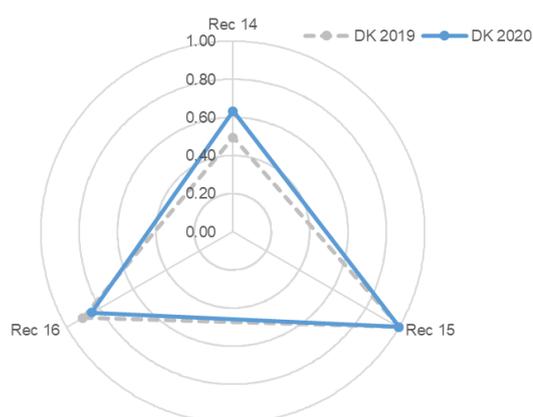
- establishment of digital platforms through which a community of data providers, consumers and partners is actively engaged in the sharing, enhancing and using of location data and value is created for all partners in the ecosystem;
- collecting best practice examples of how private companies, citizens, academic institutions and other users make use of INSPIRE/SDI data and services;
- training in necessary skills to exploit the SDI.

Examples of initiatives that have been implemented are:

- SDFE Labs⁷⁶, where location-enabled prototype solutions are developed based on specific user needs;
- Geoforum⁷⁷: an interest-based professional forum for anyone who deals professionally with the range of uses of geographic information and data;
- Brugstedet⁷⁸: a portal with a focus on the use of geographical information.

The country has policies supporting the reuse of Public Sector Information within the public administration by the private sector and has a strategic approach to funding location reference data which is represented by the agreement “Aftale om gode grunddata til alle – en kilde til vækst og effektivisering⁷⁹” (Good basic data for all - a source of growth and efficiency).

3.5.2 2019/2020 Comparison



[Figure 17 - Return on Investment - 2019/2020 comparison](#)

Denmark is positioned quite similarly in 2020 as in 2019 for all the recommendations under this focus area, as shown in [Figure 17](#). The differences over the two years are relatively limited and consist in some higher results under [Recommendation 14](#) and in a slight decrease for [Recommendation 16](#).

More specifically, under [Recommendation 14](#) Denmark now implements a wider range of actions for impact-based improvement in location-enabled processes and services. Furthermore, additional elements have been taken into consideration to assess the efficiency and effectiveness of location-

based services compared with 2019.

On [Recommendation 15](#), the score has remained unchanged, as the communication of availability and benefits of location data and location-enabled digital public services, to raise awareness and understanding of such benefits is still performed regularly, thoroughly and in a convincing way.

The reason behind the slight decrease in the index score for [Recommendation 16](#) is the reduced set of actions reported to actively support private, non-profit and academic actors in the development of new products, services or research using public sector location data. The overall score has also been impacted by changes to one of the indicators under this recommendation.

⁷⁶ See <https://dataforsyningen.dk/labs>

⁷⁷ See <https://geoforum.dk/kurser-og-arrangementer/>

⁷⁸ See <https://brugstedet.dk/>

⁷⁹ See <https://digst.dk/media/12881/grunddata-aftaletekst.pdf>

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

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

3.6.1 2020 Results

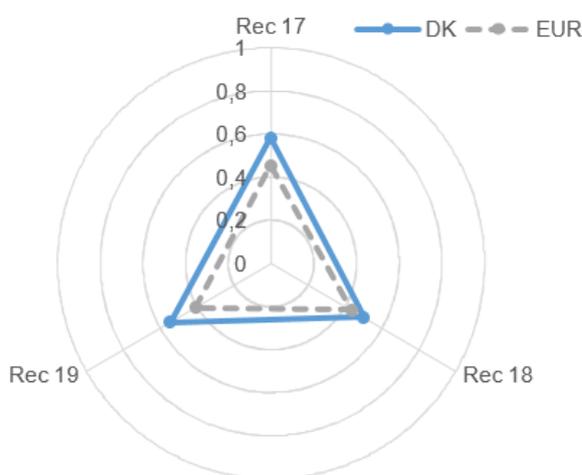


Figure 18 - Governance, Partnerships and Capabilities—scores by recommendation

The scores for each recommendation in the "Governance, Partnerships and Capabilities" focus area are shown in [Figure 18](#) and the underlying indicator scores for each recommendation are shown in [Figure 19](#). In both cases, the country scores are compared with the European averages.

The "Governance, Partnerships and Capabilities" focus area index for Denmark is 0.54. While this is the focus area where Denmark obtains the lowest score, it is still well above the European average of 0.45. In the Danish case, the positioning is the combined result of good practices under all three dimensions of governance, partnerships and capacity building.

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

A key component in this governance is the Coordination Committee⁸⁰, which is a cross-cutting committee working for the further development of the geodata infrastructure in Denmark.

⁸⁰ See <https://sdfe.dk/saadan-arbejder-vi-med-data/danske-samarbejder/samordningsudvalget/>

In this context, the Agency for Data Supply and Efficiency, the Danish Digitization Agency, Local Government Denmark and the Danish Business Authority are responsible for leading and coordinating the actions and policies related to the role of the SDI in Digital Government, with cross-fertilisation of membership on governance bodies.

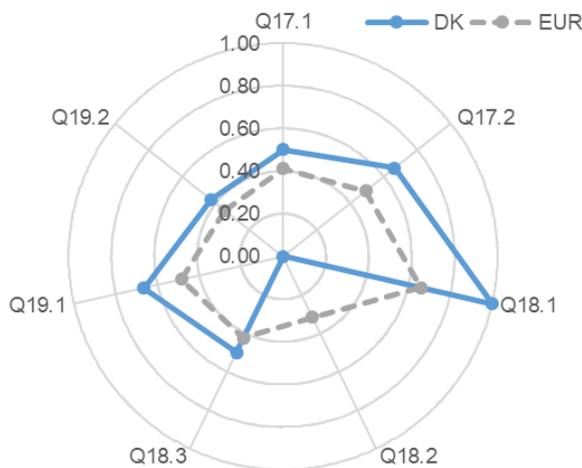


Figure 19 - Governance, Partnerships and Capabilities – scores by indicator

For [Recommendation 18](#), Denmark’s high score is due to the fact that there are many formal agreements between public authorities in the country to finance, build and operate a large number of location data services or digital public services using location data. Examples are represented by the white papers “Statistiske metoder til vurdering af grunde under ejerboliger⁸¹” (“Statistical methods for assessing land under owner-occupied dwellings”, which provides a series of statistical methods for the taxation on property based on spatial data) and “Fælles data om terræn, klima og vand⁸²” (“Common data on terrain, climate and water”, which proposes an initiative aimed at making nationwide and up-to-date data easily accessible via a common public

geographical infrastructure that can support a coherent efficient supply of land, climate and water data).

There are some examples of public-private partnerships aimed at funding digital public services using location data. These include GeoDanmark⁸³ and Kortforsyningen⁸⁴. The former is a collaboration framework between the Danish Agency for Data Supply and Efficiency (SDFE) and 98 municipalities to maintain a current and accurate mapping of the country on a joint standardised basis. The latter is the SDFE’s data distribution channel, which provides easy access to national, current and up-to-date data linked to energy, utilities and climate.

Finally, with regard to [Recommendation 19](#), Denmark’s strengths are linked to the fact that training and awareness raising on geospatial skills is undertaken by some organisations as part of a recognised geospatial competency framework. In particular, the initiatives organised to raise awareness and develop geospatial skills are:

- a public sector location information/GI champion;
- location information/GI champions in individual organisations where location information plays a significant role;
- spatial literacy awareness raising for non-specialists, e.g. policy makers, legal advisers, project managers;
- training for specialists, e.g. developers, data analysts;
- spatial literacy/GI elements in Digital Innovation Hubs;
- special interest group for knowledge sharing within the geospatial community.

⁸¹ See <https://www.skm.dk/media/6879/metoder-til-vurdering-af-grunde-20181214.pdf>

⁸² See <https://sdfe.dk/media/2919970/61-faelles-data-om-terraen-klima-og-vand-aftalepapir.pdf>

⁸³ See <https://www.geodanmark.dk/>

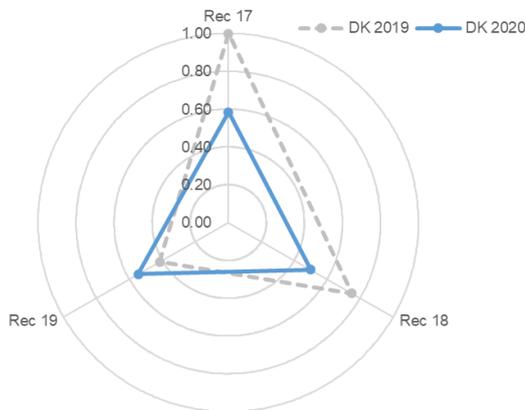
⁸⁴ See <https://kortforsyningen.dk/>

In this context, the Geoforum⁸⁵ (mentioned under [Recommendation 16](#)) can be considered as a best practice as it is an interest-based professional forum for anyone who deals professionally with the range of uses of geographic information and data.

Geoforum works to strengthen the exchange among members of new professional knowledge and to disseminate knowledge about geodata, their value and their use. The activities consist of member meetings, seminars and courses.

3.6.2 2019/2020 Comparison

Compared to the previous year, Denmark improved its score under [Recommendation 19](#), as shown in [Figure 20](#). The results in this focus area, however, have to be considered in light of the changes made to some indicators, particularly concerning the governance and capabilities domains.



[Figure 20 - Governance, Partnerships and Capabilities – 2019/2020 comparison](#)

The improvement under [Recommendation 19](#) is due to the fact that in 2020 training and awareness raising on geospatial skills is undertaken by some organisations as part of a recognised geospatial competency framework. This compares to 2019, when only some training and awareness raising activities were implemented.

Under [Recommendation 17](#), the score has decreased mostly due to the change of the indicators used. In 2019, the indicators measured the number of different ways stakeholders were involved in the governance of the SDI, which were quite diverse in Denmark's case. In 2020, the indicators have instead focused on the degree of involvement of stakeholders which, on the contrary, have shown margins for improvement.

With regards to [Recommendation 18](#), the lowering of the index score is due to the modifications of the scales of the respective indicators.

With regards to [Recommendation 18](#), the lowering of the index score is due to the modifications of the scales of the respective indicators.

⁸⁵ See <https://geoforum.dk/kurser-og-arrangementer/>

4. Best Practices

Best Practice DK1	Rubber Boot Index
Policy domain: Emergency management	
Process owners: Danish Agency for Data Supply and Efficiency	
<p>Short description: With the Rubber Boot Index, emergency preparedness can now use far more detailed data to predict the consequences of increased water levels. It enables better planning and handling of critical situations, thus minimising the risk of damage. For example, emergency services need to know whether to allocate pumps and barriers to affected areas and how to travel to these areas. The Rubber Boot Index specifies water depth in 10 cm intervals, illustrated by six colour codes, to quickly see where water levels are very deep and where the ways of access are. The first release of Rubber Boot Index was developed in 2012 in collaboration with the Danish Emergency Management Agency and further developed in 2017 with links to other geodata when a new edition of the Climate Adaptation Tool “Seawater on Land” came out in 2017, on which the Rubber Boot Index was based.</p> <p>The new release of the Index provides a more accurate tool to support better informed contingency measures. It consists of free geographical data from “Seawater on land” combined with data on the height of the Danish road network. This means that through the Rubber Boot Index it is also possible to see where flooding affects roads, which can be extremely useful in planning evacuations in an affected area.</p> <p>The tool is offered in two versions: as a web service that can be included in other professional solutions, or as part of SDFE's Map Viewer, which is aimed at citizens who can, for example, visualise the consequences of a given storm surge in their local area.</p>	
Recommendations: Policy and Strategy Alignment (4) ; Digital Government Integration (6)	
Link: https://sdfekort.dk/spatialmap	

Best Practice DK2	Public-private partnership for the development and release of the Hydrological elevation model
Policy domain: Flood management	
Process owners: Danish Nature Agency (board of the Ministry of the Environment and Food)	
<p>Short description: The hydrological elevation model, made available free of charge by the Danish Nature Agency, can be used to calculate where the water flows in the event of a cloudburst and storm surge. Among other things, the model will help municipalities with climate adaptation plans. The development and release of the model is an example of successful partnership between the public and private sector. Forsikring & Pension, the association of Danish insurance companies and pension funds, has contributed DKK 1 million to develop the model, in view of the common interest in helping to limit water damage, thus preventing too high insurance premiums for insurance clients and too high compensations for the insurance companies.</p>	
Recommendations: Digital Government Integration (6, 8)	
Link: https://naturstyrelsen.dk/nyheder/2013/sep/danmarkshoejdemodel/	

Best Practice DK3 Geodata use case portal

Policy domain: Geospatial

Process owners: Geoforum (the Danish Association for Geographic Information)

Short description: Brugstedet.dk is a portal focusing on the use of geographical information (GI). The portal serves as a communication and marketing platform and is open to anyone with ideas, solutions and ready-made examples.

At Brugstedet.dk, it is possible to find a collection of concrete examples of how geographical information can create value for public authorities and private companies.

Through the portal, one can learn how geographical information can be used to provide an information overview, demonstrate efficiencies, and help in planning, decision making and dissemination of information. The examples can be used by anyone who wants inspiration and ideas for using geographical information in their business or management.

Brugstedet.dk is also a common communication platform for the entire Danish geodata domain.

Behind Brugstedet.dk there is an editorial board, which operates the site and its activities on a voluntary basis. Among other things, the coordination task involves managing the examples that are submitted. To create even more focus on and awareness of the many good ideas in the geodata world, in 2015, the editorial team launched the Geodata Prize.

Recommendation: [Governance, Partnerships and Capabilities \(19\)](#)

Link: <http://brugstedet.dk/>

Best Practice DK4 Business model for the collaboration on GeoDanmark

Policy domain: Geospatial

Process owners: GeoDanmark

Short description: GeoDanmark is a collaboration between the Danish Agency for Data Supply and Efficiency (SDFE) and the 98 municipalities to maintain a current and accurate mapping of the country on a joint standardised basis. GeoDanmark data is the basis for authoritative geodata also known as Basic Data.

With GeoDanmark, the state and municipalities have established an economic framework for collaboratively managing common tasks. GeoDanmark decides where accurate data should be obtained and how often it should be updated.

GeoDanmark generates value not only for the participating parties (SDFE and the municipalities) but also for the society in general, in the form of a more efficient public administration and opportunities for growth in the private sector.

GeoDanmark contributes to the fulfilment of public digitisation strategies, and its data is included in the set of basic data on an equal footing with CPR, CVR and matrix data used by public administrations to provide effective and coherent service to citizens and businesses.

Recommendation: [Governance, Partnerships and Capabilities](#) (17), (18), (19)

Link: <https://www.geodanmark.dk/om-geodanmark/foreningsdokumenter/forretingsmodel/>

Best Practice DK5 The Impact of Open Geodata – follow up study

Policy domain: Geospatial

Process owners: Danish Agency for Data Supply and Efficiency (SDFE)

Short description: The Agency for Data Supply and Efficiency published an impact assessment in 2017 showing that, since the basic geographic data (geodata) was released on 1 January, 2013, its total value increased from a baseline of DKK 1.6 billion (in 2012) to DKK 3.5 billion (in 2016).

To compare the results, the method applied in the baseline survey was reused in the 2016 survey. Both measurements looked at the total value of the free geodata. The value is based on the effect of data on production and efficiency in both the public and private sectors. In addition, the estimated increase in value was supported by the fact that the number of users of SDFE's data increased 75 times over the same period, and the number of data transfers quadrupled.

Recommendation: [Return on Investment](#) (14)

Link: <https://sdfе.dk/media/2916777/de-frie-geodata-eftermaaling.pdf>

<https://sdfе.dk/media/2917052/20170317-the-impact-of-the-open-geographical-data-management-summary-version-13-pwc-qrvkvdr.pdf>

Best Practice DK6 Integrated geospatial governance

Policy domain: Geospatial

Process owners: Danish Agency for Data Supply and Efficiency (SDFE)

Short description: Denmark operates a well-organised and comprehensive approach to governance of spatial information in the context of digital government, through the following:

The Basic Data General Board

This cross-institutional committee ensures efficient and coordinated development and use of basic data across the public sector. Among the board's tasks are to draft business cases and coordinate developments to improve basic data, ensure that interfaces, standards and data models are coordinated, approve budgets, plans and content for data distributors, engage with public and private sector stakeholders to promote and optimise use of basic data and report annually to national government and Local Government Denmark.

The Coordination Committee for Infrastructure for Digital Spatial Information

This committee works to promote and further develop an effective geographic information infrastructure. It was established through Section 10 of the "Geographic Information Act" which ensures implementation of the INSPIRE Directive in Denmark. Members are state,

regional and local public authorities, private sector, universities and NGOs. The committee's main areas of work are:

- to assist the Ministry of Climate, Energy and Utilities in implementing the INSPIRE directive
- to oversee decisions on initiatives that can develop and promote the geographic information infrastructure in Denmark.

Common Public Digital Strategy Steering Committees

Within each period of its Common Public Digital Strategy, Denmark establishes dedicated steering committees to progress priority tasks. Currently there are steering committees for:

- common public digital infrastructure
- digital communication with citizens and enterprises
- new technology and better use of data

Nordic Region Digital Cooperation

The Nordic Council of Ministers cooperates on solutions where countries can achieve more together than working alone. One such area is digitalisation. The goal is to turn the Nordic/Baltic region into a coherent and integrated digital region. There is a long-standing Nordic cooperation of NMCAs in the field of spatial data and land administration, built on a mutual agreement. Several working groups and networks act within the frame of this cooperation, including the Nordic INSPIRE network, with participants from NMCAs and Environment agencies.

Recommendation: [Return on Investment](#) (14), [Governance, Partnerships and Capabilities](#) (17, 18)

Link: <https://en.digst.dk/data-and-it-architecture/basic-data/>;
<https://digst.dk/strategier/digitaliseringsstrategien/governance/styregrupper/>;
<https://www.norden.org/en/digitalisation>; https://norden.lmi.is/wp-content/uploads/2017/12/Agreement-on-cooperation_signed-22.-august-2016-Reykjav%C3%ADk-1.pdf; <https://norden.lmi.is/>; <https://norden.lmi.is/index.php/other-nordic-networks/nordic-inspire-network/>

Best Practice DK7

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

Policy domain: Geospatial

Process owners: Danish Agency for Data Supply and Efficiency (SDFE)

Short description: The purpose of the Danish Addresses Web API (DAWA) is to offer users 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 and innovation), and from the level of derived social benefits.

For the calculation of efficiency gains, use was made of existing literature cases, information about the actual use of the DAWA (number of users, number of calls, most used services and ways to use them) and assessment of savings in a sample of organisations. A questionnaire was used to verify the efficiency calculations, as well as to understand derived benefits 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.

Recommendation: [Return on Investment](#) (14)

Link: https://sdfe.dk/media/2920020/dawa_rapport-004-002.pdf

Best Practice DK8 Value of open geodata based on control group design

Policy domain: Geospatial

Process owners: Danish Agency for Data Supply and Efficiency (SDFE)

Short description: The model for calculating the value of open geodata was based on a control group design in which companies using the data were compared with similar companies that do not use this data (the control group). The value of open geodata was calculated on the basis of the additional growth that users of the open geodata have compared to the control group. As the companies that use the open geodata in question may have been at the same time the companies that already had the greatest potential for growth, whether they use open geodata or not, the control group design is one of the best statistical tools for identifying the causal context. This method makes it possible to compare the actual evolution of geodata users with the counterfactual situation in which they did not use geodata.

Once identified, the different evolutions of the respective turnovers of the companies of the control group and of the observed companies using open geodata were compared. The turnovers were weighted and scaled up to the GDP contribution in order to determine the total value of open geodata. With this approach, the cumulated contribution of open geodata to the Danish GDP from 2012 to 2017 was calculated to be 2.99 billion Danish kroner.

Recommendation: [Return on Investment](#) (14)

Link: <https://sdfe.dk/media/2919968/vaerdi-af-geodata.pdf>

Best Practice DK9 Oblique aerial photos covering Denmark

Policy domain: Geospatial

Process owners: Danish Agency for Data Supply and Efficiency (SDFE)

Short description: SDFE has produced nationwide oblique photos so that they can be used in determining property valuations, with the possibility of using such data in many other branches of public administration. These can be used, for example, in local planning where municipalities can use oblique photos to support the work of obtaining information for construction cases. With oblique photos, the case manager can see facades and sides of buildings, avoiding some walks 'in the field' to inspect them.

In the private sector, it is anticipated that oblique photos can be used in conjunction with new visualisation solutions and 3D city models by many different users, ranging from architects to real estate agents and insurance companies.

Recommendation: [Digital Government Integration](#) (7), [Return on Investment](#) (16)

Link: https://ing.dk/artikel/vinduespudsere-ejendomsmaeglere-robotvirksomheder-50-mio-gange-har-virksomheder-kigget-paa?utm_medium=email&utm_source=ing.dk&utm_campaign=tipenven
<https://skraafoto.kortforsyningen.dk/oblivisionjs/soff/index.aspx?project=Denmark&lon=10.2027929&lat=56.1277927>

Best Practice DK10 KAMP - a climate change tool

Policy domain: Climate and Environment

Process owners: Danish Agency for Data Supply and Efficiency (SDFE)

Short description: KAMP is a screening tool that compiles selected national data, calculations and projections, which is especially aimed at environmental and planning employees in the municipalities. These users have easy access to selected climate and environmental, planning and property data from many different national databases.

KAMP shows the areas where there are possible climate impacts that may need to be looked at more closely. As something completely new, KAMP users can see how many buildings and kilometres of road are potentially affected by flooding and the estimated building value that is endangered. KAMP also provides printouts of relevant data and maps. The tool also enables users to load a QGIS file, so they can continue working with the same data sets and map sections in their own systems.

KAMP is based on the latest surveys and data sets available at national level. KAMP does not contain detailed local data and models - for example, how sewers and seepage can remedy extreme rain, or how local, already planned climate protection projects will be able to reduce the risk of flooding. However, the assumptions are often not far from reality when the country is hit by very extreme weather events.

KAMP will eventually replace the existing tools "Flood Map" and "Seawater on land" on klimatilpasning.dk.

Recommendation: [Policy and Strategy alignment](#) (4), [Digital Government Integration](#) (6)

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

Best Practice DK11 Overview and distribution of utility and energy data

Policy domain: Energy and utilities

Process owners: Danish Agency for Data Supply and Efficiency (SDFE)

Short description:

The data portal for utility and energy data is a data platform made by the Ministry of Climate, Energy and Supply in collaboration with the Danish Energy Agency, the Supply Secretariat, the Supply Agency and the Danish Agency for Data Supply and Efficiency. The platform serves as a single-entry point for data on utilities sector.

The data platform is a first starting point for how data for different supply areas can be gathered together in one place (additional datasets may be added).

The purpose of the platform is to increase the use of and improve access to data in the utilities sector. In the long term, it will increase transparency in the sector, qualify the basis for decision-making and create a breeding ground for innovation and new business models.

Recommendation: [Digital Government Integration \(7, 8\)](#), [Governance, Partnerships and Capabilities \(18\)](#)

Link: <https://forsyningsdataportal.dk/>

List of abbreviations and definitions

Abbreviations

Abbreviation	Meaning
API	Application Programming Interface
CPR	Central Person Registration
CVR	Centrale Virksomhedsregister (Central Business Register)
DAGI	Danmarks Administrative Geografiske Inddelinger (Denmark Administrative Geographic Divisions)
DAWA	Danmarks Adressers Web API
DCAT-AP	Data Catalogue vocabulary – Application Profile
DQV	Data Quality Vocabulary
ECDIS	Electronic Chart Display and Information System
EFQM	European Foundation for Quality Management
EGDI	European Geological Data Infrastructure
EIF	European Interoperability Framework
ELISE	European Location Interoperability Solutions for e-Government
ESPD	European Single Procurement Document
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 ²	Interoperability Solutions for European Public Administrations, Businesses and Citizens Programme
ISO	International Standard Organisation
LIFO	Location Interoperability Framework Observatory
NGO	Non-Governmental Organisation
NIFO	National Interoperability Framework Observatory
OGC	Open Geospatial Consortium
PSI	Public Sector Information
SDI	Spatial Data Infrastructure
WCS	Web Coverage Service
WFS	Web Feature Service
WMS	Web Map Services
WMTS	Web Map Tile Service
4PDIH	Digital Innovation Hub

Definitions

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

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

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

List of figures

Figure 1 - EULF Blueprint focus areas.....	2
Figure 2 - LIFO online resources	3
Figure 3 - LIFO participating countries in 2019 and 2020	4
Figure 4 - Overall EULF Blueprint implementation.....	7
Figure 5 - Comparison between LIFO 2019 and LIFO 2020 – Denmark	9
Figure 6 - Policy and Strategy Alignment – scores by recommendation	11
Figure 7 - Policy and Strategy Alignment – scores by indicator	12
Figure 8 - Policy and Strategy Alignment – 2019/2020 comparison.....	13
Figure 9 - Digital Government Integration - scores by recommendation	14
Figure 10 - Digital Government Integration - scores by indicator	15
Figure 11 - Digital Government Integration - 2019/2020 comparison.....	17
Figure 12 - Standardisation and Reuse – scores by recommendation	18
Figure 13 - Standardisation and Reuse – scores by indicator	19
Figure 14 - Standardisation and Reuse – 2019/2020 comparison	22
Figure 15 - Return on Investment – scores by recommendation.....	23
Figure 16 - Return on Investment – scores by indicator.....	24
Figure 17 - Return on Investment - 2019/ 2020 comparison	25
Figure 18 - Governance, Partnerships and Capabilities– scores by recommendation	26
Figure 19 - Governance, Partnerships and Capabilities– scores by indicator	27
Figure 20 - Governance, Partnerships and Capabilities – 2019/2020 comparison	28
Figure 21 – Hierarchy of indicators and indexes	42

List of tables

Table 1 – Strengths and Weaknesses by Focus Area	8
Table 2 - Focus Area "Policy and Strategy Alignment" - vision and recommendations	11
Table 3 - Focus Area "Digital Government Integration" - vision and recommendations.....	14
Table 4 - Focus Area “Standardisation and Reuse” - vision and recommendations	18
Table 5 - Focus Area “Return on Investment” - vision and recommendations	23
Table 6 - Focus Area “Governance, Partnerships and Capabilities” - vision and recommendations.....	26
Table 7 – Relationships between indicators and indexes.....	42

Annex 1: LIFO 2020 Scoring methodology

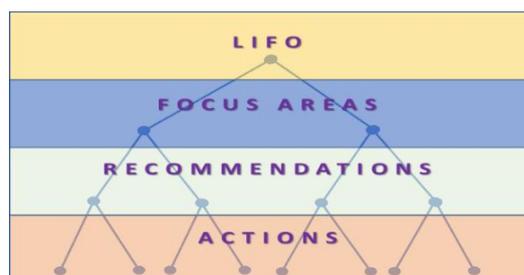


Figure 21 – Hierarchy of indicators and indexes

The LIFO analytical model, described in the *LIFO 2020 Guidelines and recommendations*⁸⁶, is based on a hierarchy of indicators and indexes, as represented in [Figure 21](#): from bottom to top, (action) indicators, recommendation indexes, focus area indexes and LIFO index.

(Action) Indicators: A number of actions⁸⁷ 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.

⁸⁶ https://joinup.ec.europa.eu/sites/default/files/inline-files/2020_LIFO_Guidelines_2.pdf

⁸⁷ 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"> - Availability of spatial data and services - Conformity of metadata - Conformity of spatial data sets - Accessibility of spatial data sets 	Change of calculation method for the INSPIRE country fiche

		through view and download services - Conformity of the network services	
Q7.2	Use of SDI in cross-border services	Is the country actively involved in delivering cross-border digital public services using their spatial data infrastructure (SDI)?	Change in scale
Q7.3	SDI approach used	Please specify the main SDI approach used for delivery of key digital public services in the sectors selected in 6.2.	New question
Q7.4	Use of the public sector SDI by private sector and other organisations (e.g. NGOs)	To what extent is the public sector SDI used by the private sector and other organisations (e.g. NGOs) for delivery of 'new and innovative' applications, products and services?	
Recommendation 8			
Q8.1	Use of an open and collaborative methodology in location-enabled digital public services	To what extent is an open and collaborative methodology applied, to design and improve location-enabled digital public services at local, sub-national or national level (e.g. through consultations, user groups, feedback requests, iterative development)?	
Q8.1.1	Level of government where a collaborative approach is used	At what level of government is the collaborative approach applied?	Single choice in 2019, multiple choice in 2020
Q8.2	Collaboration with external parties in service delivery	When developing or delivering location-based digital public services, in what ways are external parties involved? This includes the private sector, NGOs and citizens.	Change in scale
Recommendation 9			
Q9.1	Approach for integration of statistical and location information	What actions are implemented for the integration of location and statistical information in the production of location-based statistics?	

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

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

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

Focus Area: Return on Investment			Changes vs 2019
No.	Indicator	Question	
Recommendation 14			
Q14.1	Performance monitoring of location-enabled digital public services	What of the following elements are evaluated to assess the efficiency and effectiveness of location-based services in your country?	
Q14.1.1	Performance monitoring scope	Are the measurements done: <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 Open Data Maturity Report)	
Q16.2	Support to the development of products and services by external parties	Which of the following actions are implemented in your country to actively support private, non-profit and academic actors in the development of new products, services or research using public sector location data?	Change of scale

Q16.3	Existence of a strategic approach to funding location reference data	Is there a strategic approach to funding public sector location reference data to make access at point of use cost effective?	
-------	--	---	--

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

Q19.2	Awareness raising initiatives in the geospatial domain	What type of initiatives are organised to raise awareness and develop geospatial skills?	Change in scale
-------	--	--	-----------------

Note: Some indicators have been modified in LIFO 2020 compared with LIFO 2019⁸⁸, 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 2019⁸⁹ 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.

⁸⁸ 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>

⁸⁹ The indicators used in LIFO 2019 are listed at <https://joinup.ec.europa.eu/collection/elise-european-location-interoperability-solutions-e-government/solution/lifo-location-interoperability-framework-observatory/lifo-indicators>

Annex 3: LIFO 2020 Additional information: Denmark

Title	Attachments ⁹⁰
LIFO Survey questionnaire 2020 – Denmark	 LIFO Survey 2020 Denmark
LIFO Survey questionnaire 2020 scores and charts – Denmark	 LIFO 2020 scores and charts Denmark

FOCUS AREA	DK 2020 v DK 2019			DK 2020 v EUR 2020 (all countries)			DK 2020 v EUR 2020 (2019 countries)			DK 2019 v EUR 2019		
	DK 2019	DK 2020	+/-	EUR 2020	DK 2020	+/-	EUR 2020	DK 2020	+/-	EUR 2019	DK 2019	+/-
Policy and strategy alignment	0.71	0.87	0.16	0.62	0.87	0.15	0.68	0.87	0.19	0.57	0.71	0.14
Digital government integration	0.57	0.69	0.12	0.57	0.69	0.12	0.58	0.69	0.11	0.54	0.57	0.04
Standardisation and reuse	0.53	0.72	0.19	0.55	0.72	0.17	0.62	0.72	0.10	0.54	0.53	-0.01
Return on investment	0.80	0.83	0.03	0.58	0.83	0.24	0.65	0.83	0.15	0.60	0.80	0.20
Governance, partnerships and capabilities	0.72	0.54	-0.18	0.45	0.54	0.09	0.50	0.54	0.04	0.44	0.72	0.28
LIFO INDEX	0.67	0.73	0.06	0.55	0.73	0.17	0.60	0.73	0.12	0.54	0.67	0.13

⁹⁰ 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.