European Commission

LIFO: Location Interoperability Framework Observatory

2019 Country Factsheet
Denmark

ISA²

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The monitoring information for Denmark has been provided by the Styrelsen for Dataforsyning og Effektivisering (SDFE – Agency for Data Supply and Efficiency). The information reported in the factsheet reflects the state of knowledge of the Agency and is not intended to provide a full representation of location interoperability in Denmark.

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1. Introduction

The **Location Interoperability Framework Observatory** (**LIFO**) is a domain-specific observatory relating to location interoperability. It provides a tool **to monitor, assess and report on the state of play of location interoperability in policy and digital public services of EU Member States and other countries implementing** INSPIRE**.**

The LIFO complements the National Interoperability Framework Observatory (NIFO) that monitors, assesses and reports the progress in implementing the **European Interoperability Framework** (EIF). The NIFO collects and shares details across all levels of the EIF relating to important initiatives in the Member States, uncovering best practices, areas needing improvement or where solutions could be developed.

The LIFO analytical model measures, through specific indicators, **the current level of adoption of the recommendations on location interoperability from the** EULF Blueprint[1], covering its five focus areas: *Policy and Strategy Alignment*; *Digital Government Integration*; *Standardisation and Reuse*; *Return on Investment*; *Governance, Partnerships and Capabilities*. The LIFO model is composed of primary indicators, based on information provided by respondents to a questionnaire, and secondary indicators, re-using information from existing sources, for example the INSPIRE monitoring.

The information collected through the observatory can be used to assess the current status, compare countries and plan appropriate measures, including potential partnerships and opportunities for sharing solutions. More in detail:

- it helps achieve the objectives of the EULF, for example: policy coherence, effective use of location information in digital public services, standards-based approaches, attention to data quality, effective partnerships, and increased awareness and skills;
- as a complementary tool for NIFO (and thanks to the alignment between EULF and EIF), LIFO helps monitor how the EIF is implemented in the geospatial domain;
- it provides visibility and access to guidelines and best practices for each country and across countries, for reuse and/or suggestion of similar / connected developments;
- it can be used as a self-assessment tool for public administrations towards their implementation of location interoperability, both internally and cross-border.

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

Appreciation is given to the ELISE ‘User Panel’ of 10 Member States and other countries (namely, AT, BE, CZ, DK, FR, IT, NO, PT, SI and SK) who validated the model, answered the survey, and provided further information to ensure the results are representative of the national state of play.

The LIFO will be extended to all ISA2 and INSPIRE implementing countries in 2020 in order to capture the full status of location interoperability across Europe.

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[1] The European Union Location Framework (EULF) is a geospatial domain interoperability framework allied to the EIF. Key EULF guidance is published in the EULF Blueprint.

2. Structure of the document

This factsheet provides an overview of the information collected on location interoperability in Denmark in 2019. It contains the following chapters:

- Location Interoperability State of Play: this chapter contains an overview of the implementation of the EULF Blueprint recommendations in the different focus areas. The paragraphs dedicated to each focus area contain graphs displaying the country's scores for the individual indicators and the average scores for each recommendation. In both cases, scores are compared with the average of the monitored countries. Descriptions and evidence are included to support the relevant scores.
- Best Practices: which highlights existing initiatives and applications in different domains demonstrating the benefits of a consistent use and integration of location information and services in digital public services.

Annexes to the document are:

- The method of scoring and normalisation applied to the indicators;
- A glossary of the most relevant terms used in the document;
- The questionnaire with the replies provided for Denmark and the corresponding scores.

The 2019 LIFO monitoring information for Denmark has been provided by the Styrelsen for Dataforsyning og Effektivisering (SDFE – Agency for Data Supply and Efficiency). The information reported in the factsheet reflects the state of knowledge of the Agency and is not intended to provide a full representation of location interoperability in Denmark.

3. Location Interoperability State of Play

3.1. Overview

Denmark scores higher than the European average in all but one of the focus areas (see Figure 1). The value of the LIFO index is 0.66[2]. This compares with a LIFO European average of 0.54.

Three EULF Blueprint focus areas stand out as the main strengths in Denmark's location interoperability practices, both nationally and in comparison, with the ten participating countries:

- "Policy and Strategy Alignment", thanks to the existence of a consistent, aligned and coordinated policy and strategic approach for the use of location information that enables more efficient and effective integration of cross-sector and cross-border location-based applications;
- "Return on investment", considering the strategic approach to funding, procurement, and delivery of location information and location-based services to minimise costs and maximise benefits for government, businesses and citizens, as well as the approach to assessment and measurement of related costs and benefits.
- "Governance, Partnership and Capabilities", thanks to the effective governance of location information processes and the extensive use of partnerships for the development and operation of the spatial data infrastructure.

Denmark also scores well in other focus areas, in "Digital Government Integration", with good evidence of the integration of location information in the design, development and delivery of several value-added public services, and in "Standardisation and Reuse", mainly thanks to an architecture making available API for all high-value datasets.

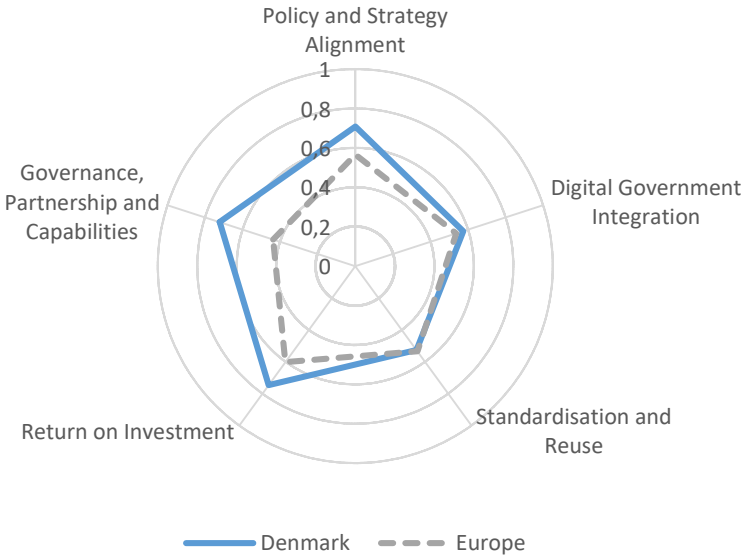

Figure 1 - Overall EULF Blueprint implementation

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

[2] For a description of calculation method of the LIFO index and the other indexes and indicators see Annex 1: LIFO 2019 Scoring methodology

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	Comply with data protection principles as defined by European and national law 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 1 - Focus Area "Policy and Strategy Alignment" - vision and recommendations

The “Policy and Strategy Alignment” focus area index for Denmark is 0.71, well above the European average of 0.57.

With reference to Recommendation 1, in Denmark the location strategy is embedded in the digital government strategy[3]. Although there is no legislation on the use in digital government of authoritative location datasets and services, the latter is consolidated and regulated by binding agreements.

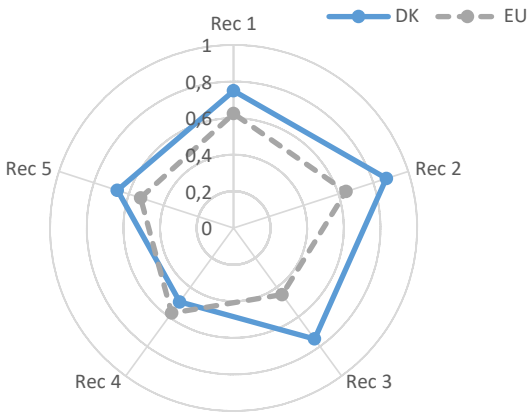

Figure 2 – Policy and Strategy Alignment – scores by recommendation

Regarding Recommendation 2, specific strengths are:

- All location data is available free of charge under an open licence without restrictions; a common licensing framework[4] covers location data collected and distributed in partnership with the municipalities, but does not cover all location data at a national level;
- Core location reference datasets are incorporated in a national scheme of core datasets that comprises, for example, citizen, business and roads[5];
- Under the national guidelines on the publication of public sector data, basic data (including location data such as real

[3] See respectively https://digst.dk/media/12811/strategi-2016-2020-enkelt-tilgaengelig.pdf (https://digst.dk/media/16165/ds_singlepage_uk_web.pdf in English) (the digital government strategy) and https://uk.fm.dk/publications/2012/good-basic-data-for-everyone/ (the core data strategy, encompassing location data)

[4] See https://sdfe.dk/om-os/lovstof/rettigheder-og-vilkaar/

[5] Both principles (free-of-charge availability of location data and definition of core location datasets) are stated in https://en.digst.dk/data-and-it-architecture/basic-data/.

estate, place names, addresses, administrative units etc.) are distributed through a common data distributor[6].

Such strengths determine a score on EULF Recommendation 2 that is significantly higher than the European average.

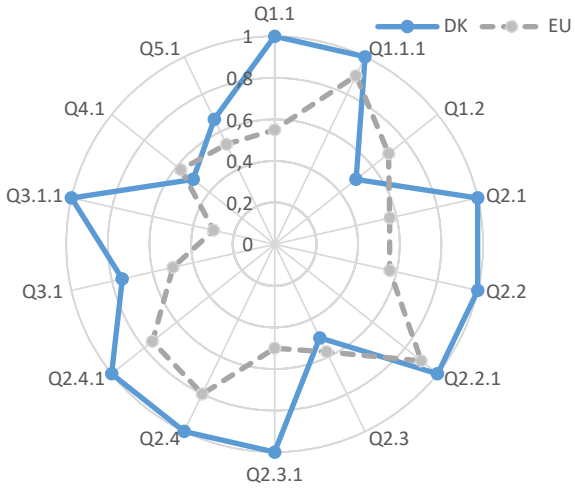

Figure 3 - Policy and Strategy Alignment - scores by indicator

Denmark also scores particularly well under Recommendation 3. Most 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.

Location-based evidence and analysis is used to help in developing relevant policies and monitoring outcomes in some relevant topics (Recommendation 4).[7]

For public sector procurements of location information and / or services (Recommendation 5), specific references are made to the applicable parts of the INSPIRE Directive and / or the national standards[8]. The use of the European Single Procurement Document (ESPD) further supports the standardisation of information exchange in procurement processes, including location information.

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
Recommendation 7	Use INSPIRE and SDI models, data and services for delivering cross-sector and cross-border digital public services to citizens, businesses, government and other parties
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 2** - Focus Area "Digital Government Integration" - vision and recommendations*

6 https://datafordeler.dk/
7 See for example Best Practice DK1
8 https://udbudsportalen.dk/

Denmark is well aligned with the EULF Blueprint recommendations in this focus area. The "Digital Government Integration" focus area index for Denmark is 0.57, compared with the European average of 0.54.

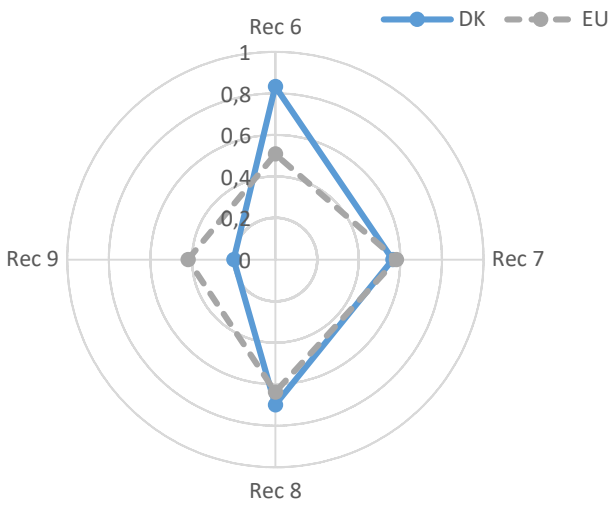

Figure 4 - Digital government integration – scores by recommendation

Regarding Recommendation 6 and Recommendation 8, there is strong integration of location information in the design, development and delivery of several value-added public services. Opportunities are taken to introduce new business models with, for example, co-delivery with the private sector or use of digital platform concepts to engage multiple parties. Some examples of such practices are:

- *Rejseplanen*[9], a trip planner integrating data from a variety of public transport providers in Denmark (a version for the blind or visually impaired is also available); location information is used here as a ground-breaking contribution, e.g. to integrate processes, location based analytics, AI algorithms;
- *Dingeo*[10], a platform allowing users to search dynamically for properties on sale; it "retrieves geodata from dusty and inaccessible archives intended exclusively for data experts and releases them to ordinary Danes" with "the overall goal [of] a democratisation of geodata and geo-information, with the majority of the geodata displayed on DinGeo coming from open data sources that the public administration makes available on the Internet";
- *Klimatilpasning*[11] (Climate Adaptation Portal), a portal managed by the Danish Environmental Protection Agency in collaboration with a number of ministries, boards and stakeholders, including the National Association of Local Authorities and the Danish Regions; the portal contains graphically presented climate data and information on regional climate change in Denmark, and encompasses some interactive functionalities;
- *WasteApp*[12], a privately developed solution for users to plan / order waste collection, which reuses addresses, road network, business register data etc. from public geospatial datasets.

For Recommendation 7, location datasets are used for almost all digital public services. Furthermore, cross-sector digital public services are delivered using harmonised location data and services[13].

The public sector SDI is used very extensively by the private sector and other organisations for the delivery of new and innovative applications, products and services.

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9 https://www.rejseplanen.dk/webapp/index.html
10 https://www.dingeo.dk/
11 https://www.klimatilpasning.dk/vaerktoejer/klimakort/nedboer
12 https://www.wasteapp.dk/
13 Several examples (such as the reuse of the Building and Dwelling Register data, or businesses that, for example, produce printed and digital information services) are provided in https://en.digst.dk/media/14139/grunddata_uk_web_05102012_publication.pdf

Denmark is quite well advanced in the implementation of the INSPIRE Directive.[14] In this regard, full implementation has been reached in terms of effective coordination and identification and documentation of datasets, while there is still some way to go in terms of service provision for the identified datasets and interoperability of the datasets.

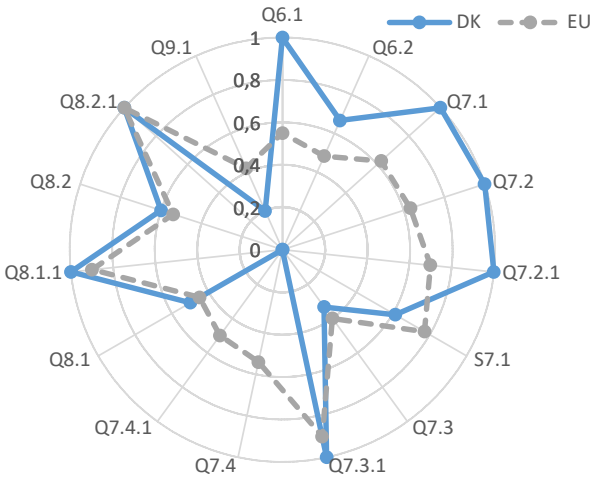

Figure 5 - Digital government integration - scores by indicator

A collaborative approach is applied both to design and improvement of location-enabled digital public services in several cases at national level, and to service delivery in various ways (subcontracting them to the private sector under public control, developing public / private partnerships[15], making public-owned data available for the delivery of services by third parties)[16].

Finally, regarding Recommendation 9, Denmark implements the following actions for the integration of location and statistical information in the production of location-based statistics:

- There is an accurate and up-to-date knowledge base of where citizens and businesses are located;
- There is a common geospatial reference framework for statistics to enable timely, accurate and efficient production of location-based statistics.

3.4. Standardisation and Reuse

Vision	
Core data has been defined and a funding model has been agreed for its ongoing maintenance and availability. Consistent use of geospatial and location-based standards and technologies, enabling interoperability and reuse, and integration with broader ICT standards and technologies, including the standards and solutions promoted by the ISA2 programme. Use of these standards in all areas related to the publication and use of location information in digital public services, including metadata, discovery, view, exchange, visualisation etc.	
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

[14] Currently the INSPIRE country fiche 2016 is available
[15] See Best Practice DK2.
[16] See also https://data.virk.dk/aabne-data/inspiration/cases/intelligent-skybrudsalarm

Table 3 - Focus area Standardisation and Reuse - vision and recommendations

The “Standardisation and Reuse” focus area index for Denmark is 0.53, in line with the average of 2019 data collection.

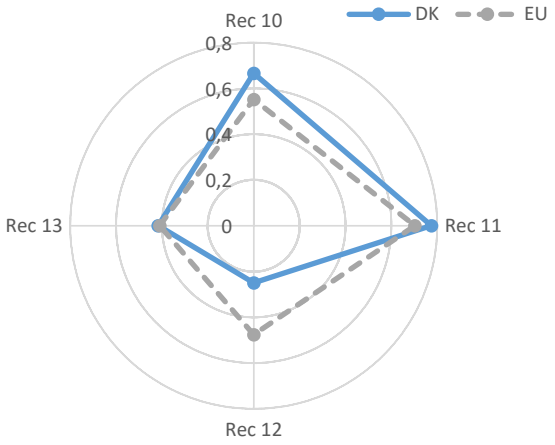

Figure 6 - Standardisation and Reuse – scores by recommendation

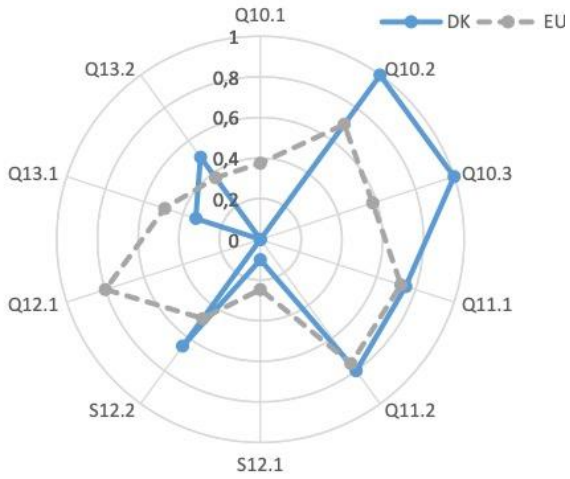

Figure 7 - Standardisation and Reuse - scores by indicator

Denmark’s strengths are, in particular:

- For Recommendation 10, APIs are available for all high value public sector datasets including location datasets[17], in accordance with the digitisation strategy and the guidelines on a common public-sector digital architecture; furthermore, there is a clear approach to monitoring, testing and upscaling new technological developments, in collaboration with different stakeholders;
- Regarding Recommendation 11, ICT solutions from other national or international catalogues are reused in the SDI. A significant number of registers of location information are implemented.[18] In particular, data on Denmark and its citizens collected in large public registers (such as the Civil Registration System, the Central Business Register, and the Building and Housing Register) are standardised and combined under common terms in the Basic Data Programme. Moreover, the Common Public Dataset Directory is a directory under construction, intended to collect metadata about all governmental datasets. It provides an overview of existing datasets, making it possible for everyone to retrieve and re-use the available information.

On the other hand:

- For Recommendation 12, only a low number of spatial data sets are in conformity with Regulation (EU) No. 1089-2010 and a significant number of network services are not in conformity with Regulation (EC) No. 976-2009; the overall picture is still in line with the average state of play of the ten analysed countries. Regarding the mechanism to align spatial with non-spatial metadata, Denmark applies its own approach rather than reusing GeoDCAT-AP;
- For Recommendation 13, only a limited number of the recommended practices are in place to ensure location data quality in terms of governance, design and measurement.

[17] See https://datafordeler.dk/dataoversigt/; https://planinfo.erhvervsstyrelsen.dk/adgang-til-webservices; https://www.kortforsyningen.dk/indhold/webservice-liste; https://dawa.aws.dk/dok/api; http://datahub.virk.dk/data/search; https://cvrapi.dk/documentation; https://www.dst.dk/da/Statistik/statistikbanken/api

[18] Addresses, Geographical names, Administrative units, Cadastral parcels, Buildings, Hydrography, Transport networks, Code lists

However, Denmark is positioned in line with the average of the surveyed countries in this respect.

3.5. Return on Investment

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

Recommendation 14	Apply a consistent and systematic approach to monitoring the performance of their location information activities
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 4 - Focus area Return on Investment - vision and recommendations

The "Return on Investment" focus area index for Denmark is 0.80, well above the European average of 0.60. Several points of strength have been identified in the Danish approach:

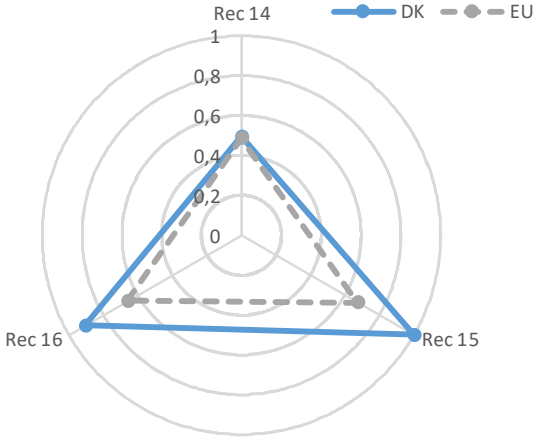

Figure 8 - Return on Investment - scores by recommendation

With reference to Recommendation 15, besides portals providing information on value-creating cases of use in the wider data management domain[19], there is a specific example of a portal focusing on the use of geospatial information[20].

With reference to Recommendation 16, a wide range of actions are implemented or planned to actively support private, non-profit and academic actors in the development of new products and e-services (including the existence of policies in that regard) and of channels by which the searchability and accessibility of location data and web services is fostered for all stakeholders. The Danish government considers the availability of core public registers to the private sector as a potential driver for innovation, growth and job creation; therefore it launched a Basic Data initiative, in order to foster free availability of good basic data for the private sector[21].

19 https://data.virk.dk/aabne-data/inspiration/cases; https://sdfe.dk/find/?query=cases
20 See Best Practice DK3
21 For more detailed information, consult: https://en.digst.dk/media/18773/good-basic-data-for-everyone-a-driver-for-growth-and-efficiency.pdf

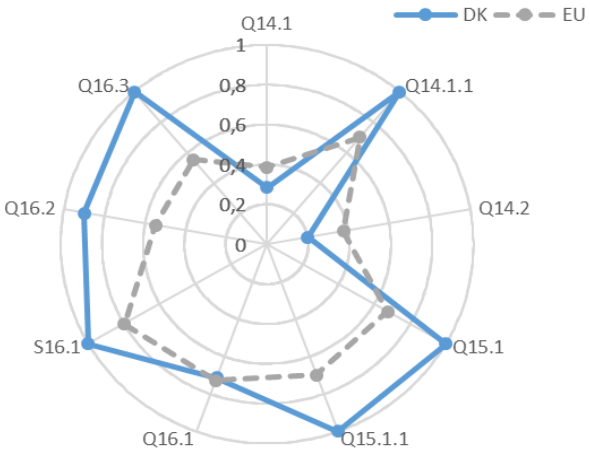

Figure 9 - Return on Investment - scores by indicator

Other relevant initiatives in this context are:

- Geodata-info.dk[22], the Danish geoportal that enables professional users and citizens to search for geodata sets and geodata services, and allows them to contact relevant data owners for further information;
- Virk Data Data Catalog[23] that facilitates access for companies and other interested parties to public data for reuse in privately developed solutions;
- The Common Public Dataset Directory, a directory under construction, that intends to collect metadata about all governmental datasets.

For Recommendation 14, measurements of the efficiency and effectiveness of location-based services are made at several levels (project or service level, at the level of agencies delivering such services and at a SDI / national level). The assessment of efficiency and effectiveness of location-based services is based on a variety of elements (reduction in administrative burden, simplification of administrative processes, enhancement of business opportunities, total cost of ownership, user satisfaction, return on investment)[24]. On the other hand, the overall approach may be improved by extending the relatively limited set of actions implemented for impact-based improvement in location-enabled processes and services.

3.6. Governance, Partnerships and Capabilities

Vision There is high level support for a strategic approach to the funding and availability of location information at Member State and EU level, based on INSPIRE and other tools to achieve interoperability. Effective governance, partnerships, work programmes, responsibilities and capabilities to progress such an approach have been established, taking into account the needs and expectations of stakeholders at Member State and EU level. Governments recognise the importance of 'location' understanding and skills and invest in awareness raising, training and resourcing. Service design takes account of user capabilities. Specialists form communities to share knowledge and develop new ideas related to location information. As a result, there is a sufficient level of understanding and skills to develop, deploy and use effective location-based services.	
Recommendation 17	Introduce an integrated governance of location information processes at all levels of government, bringing together different governmental and non-governmental actors around a common goal
Recommendation 18	Partner effectively to ensure the successful development and exploitation of location 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 5 - Focus area Governance, Partnerships and Capabilities - vision and recommendations

22 https://geodata-info.dk/srv/eng/catalog.search;jsessionid=446B5B095996F3CD012D54E2E058EAAA#/home
23 http://datahub.virk.dk/data/search
24 A report displaying how benefits from the use of location-based services are measured is published at https://sdfe.dk/media/2917052/20170317-the-impact-of-the-open-geographical-data-management-summary-version-13-pwc-qrvkvdr.pdf. See also Best Practice DK5.

The “Governance, Partnerships and Capabilities” focus area index for Denmark is 0.72 compared with the European average of 0.44. This is the focus area where Denmark is best positioned, ahead of all other countries in the 2019 LIFO data collection.

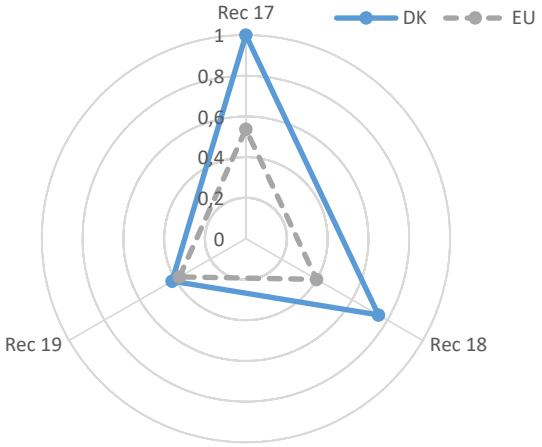

Figure 10 - Governance, Partnerships and Capabilities – scores by recommendation

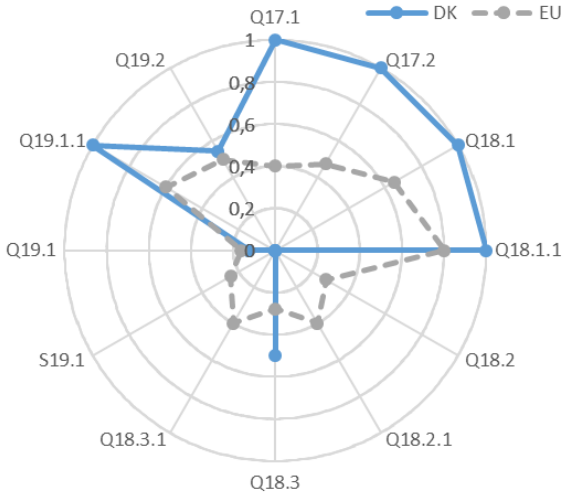

Figure 11 - Governance, Partnerships and Capabilities – scores by indicator

An important contributing factor is for Recommendation 17, where Denmark operates an effective integrated governance of location information in the context of its digital and data strategies, which applies to all levels of government, includes cooperation across the Nordic region, and brings together different governmental and non-governmental actors[25]. Key components of this governance are:

i) The Basic Data General Board;
ii) The Coordination Committee for Infrastructure for Digital Spatial Information;
iii) Common Public Digital Strategy Steering Committees;
iv) The Nordic Council of Ministers and formal regional cooperation on digitalisation and INSPIRE implementation.

Denmark is effective in actions relating to Recommendation 18[26]. There are formal agreements between public authorities to finance, build and operate a large number of location data services or digital public services using location data. Furthermore, there are some examples of public-private cooperation in funding digital public services using location data.[27]

Regarding Recommendation 19, a notable strength is that the geospatial competency framework is part of a broader ICT framework.[28] Additionally, there are several initiatives to raise awareness on and develop geospatial skills. Among these are: spatial literacy awareness raising initiatives for non-specialists, training for specialists such as developers or data analysts, special interest groups for knowledge sharing within the geospatial community, public or cross-government events

[25] See Best Practice DK6

[26] See Best Practice DK4. A specific example is the Cooperation agreement between the Ministry of the Environment, KL, Danish Regions and the Digital Task Force about joint public partnership on Denmark's Environmental Portal and digital management in the environmental field (see https://www.miljoeportal.dk/media/1081/samarbejdsaftale-om-partnerskab.pdf)

[27] For example, the initiative to map within 2022 the entire ice-free part of Greenland, as part of the development of its society, in a joint effort by the government (Ministries of Energy, Supply and Climate, of Self-Government and of Defense) and the A. P. Møller Foundation. See https://kefm.dk/aktuelt/nyheder/2018/sep/ny-kortlaegning-af-groenland-skal-skabe-grundlag-for-udvikling-og-vaekst/

[28] https://em.dk/media/11925/strategi-for-danmarks-digitale-vaekst_online.pdf

specialising in location information / GI topics, structured training programmes to obtain accreditation under a competency framework and, finally, INSPIRE training modules.

Subject to improvement is the fact that the training or awareness raising initiatives on geospatial skills are in general undertaken by organisations to meet some specific needs but not as part of a wider recognised or accredited competency framework.

4. Best practices

EULF Best Practice DK1	**The "Rubber Boot" Index – better information on flood risks**
Policy domain: Emergency management	
Process owners: Danish Agency for Data Supply and Efficiency (SDFE)	
Short description: With the Rubber Boot Index, emergency preparedness can now use far more detailed data to predict the consequences of elevated water levels. It provides better opportunities to plan and handle critical situations. The Danish Elevation Model (DK-DEM) which is derived from a national laser scanning is considered to be one of the world's best national height model. It comprises 415 billion data points, which are used to map height differences for terrains and areas in a 0.4m grid for the entire country. Based on this model, SDFE developed the "Rubber Boot Index" – an application that provides detailed and precise maps showing the water's entry and spread in cities, on the transport network, and along coasts and streams in the whole country. The application is used by the Danish Emergency Management Agency and The Danish Meteorological Institute to create a real-time picture of the current situation, for instance during periods of extreme weather conditions with heavy rain and tidal waves. The application is also used by municipalities and state authorities in long-term planning of efforts on climate adaptation, as well as by real estate agents and citizens retrieving information on, for example, the flood risks in particular property locations. The application specifies water depth in 10 cm intervals, illustrated by six colour codes, which provides the user with a swift overview. The first version of the Rubber Boot Index in 2012 was developed by SDFE in collaboration with the Danish Emergency Management Agency. When a new edition of the Climate Adaptation Tool "Seawater on Land" came out in 2017, on which the Rubber Boot Index was based, SDFE decided to further develop the Rubber Boot Index and link it with other geodata. The new release of the Index provides a more accurate tool that can help in making more informed decisions. It consists of free geographical data from "Seawater on land" combined with data on the height of the Danish road network. This means that in the Rubber Boot Index you can also see any flooding on roads, which can be very useful in planning journeys to evacuate an affected area. 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.	
Recommendations: Recommendation 4 (Policy and Strategy Alignment); Recommendation 6 (Digital Government Integration)	
Link: https://sdfekort.dk/spatialmap	

EULF 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)	
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.

Recommendations: Recommendation 6 and Recommendation 8 (Digital Government Integration)

Link: https://naturstyrelsen.dk/nyheder/2013/sep/danmarkshoejdemodel/

EULF Best Practice DK3 **Geodata use case Portal**

Policy domain: Geospatial

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

Short description: Brugstedet.dk is an example 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 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. The Geodata Prize is awarded to demonstrate that Geoforum wants to support and share all the good ideas in the industry – and preferably at brugstedet.dk. The awards are selected by a professional jury.

Recommendations: Recommendation 17 and Recommendation 19 (Governance, Partnerships and Capabilities)

Link: http://brugstedet.dk/

EULF 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 the authoritative geodata within the national Basic Data programme.
GeoDanmark is a collaboration framework as well as a governance body. GeoDanmark data is standardised across the country and GeoDanmark has decided where accurate data should be obtained and how often it should be updated based on the needs that exist in Denmark.
GeoDanmark is of financial value to the participating parties (SDFE and the municipalities) but is also of more general value for society in the form of a more efficient public administration and opportunities for growth in the private sector. Municipalities and SDFE share the costs of data collection and operation 50/50, and the governance structure ensures both parties influence data content and production processes.

Recommendations: Governance, Partnerships and Capabilities)

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

EULF 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, it's 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 look 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 is 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.
Recommendations: Recommendation 14 (Return on Investment)
Link: https://sdfe.dk/media/2916777/de-frie-geodata-eftermaaling.pdf https://sdfe.dk/media/2917052/20170317-the-impact-of-the-open-geographical-data-management-summary-version-13-pwc-qrvkvdr.pdf

EULF 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 boards 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. The committee's main areas of work are i) to assist the Ministry of Climate, Energy and Utilities in implementing the INSPIRE directive; and ii) to oversee decisions on initiatives that can develop and promote the geographic information infrastructure in Denmark. Members are state, regional and local public authorities, private sector, universities and NGOs. 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.
Recommendations: Recommendation 14 (Return on Investment); Recommendation 17 (Governance, Partnerships and Capabilities)

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/

Annex 1: LIFO 2019 Scoring methodology

The LIFO scoring methodology is based on a hierarchy of indicators and indexes.

(Action) Indicators: A certain number of actions[29] have been selected in the EULF Blueprint as being representative of the scope of the recommendations to which they belong. For each of these actions, an indicator has been designed to measure how monitored countries are progressing towards the "vision" outlined in the EULF Blueprint. 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 0-1, as follows:

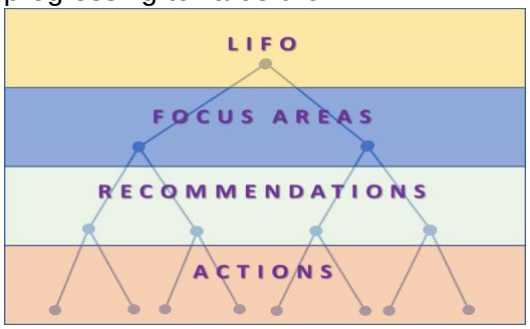

Figure 12 – Hierarchy of indicators and indexes

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, in order to represent the performance of each country at the respective levels. The relationships between (Action) Indicators, Recommendation Indexes, Focus Area Indexes and the overall LIFO Index are described in the table below.

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[30]
Action	61	Scores calculated using different scoring methods, converted to standard normalised scores in range 0-1.

***Table 6** – 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 question has a null score. This is shown as zero in the indicator charts and the question is ignored in calculating the index scores.

[29] Described in the "How" section of each Recommendation

[30] In the event of a failure to respond or an "I don't know" answer, the indicator in question scores zero and it is excluded from the computation of the average score for the above levels.

Annex 2: Glossary

Term	Meaning	Link
European Location Interoperability Solutions for e-Government (ELISE)	The action in the ISA2 programme responsible for maintaining the EULF Blueprint and coordinating the LIFO.	https://joinup.ec.europa.eu/collection/elise-european-location-interoperability-solutions-e-government/about https://ec.europa.eu/isa2/home_en
European Union Location Framework (EULF)	An EU-wide, cross-sector interoperability framework for the exchange and sharing of location data and services. It consists of a package of recommendations, guidance, methodologies, case studies, training, pilots and collaborative action required by public administrations and stakeholder communities to facilitate the free flow of location data and ensure its effective use in e-government services.	https://joinup.ec.europa.eu/collection/european-union-location-framework-eulf/about
EULF Blueprint	Guidance framework for a wide audience to implement the EULF vision. The EULF Blueprint is updated periodically to embrace new developments in digital government.	https://joinup.ec.europa.eu/collection/european-union-location-framework-eulf/eulf-blueprint
EULF Vision	Vision and framework for 'location-enabled government', based on applying good practice in a number of 'focus areas'. It identifies the objectives, transition strategy and high-level actions needed in each focus area.	https://joinup.ec.europa.eu/sites/default/files/inline-files/ReqNo_JRC94727_lb-na-27125-en-n%20.pdf
Focus area	Best practice domain relevant to the effective use of location information in policy and digital public services. The focus areas identified in the EULF Vision and adapted in the EULF Blueprint are: Policy and Strategy Alignment, Digital Government Integration, Standardisation and Reuse, Return on Investment, Governance, Partnerships and Capabilities.	
Indicator	Quantitative measurement of the performance / practice of an organisation or entity. In the context of the LIFO, the	

Term	Meaning	Link
	indicators evaluate the degree of alignment of the practices implemented by Member States to the EULF Blueprint recommendations. LIFO includes “primary indicators”, which are specifically created for the Observatory and are measured through direct questions to LIFO contact points, and “secondary indicators”, taken from external sources, following principles of relevance for the scope of LIFO.	
INSPIRE implementing countries	Group of countries that have engaged to implement the INSPIRE directive or parts thereof. It includes: EU Member States, EFTA Members and a group of non-member states.	https://inspire.ec.europa.eu/INSPIRE-in-your-Country
Recommendation	EULF location interoperability best practices in the EULF Blueprint focus areas. Each of the 19 EULF Blueprint recommendations, contains a description of the rationale for following the recommendation and the expected benefits (why?), a checklist of associated actions (how?), potential problem areas to address in implementing the recommendation (challenges), a variety of best practices across Europe where this has been done successfully, links to relevant parts of the EIF, and further reading related to the recommendation.	