LIFO: Location Interoperability Framework Observatory

2020 COUNTRY FACTSHEET

NORWAY

ISA²

Contents

1. Introduction

Location Interoperability Framework Observatory

The Location Interoperability Framework Observatory (LIFO[1]) monitors the implementation of location interoperability good practices in European public administrations.

The monitoring is based on the level of adoption of the recommendations set out in the five focus areas of the European Union Location Framework (EULF) Blueprint[2] (see Figure 1).

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

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

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

European Union Location Framework Blueprint
EULF Blueprint

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

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

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

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

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

Figure 1 - EULF Blueprint focus areas

---

[1] https://joinup.ec.europa.eu/collection/elise-european-location-interoperability-solutions-e-government/solution/lifo-location-interoperability-framework-observatory/about
[2] http://data.europa.eu/w21/8e942bc2-657a-4289-b057-f2a285ee7375
[3] https://ec.europa.eu/isa2/eif_en
[4] https://ec.europa.eu/isa2/solutions/nifo_en
[5] https://joinup.ec.europa.eu/collection/elise-european-location-interoperability-solutions-e-government/about
[6] https://ec.europa.eu/isa2/home_en

The LIFO data collection is carried out through an online questionnaire sent to country representatives for digital government in the geospatial domain. The questionnaire is based on the LIFO analytical model[7]. This model is composed of primary indicators, calculated using information provided by respondents to the online questionnaire, and secondary indicators, reusing information from existing sources, for example, the monitoring under the INSPIRE Directive[8]. The indicators address good practices in the provision and use of location data in digital government and are shaped by the European policy context. They include measures relating to several EU directives and regulations including, for example, required datasets and means of access under both the INSPIRE Directive and the Open Data Directive[9], obligations under the General Data Protection Regulation (GDPR)[10], approaches under the Public Procurement Directive[11], and factors relevant to the EIF[12].

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

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

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

Figure 2 - LIFO online resources

---

[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.
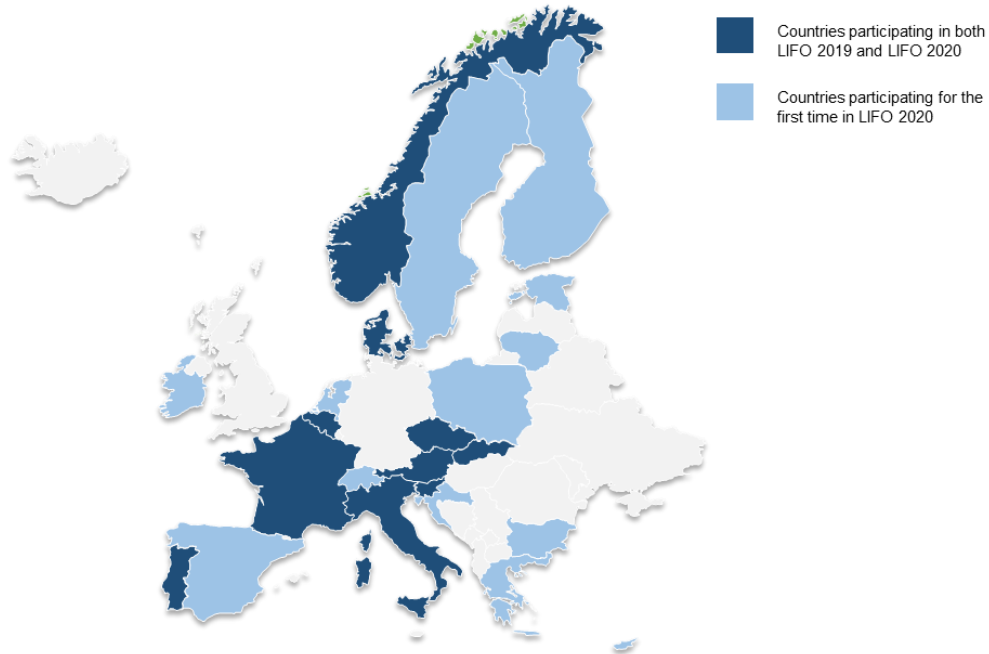
Figure 3 - LIFO participating countries in 2019 and 2020

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 Norway 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 Norway comprising the questionnaire response, scores and charts from the response, and a 2019/2020 comparison table.

The 2020 LIFO monitoring information for Norway has been provided by *Kartverket* (Norwegian Mapping Authority), with assistance from other governmental agencies.

3. Location Interoperability State of Play

3.1. Overview

3.1.1 2020 Results

- The information collected on location interoperability in Norway indicates a very good alignment with the EULF Blueprint recommendations. The country scores higher than the European average across the 23 countries monitored in all focus areas (see Figure 3).
- The focus areas that have registered the highest scores are "Policy and Strategy Alignment" and "Return on Investment". With respect to the former, the results are mainly driven by the good alignment between location information and digital government strategies and by the extensive use of standards for public sector procurements of location information and/or services in line with the standards applied to broader ICT procurement. Most organisations are fully compliant with GDPR under the location privacy perspective.
- The "Return on Investment" focus area factors that have contributed mostly to the good positioning are the extent of the measures implemented to facilitate searching, finding and accessing public sector location data and services for third parties, as well as the actions to support private, non-profit and academic actors in the development of new products, services or research using public sector location data. Moreover, there is a consistent and systematic approach to monitoring the performance of location-based services, along with frequent and thorough communication of availability and benefits of location data and location-enabled digital public services.
- In the "Governance, Partnerships and Capabilities" focus area, the main positive drivers are the extensive awareness raising and training initiatives on geospatial skills and the presence of several formal agreements between public authorities to finance, build and operate many location data services or digital public services using location data. There is a strong integrated leadership and coordination on actions and policies related to the role of the SDI in Digital Government, with cross-fertilisation between members in governing bodies.
- The "Standardisation and Reuse" focus area also shows a positive deviation from the European average, due to the well-structured approach to the SDI architecture and to the large array of actions implemented to govern and assure location data quality.
- Finally, the strengths of the "Digital Government Integration" focus area, are due to the wide use of the public sector SDI for delivering digital public services across public bodies, the presence of key digital public services using location information in an innovative and comprehensive way, and the open and collaborative methodology applied to design and improve location enabled digital public services at all levels (local, sub-national and national). The public sector SDI is used extensively by the private sector and other organisations (e.g. NGOs) for the delivery of new and innovative applications, products and services and several actions are implemented for the integration of location and statistical information.
- For a better understanding of these results, it must be noted that Norway, as with all EFTA countries, is not subject, in full or in part, to the provisions of EU legislation (e.g. on the application of the INSPIRE Directive or of the GDPR).

The LIFO index for Norway combining the scores for the five focus areas is 0.74 which confirms the excellent performance of the country in terms of location interoperability in all focus areas. This is significantly above the European average LIFO index, which is 0.55.
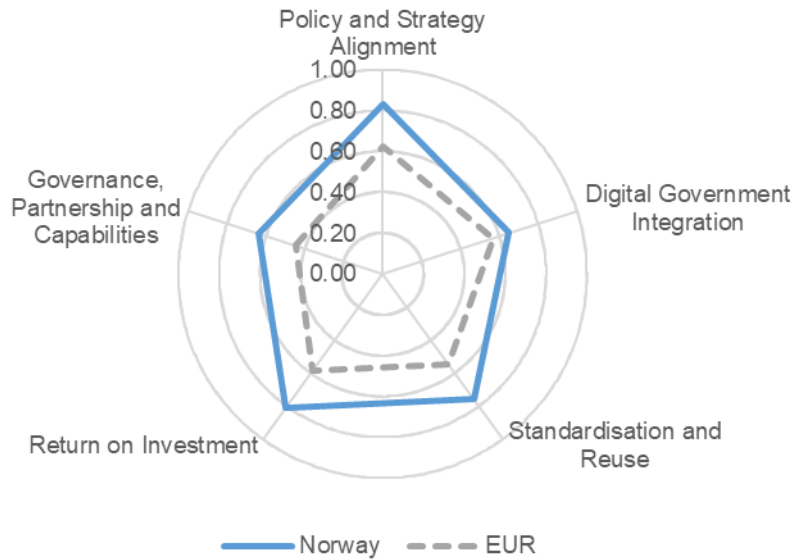
Figure 4 - Overall EULF Blueprint implementation

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

Focus Area	Strengths	Weaknesses
Policy and Strategy Alignment	• Good alignment of location information and digital government strategies • Location-based evidence and analysis is used to help in developing relevant policies and monitoring outcomes in most relevant policy topics • Most organisations are fully compliant with GDPR	
Digital Government Integration	• The public sector SDI is widely used for delivering digital public services across public bodies • Key digital public services use location information in an innovative and comprehensive way • Public sector location datasets are harmonised according to INSPIRE data specifications for use in cross-border public services • An open and collaborative methodology is applied to design and improve	• Limited collaboration with external parties when developing or delivering location-based digital public services

Focus Area	Strengths	Weaknesses
	location enabled digital public services applied in several cases at the local, sub-national and national level • The public sector SDI is used very extensively by the private sector and other organisations for delivery of new and innovative applications, products and services • Several actions are implemented for the integration of location and statistical information	
Standardisation and Reuse	• Well-structured approach to the SDI architecture • Several actions are implemented to govern and assure location data quality • APIs are available for all high value location datasets as part of a national strategy	• Ad-hoc approach in place to discover, explore and incorporate new technological features or emerging technologies
Return on Investment	• Various measures are implemented to make the process of searching, finding and accessing location data and web services as easy as possible • Several 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 • Consistent and systematic approach to monitoring the performance of location-based services • Frequent and thorough communication of availability and benefits of location data and location-enabled digital public services	

Focus Area		Strengths	Weaknesses
	Governance, Partnerships and Capabilities	• Extensive awareness raising and training initiatives on geospatial skills • Strongly integrated leadership and coordination on actions and policies related to the role of the SDI in Digital Government, with cross-fertilisation of members in governance bodies • Formal agreements in place between public authorities to finance, build and operate many location data services or digital public services using location data	

Table 1 – Strengths and Weaknesses by Focus Area

3.1.1 2019/2020 Comparison

Norway is one of the countries that have participated in both the 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.

The comparative overview for Norway between 2019 and 2020 is shown in Figure 5. The graph displays both comparisons within the country and with European averages. Between the two years, the LIFO index for Norway has increased from 0.65 to 0.74. This is due in a large part to the positive variations in the following focus areas:

• "Standardisation and Reuse", due to the increase in the range of spatial datasets which conform to the applicable EU Regulation No 1089-2010, the registers of location information made additionally available, and the wider range of actions implemented to ensure location data quality governance;
• "Governance, Partnerships and Capabilities", due to the reinforced joint leadership and coordination on actions and policies related to the role of the SDI in Digital Government and to the even more diverse initiatives organised to raise awareness and develop geospatial skills.

The "Standardisation and Reuse" focus area index increased by 0.14 (from 0.62 in 2019 to 0.76 in 2020), surpassing the European average that has slight changed for the 'EUR 2020' countries and increased by 0.07 for the 'EUR 2020 (2019 countries)'. The factors that have mostly impacted on the positive evolution between 2019 and 2020 in this focus area are for Recommendation 12 and Recommendation 13. Even considering that the results under Recommendation 12 are not fully comparable between the two years due to some changes to the indicators, Norway's improved positioning reflects the increased conformity of spatial data sets to the applicable EU Regulation No 1089-2010 (applied as a reference in Norway on a voluntary basis). Additional approaches adopted to ensure location data quality governance (Recommendation 13) have also helped to increase the score of this focus area.

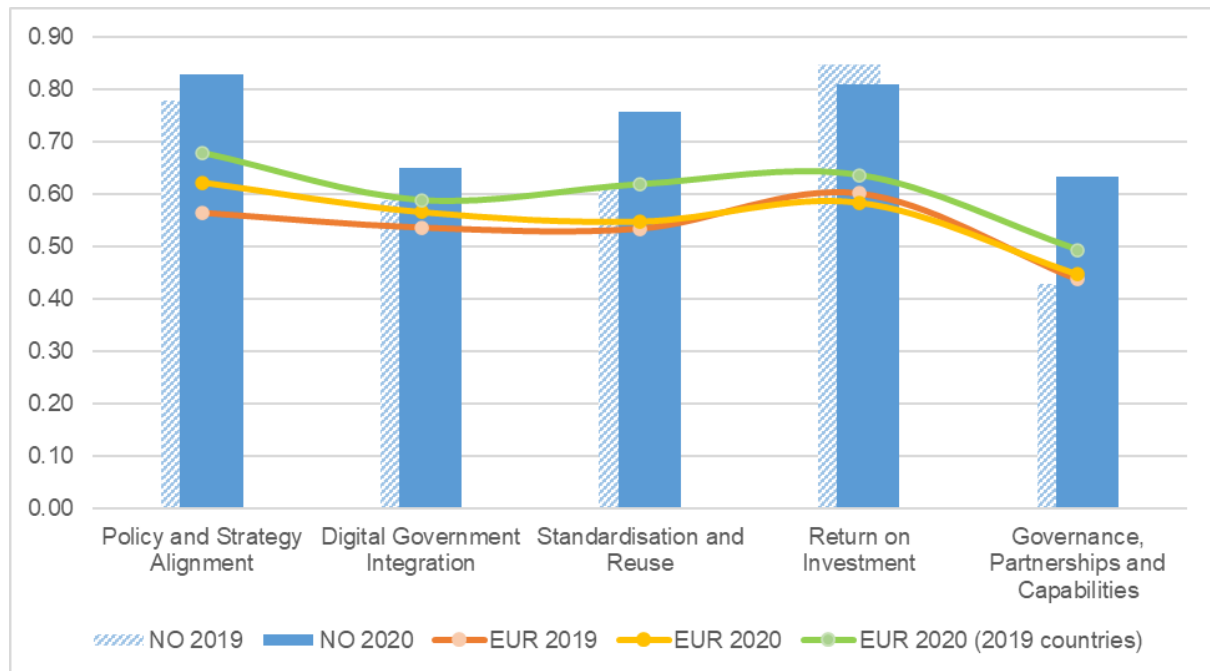*Figure 5 - Comparison between LIFO 2019 and LIFO 2020 - Norway*

The "Governance, Partnerships and Capabilities" focus area has seen a significant improvement, with its index increasing by 0.20 (from 0.43 in 2019 to 0.63 in 2020) surpassing the European average which has slight increased for the 'EUR 2020' countries and increased by 0.04 on the 'EUR 2020 (2019 countries)'. The positive evolution between 2019 and 2020 in this focus area relates to Recommendation 17, where the country reports a reinforced joint leadership and coordination on actions and policies related to the role of the SDI in Digital Government. It is relevant to remark that the increase in this focus area index is also due to the changes in the indicators for 2020.

In "Policy and Strategy Alignment", there has been a slight increase by 0.05 (from 0.78 in 2019 to 0.83 in 2020), in line with the growth of the European average that has seen an increase by 0.06. This step forward is linked with the alignment of location information policy with wider data policies reached at all levels of government. A core reference data policy and a data licensing framework incorporating stakeholders' needs are now in place (Recommendation 2).

For the "Digital Government Integration" focus area, the score has increased by 0.06 (from 0.59 to 0.65 in 2020), surpassing the European average which remained stable compared with 2019 for both for the EUR 2020 and the EUR 2020 (2019 countries). This improvement is due to the higher reported number of key digital public services exploiting location information in a comprehensive way and to the extensive adoption of service improvement approaches for optimising key digital public services in their use of location information (Recommendation 6).

Finally, "Return on Investment" is the only focus area where the score has decreased in comparison to 2019 (-0.04, from 0,85 in 2019 to 0.81 in 2020), in line with the European average which also decreased by -0.04. However, it must be noted that the small decrease of this index score (which remains very high) is due to the changes made to some indicators.

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

3.2. Policy and Strategy Alignment

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

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

3.2.1 2020 Results
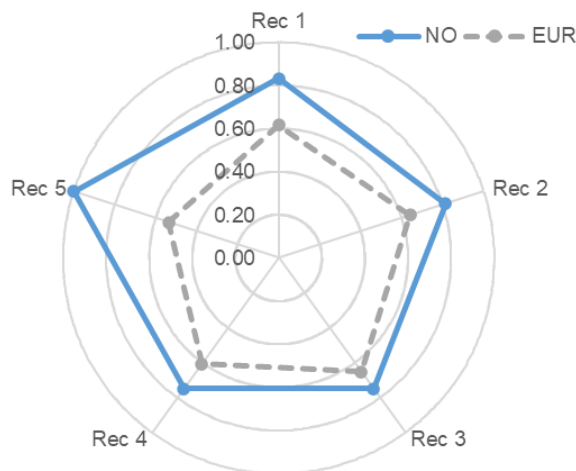
Figure 6 - Policy and Strategy Alignment - scores by recommendation

The "Policy and Strategy Alignment" focus area index for Norway is 0.83, significantly above the European average of 0.62.

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.

Norway's location information strategy, defined in the document "*Everything happens somewhere - National geospatial strategy towards 2025*"[18], builds on and complements the Digital Agenda for Norway (*ICT for Simpler Everyday Life increased Productivity*)[19] and its follow-up strategy, the *Digital strategy of the public sector 2019-2025*[20]. As such, location information and digital government strategies in Norway are aligned in many key elements (Recommendation 1).

The location information strategy is cross-sectoral. It both takes a holistic perspective and supports sectoral goals for the digitisation of the public administration.

---

[18] https://www.regjeringen.no/en/dokumenter/national-geospatial-strategy-towards-2025/id2617560/?ch=1

[19] https://www.regjeringen.no/contentassets/07b212c03fee4d0a94234b101c5b8ef0/en-gb/pdfs/digital_agenda_for_norway_in_brief.pdf

[20] https://www.regjeringen.no/contentassets/db9bf2bf10594ab88a470db40da0d10f/en-gb/pdfs/digital_strategy.pdf

General cross-sector legislation mandates the use in digital government of authoritative location datasets and services.

Figure 7 - Policy and Strategy Alignment – scores by indicator
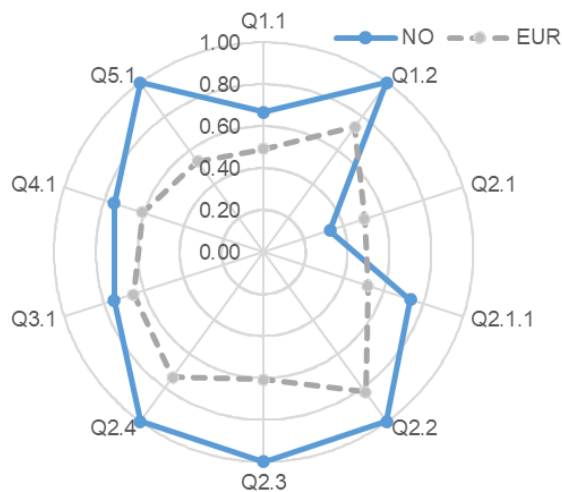
With reference to Recommendation 2, most location data is available free of charge under an open licence without restrictions or under a national data licensing framework, while other data is available with minimum restrictions.

There is a national licence for public data, the Norwegian Public Data Licence (NLOD 2.0)[21], that entitles users to freely copy, use and make available public sector information, provided that they name the contributors and fulfil the terms described in the licence. The licence is without spatial restrictions and has a specific focus on location. It requires reporting in all maps the references of the relevant data sources.

Norway's open data approach is also determined by national guidelines on the publication of public sector information.

A wide range of location core reference datasets are available for general use, although they are not harmonised across borders. One example is the "public map basis" (DOK - Det offentlige kartgrunnlaget)[22], which is public geographical data organised for urban planning and construction work. The purpose of the "public map basis" is to ensure knowledge-based effective urban planning and case management.

The use of these datasets, and related services, made available in Norway's National Spatial Data Infrastructure, is regulated by a specific document[23] that defines the general terms for cooperation in the infrastructure.

Regarding location data protection, most controllers and processors of public sector location data in Norway are fully compliant with GDPR, including awareness of potential location data privacy issues and processes in place to comply with the rights of data subjects (Recommendation 3). No specific complaints, legal cases or fines related to location data privacy involving public administrations are known to date.

With reference to the use of location information for policy making (Recommendation 4), location-based evidence and analysis are used to help in developing relevant policies and monitoring outcomes in most relevant policy topics. For instance, location-based analysis is used for identifying areas exposed to flooding at a national level[24]. Similarly, location data on snow avalanches, landslides and floods are mapped and used for planning, civil protection and emergency response[25].

Recommendation 5, on procurement of location data and services, shows that the Norwegian government has set out public sector targets and standards for e-procurement, in alignment with broader European initiatives. Legislation passed in 2012 requires that Norwegian public sector entities must use digital mechanisms for all procurement activities, such as the

---

[21] https://data.norge.no/nlod/no/2.0
[22] https://register.geonorge.no/register/det-offentlige-kartgrunnlaget/dekning
[23] https://www.geonorge.no/globalassets/geonorge2/avtaler-og-bilag-norge-digitalt/generelle-vilkar.pdf
[24] https://kartkatalog.geonorge.no/metadata/flom-aktsomhetsomr%C3%A5der-wms/834179b8-d189-4bc0-b00f-533ffe80faed
[25] https://kartkatalog.geonorge.no/metadata/skredfaresoner-wms/551ebd8b-d5e8-4304-a030-505b03dd8773

European Single Procurement Document (ESPD)[26]. In this context, public sector procurements of location information and/or services make reference to standards-based architecture documents describing where and how the procured components must fit. Examples of relevant procurement documents are:

- technical framework for the NSDI[27], which gives direct links to requirements and recommendations to be applied in procurement (several of which refer to INSPIRE);
- National Public Procurement and Regulation 2020[28], which covers common issues in public procurement laws and regulations. It is a framework and has no reference to standards;
- the Planning and Building Act[29], which mandates the application of a national land-use planning standard.

3.2.2 2019/2020 Comparison
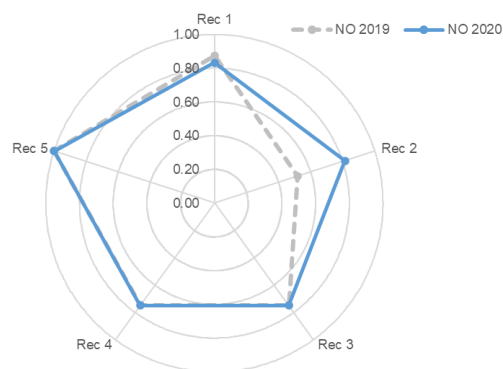
Figure 8 - Policy and Strategy Alignment – 2019/ 2020 comparison

As shown in Figure 8, compared with the previous year, the improvement encountered in this focus area is mostly due to Recommendation 2. Norway's location information policy is now aligned with wider data policies at all levels of government. Additionally, in 2020, a core reference data policy and a data licensing framework incorporating location data have been put in place.

Under the remaining recommendations, Norway has confirmed the good positioning reached in 2019. There is a significant degree of alignment in the location strategy on digital government elements and in the digital strategy on location elements (Recommendation 1). Most controllers and processors of public sector location data are compliant with GDPR (Recommendation 3). The country continues to use location-based evidence and analysis to help developing relevant policies (Recommendation 4) in most relevant policy topics. Finally, Norway continues applying public sector targets and standards for e-procurement, in line with broader European initiatives (Recommendation 5).

---

[26] https://www.anskaffelser.no/avtaler-og-regelverk/lov-og-forskrifter
[27] See https://register.geonorge.no/data/documents/Rammeverksdokumentet_teknologisk-rammeverk-for-den-geografiske-infrastrukturen_v1_versjon-1_0_.html
[28] See https://www.adeb.no/globalassets/publikasjoner/english-publications/public-procurement-and-government-contracts-2020-norway.pdf
[29] See https://lovdata.no/dokument/NL/lov/2008-06-27-71

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
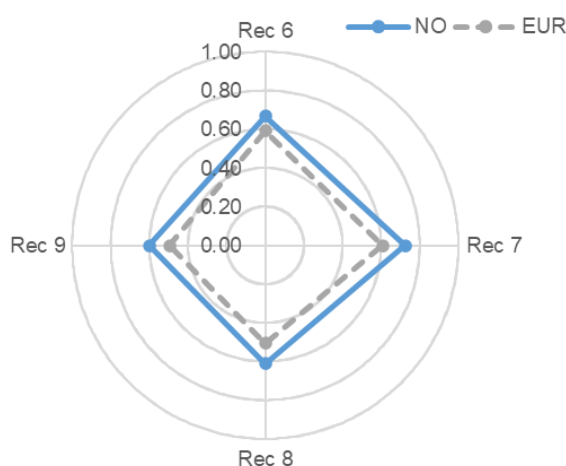
Figure 9 - Digital Government Integration – scores by recommendation

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 to the European averages.

The "Digital Government Integration" focus area index for Norway is 0.65, above the European average of 0.57, and with positive variations for all recommendations.

The highest alignment with the EULF Blueprint in this focus area is reported for Recommendation 7. The public sector SDI is widely used in Norway for delivering digital public services across public bodies, with the datasets used in line with the INSPIRE Directive. INSPIRE is implemented in Norway's Geodata act[30] and in the regulations on the Geodata act[31]. The implementing rules are translated to Norwegian and are legally binding documents.

In this context, examples of digital public services reusing data from the SDI are:

- SeEiendom[32], a portal where citizens have access to land register information; searches of property information are possible by road name, address or farm and utility number;

---

[30] https://lovdata.no/dokument/NL/lov/2010-09-03-56
[31] https://lovdata.no/dokument/SF/forskrift/2012-08-08-797
[32] See https://seeiendom.kartverket.no/

- Gårdskart på nett[33], a system for assigning financial support to agricultural businesses (where location is a key element);
- Fix Errors in Map[34], an application enabling citizens to propose updates to spatial data.

All these examples apply spatial data services as described in INSPIRE.

The national SDI is the main approach used for the delivery of key digital public services in the following domains (in parentheses the main frameworks used for each of them): agriculture (geonorge.no), civil registry (geonorge.no), environment (geonorge.no and Naturbase), marine (geonorge.go, Barentswatch, Mareano, Kystinfo), property and land administration (geonorge.no and Cadastre), and transport (geonorge.no and National Road Data Base).
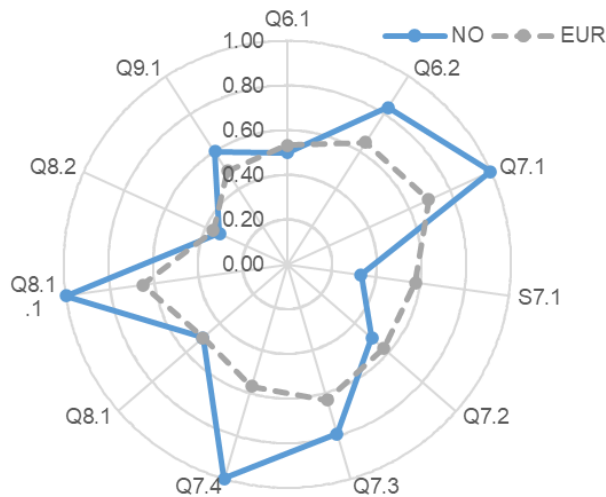

Figure 10 – Digital Government Integration – scores by indicator

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

Public sector location datasets are harmonised according to INSPIRE data specifications for use in cross-border public services. An example is the common representation of the borders between Norway and Sweden, where a series of connection points have been established (mainly for lakes, rivers and some man-made constructions like buildings)[35].The country is also engaged in the delivery of cross-sector digital public services using INSPIRE for harmonisation of data applications. An example is the EULF transportation pilot[36].

Norway, as all EFTA countries, is not subject to the obligation of regular reporting on the implementation of INSPIRE Directive, unlike EU Member States that are assessed and rated according to their reports submitted every three years. Nonetheless, Norway does elect to provide INSPIRE monitoring information. The INSPIRE country fiche for 2019[37] registers a complete or almost complete implementation for the identification and description of spatial datasets and for the provision of services for the identified datasets. There are still significant areas for improvement for the implementation of the key obligations on dataset interoperability.

Results under Recommendation 9 also show relatively high alignment with the EULF Blueprint. Various actions are implemented in Norway for the integration of location and statistical information, 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;

---

[33] See https://gardskart.nibio.no/search

[34] See https://retteikartet.no

[35] This digital map is available via app for mobile and tablet at https://kartverket.no/Kart/Hele-Norge-rett-i-lomma/.

[36] See Best Practice NO1

[37] The country fiche highlights the progress of the country in the various areas of INSPIRE implementation and presents an outlook of planned actions for further improvement of the INSPIRE implementation. The country fiche includes information acquired through the triannual INSPIRE implementation report.

- location-based statistics updated dynamically to give an up-to-date snapshot to aid decision-making;
- capture of the spatio-temporal dimension of statistics in a format that enables it to be used readily in a GIS for geostatistical analysis;
- contribution to European projects aiming at establishing a data and production infrastructure for location-based statistics (e.g. GEOSTAT).

Norway scores well under Recommendation 6, as the country has largely adopted service improvement approaches for optimising the use of location information in key digital public services. There are interesting examples of key digital public services using location information in an innovative way (i.e. location information is used as a contribution, e.g. to integrate processes, location-based analytics, AI algorithms), such as:

- Gårdskart på nett[38];
- Digital plan dialog: a service that collects and presents information about planned land use and documents for planning purpose[39].

There are also several examples of key digital public services using location information in a comprehensive way (i.e. that use location information as an important feature in the design and delivery of the service), such as:

- SeEeiendom[40];
- Fix Errors in Map[41];
- Species observations: enables citizens to register observations for new species in the national register[42].

Norway performs above the European average, in its use of an open and collaborative methodology to design and improve location enabled digital public services, which is applied in several cases at the local, sub-national and national level through consultations, user groups, feedback requests and iterative development (Recommendation 8). Public authorities make their location data openly available for external parties, including private sector, NGOs and citizens, to develop their own products and services. Citizens in particular are further involved in specific actions, such as making corrections directly on maps (through the Fix Errors in Map application), identification of hiking paths by the Norwegian Trekking Association, registration of landslides[43] or registration of natural species.

Some other examples of the collaboration with citizens and the private sector are:

- Geointegration: a framework consisting of interfaces to the land register and planning register. It has been developed as a standard, consensus-based process, with funding of certain costs provided by the private sector for design, development and testing;
- Geosyncronization: a service that ensures that local copies are synchronised with national databases. Similar to the above service, it has been developed through a consensus process, and involvement of the private sector for funding;
- Fellestjenester BYGG: an innovative platform for control and submission of building permits[44].

---

[38] See page 14 and note 33
[39] https://www.dialog.lk/
[40] See page 13 and note 32
[41] See page 14 and note 34
[42] https://www.artsobservasjoner.no/
[43] https://www.skredregistrering.no/
[44] See Best Practice NO2

3.3.2 2019/2020 Comparison

Compared with 2019, the improvement of the focus area index is mostly linked to Recommendation 6. This is due to the higher number of key digital public services using comprehensive location information (see Figure 11). The country now adopts a range of service improvement approaches for optimising key digital public services in their use of location information, whereas in 2019, only limited steps were taken.

Under the other recommendations, Norway's positioning confirms the positive trend registered in 2019. The slight differences in the recommendation indexes are due to the change in the scale of some indicators.
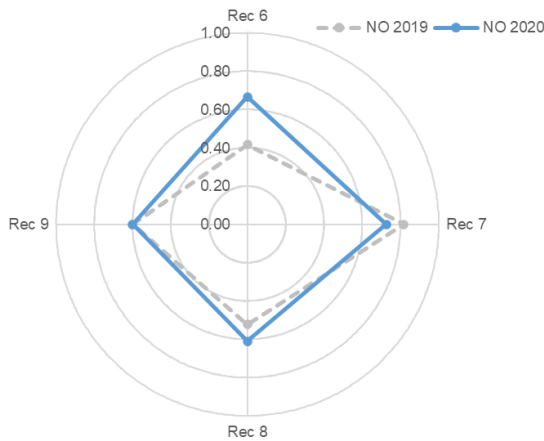
Figure 11 - Digital Government Integration – 2019/2020 comparison

The location data (SDI) framework continues delivering digital public services across government (Recommendation 7).

Norway has also maintained its positioning in the use of an open and collaborative methodology to design and improve location-enabled digital public services (Recommendation 8). When delivering location-based digital public services, external parties continue to be involved in the same ways as in 2019.

Finally, the same range of actions has been implemented in 2020, compared with 2019, for the integration of location and statistical information in the production of location-based statistics (Recommendation 9).

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

The "Standardisation and Reuse" focus area index for Norway is 0.76, compared to European average of 0.55. 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.
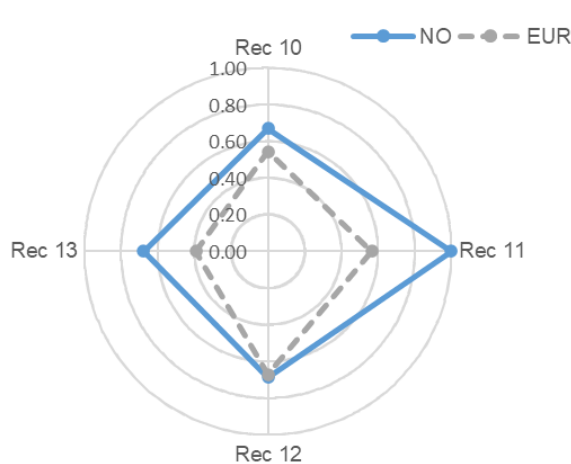
Figure 12 - Standardisation and Reuse – scores by recommendation

The strongest practice within this focus area is related to the reuse of authentic registers and solutions (Recommendation 11).

In this regard:

• reuse of national generic ICT solutions is made in the SDI;
• the possibility for re-using generic ICT solutions in the SDI is planned or has been studied;
• reuse of generic ICT solutions from other national or international catalogues is made in the SDI.

Several registers of location information are implemented, namely: addresses, geographical names, administrative units, cadastral parcels, buildings, hydrography, transport networks, glossary, code lists, GML schemas, namespaces, product specifications, feature concept registry, digital cartography, EPSG codes.

Concerning location data quality, Norway has performed above the European average (Recommendation 13), since several actions are typically implemented for this purpose. In terms of design, these actions include:

19

- development and application of a framework for analysis of data quality;
- linking data quality standards to data standards;
- inclusion of the different dimensions of data quality in the standard, such as timeliness, accuracy, completeness, integrity, consistency, compliance to specifications / standards and legislation.

In terms of measurement, the actions implemented are:

- measurement of conformance of data to quality parameters set out in the data policy on an agreed frequency;
- ex-post evaluation of existing data quality issues.

The main standards applied to ensure location data quality are the ISO Standard 19157 on Data Quality and the W3C Data Quality Vocabulary (DQV).

Several actions are in place in relation to location data quality governance, namely:

- alignment of the data quality improvement roadmap with the information governance vision and strategy;
- existence of a cross-unit or cross-organisation special interest group for data quality;
- definition of a data quality review process;
- collection of feedback from users to report problems and help improve data quality.

The adoption of a common architecture to develop digital government solutions (Recommendation 10) is well established. The location data architectural approach in Norway fits within a broader national ICT architectural framework based on the EIF / EIRA.

A more ad-hoc procedure is in place to discover, explore and incorporate new technological features or emerging technologies; with very little testing being carried out.

APIs are available for all high value location datasets[45] as part of a national strategy. For instance, APIs are available for addresses[46] and cultural heritage[47]. Guidelines on geospatial APIs and services are also provided[48].
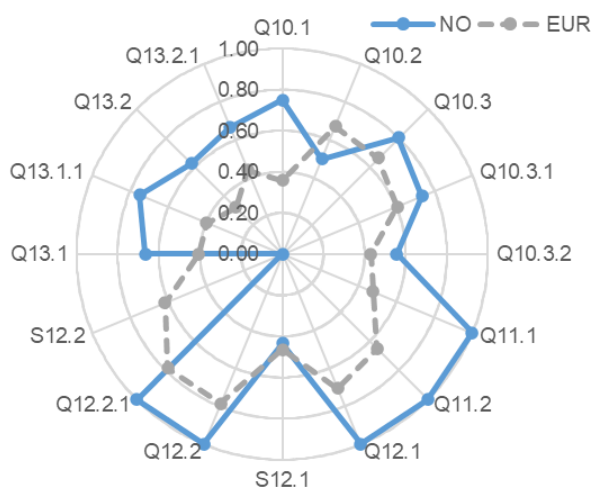
Figure 13 - Standardisation and Reuse – scores by indicator

Based on the INSPIRE monitoring, a good percentage of datasets are in conformity with Regulation (EU) No 1089/2010 and no network services are in conformity with Regulation (EC) No 976/2009 (Recommendation 12). This should be viewed in light of the longer deadlines for the implementation of EU regulations applicable to EFTA countries.

To connect geospatial data and general data, national and international specifications and tools are used.

The following geospatial domain standards are applied:

- international standards (like ISO/TC211, OGC, IHO, GDF);

---

[45] https://kartkatalog.geonorge.no/?DistributionProtocols=REST-API&organization=Kartverket
[46] https://kartkatalog.geonorge.no/metadata/44eeffdc-6069-4000-a49b-2d6bfc59ac61
[47] https://kartkatalog.geonorge.no/metadata/1e9b83e3-40e7-43ee-a96a-b9a084edc212
[48] https://kartverket.no/

- adaptations of international standards (e.g. INSPIRE);
- W3C;
- IETF(GeoJSON);
- standalone domestic standards.

3.4.2 2019/2020 Comparison
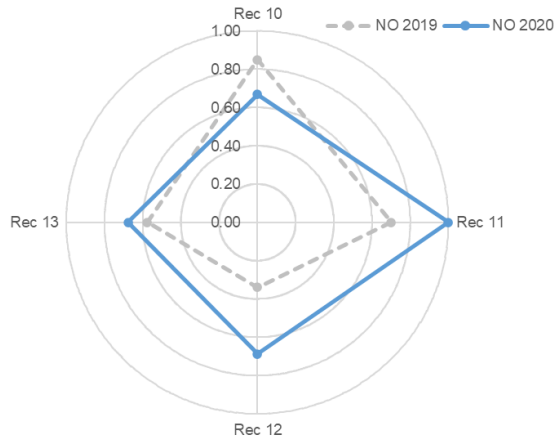
Figure 14 - Standardisation and Reuse – 2019/ 2020 comparison

Compared with the previous year, there is a significant increase in the score under Recommendation 12 and Recommendation 11, as shown in Figure 14. For Recommendation 12, Norway's practice has improved due to the significant progress of the indicator on the conformity of spatial data sets to the applicable EU Regulation No 1089-2010, which Norway has adopted on a voluntary basis. It must be noted that there is a change in terms of questions proposed in the survey. In 2020, one more indicator was added, in addition to a substantial change in one of the existing indicators.

The country now reports making use of generic ICT solutions in the SDI, such as those designed by the ISA/ISA² programme, and has reported an additional implemented register of location information (a glossary) since 2019 (Recommendation 11). It must be noted that the comparability of results is also affected by some changed and new indicators.

With respect to Recommendation 13, the better result compared to 2019 is due to a more extensive approach used to ensure location data quality governance.

Finally, Norway has decreased its score for Recommendation 10, where a clear approach to monitoring, testing and upscaling of new technological developments is not reported anymore. Instead, a more ad-hoc approach with very little testing is currently being applied.

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 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
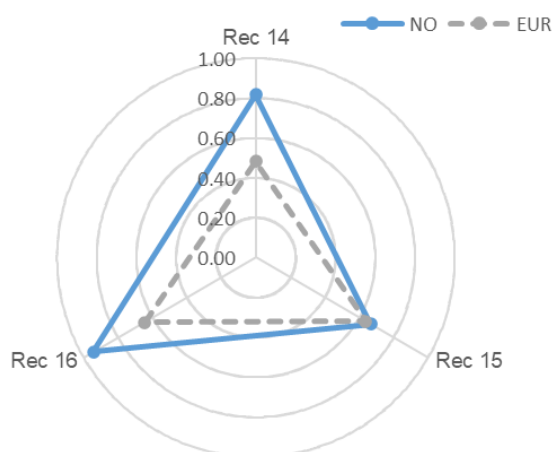
Figure 15 – Return on Investment – scores by recommendation

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 to European averages.

The "Return on Investment" focus area index for Norway is 0.81, well above the European average of 0.58, and with positive variations for all recommendations.

Norway scores particularly well under Recommendation 16, concerning both data policy enablers and the support to innovation and growth. Several 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. Such measures include:

- a national open data portal merging location data and non-location data;
- a national discovery geoportal integrating INSPIRE and non-INSPIRE data;
- a geoportal harvested by the European Data Portal;
- thematic portals complementing general search facilities with "specialist" search;
- websites with exposition of data;
- spatial data sets made available on web search engines;
- metadata APIs.

Additionally, there are policies supporting the reuse of Public Sector Information by the private sector.

Many actions are implemented to support private, non-profit and academic actors in the development of new products and e-services:

- an open data policy[49];
- promoting access to open data through hackathons[50];
- testbeds for trial use of public sector data;
- 'innovation labs' or 'innovation hubs'[51];
- government sponsorship of 'innovation' pilot projects, potentially with grants / funding;
- non-government actors in the governance framework for public sector data – an example is provided by the working group for the technological framework for the SDI (including the technical governance framework);
- establishing digital platforms through which a community of data providers, consumers and partners is actively engaged in the sharing, enhancing and using of location data and value is created for all partners in the ecosystem[52];
- collecting requirements of businesses, research institutions and other (potential) users for consideration in further development of INSPIRE/SDI;
- collecting best practice examples of how private companies, citizens, academic institutions and other users make use of INSPIRE/SDI data and services;
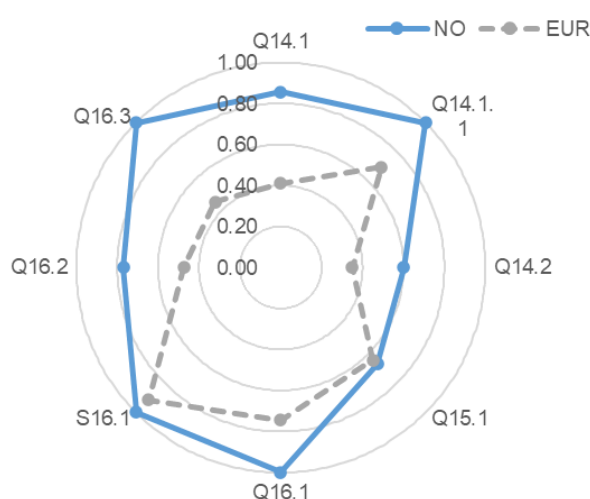- training in necessary skills to exploit the SDI.

Figure 16 - Return on Investment – scores by indicator

The development of new products and services is also supported by the provisions of the digitisation strategy[53] that includes specific focus on data sharing and reuse from public administrations, with the aim of ensuring increased wealth creation for private businesses.[54] Additionally, Norway has a strategic approach to funding public sector location reference data together with funding other important public sector authentic datasets.

Norway is well positioned under Recommendation 14, due to the wide range of elements considered for assessment of the efficiency and effectiveness of location-based services. Such elements include: total cost of ownership (for high value data), risks, reusability, availability, responsiveness, return on investment, reduction in administrative burden, simplification of administrative processes, increased participation, enhanced business opportunities, user satisfaction and user-centricity. The evaluation is made at various steps (during strategic planning or post-execution evaluation) and at various levels (project or service level, organisational level and SDI / national level).

Among the actions implemented for impact-based improvement in location-enabled processes and services there are:

---

[49] https://data.norge.no/
[50] E.g. Hack4Norway, see https://data.europa.eu/it/news/exploring-norways-open-data
[51] https://nordicedge.org/smart-city-innovation-cluster/
[52] https://www.digdir.no/digitalisering-og-samordning/nasjonalt-ressurssenter-deling-av-data/1914digitalPlatforms
[53] https://www.regjeringen.no/no/dokumenter/en-digital-offentlig-sektor/id2653874/?ch=1
[54] See for example the Resource Centre for Data Sharing at https://www.digdir.no/datadeling/norwegian-resource-centre-sharing-data/2766

- identification and monitoring of the benefits of location information: most initiatives that require some governmental funding need to provide some sort of potential profit considerations. Some references in that respect are:
  - the Geolett project[55], which includes an approach to monitor the benefits of high value data for automated building permits[56];
  - a preliminary study for the development of business models, standards and technology in the Norwegian construction industry[57] that considers the benefits from using Building Information Modelling (BIM) in service chains;
  - a report[58] describing the potential positive outcome coming from the use of data and service management in public sector (but not limited to location-enabled digital public services);
- use of the monitoring information to fund improvements in particular location data or services and to prioritise investment across the governmental portfolio - an example is provided by the Geovekst project[59], which focuses on the cost sharing of large scale topographic base maps;
- use of a common maturity assessment method across EU Member States and benchmarking of performance measurement with other MS. This includes identification and monitoring of the benefits of location information – an example is provided by the maturity assessment of the cadastre model.

Finally, the communication of availability and benefits of location data and location-enabled digital public services to raise awareness and understanding, is frequently performed in a thorough and convincing way (Recommendation 15). Examples are:

- information management meetings organised by the national digitization agency as a communication forum;
- technical framework for the SDI which focuses on requirements and recommendations from public sector in general;
- publication of newsletter on the SDI (also focusing on benefits evidence);
- a "Best practise competition"[60] organised by the Ministry of Local Government and Modernization on new and innovative applications of geospatial data.

The benefits identified concern first of all improvements in processes (better cooperation, solution and data reuse, seamless and integrated services, standardisation, general interoperability and alignment with the EU). Some outcome benefits have also been identified (e.g. improved capability to cooperate in facing social and environmental challenges, support to economy and trade, evidence-based policy making). Benefits have not specifically been measured, but rather highlighted through use cases (e.g. the results obtained by exploiting the SDI in the national ecosystem, the definition of the SDI technological framework).

3.5.2 2019/2020 Comparison

Norway improved its practices under Recommendation 14, in comparison with 2019 as shown in Figure 17.

More specifically, the country is now using three additional types of elements to assess the efficiency and effectiveness of location-based services. Evaluations are more extensively

---

[55] https://www.digdir.no/digitalisering-og-samordning/direktoratet-byggkvalitet-prosjekt-geolett/1801
[56] Mulighetsstudie GeoLett - Direktoratet for byggkvalitet (dibk.no)
[57] https://www.standard.no/Global/PDF/Standard%20Morgen/2020BIM-rapport/Standard_rapport%20BIM_enkeltsider_SKJERM.pdf
[58] 24rapport_informasjonsforvaltning.pdf (menon.no)
[59] https://www.kartverket.no/geodataarbeid/geovekst
[60] https://www.regjeringen.no/no/aktuelt/diplom-for-geodata-mot-korona-og-strandsoppel/id2789852/

made at the strategic planning or evaluation phases, at the project or service level, and at organisational level and at SDI / national level.
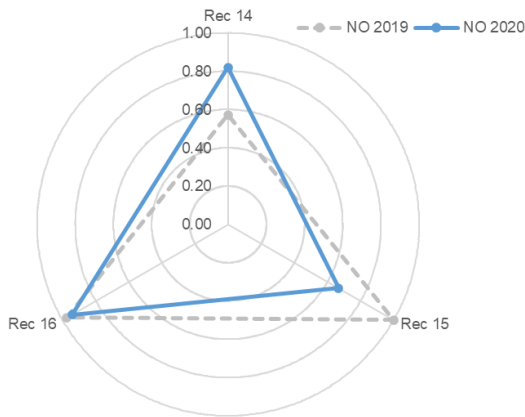
Figure 17 - Return on Investment - 2019/ 2020 comparison

Recommendation 15 showed a decrease in the score only due to change in the corresponding indicator. In reality, communication activities have not dinimished, but have rather seen a slight intensification. There are several initiatives of the Norwegian Mapping Authority in cooperation with the digitisation agency regarding information management and architectures for the digital ecosystem. Norway is also member of SKATE, the Strategic Cooperation Council for Management and Coordination of eGovernment Services, which focuses on interoperability between domains of different public administrations.

Norway has maintained its positioning under Recommendation 16, as both in 2019 and 2020 it has implemented all available measures to make the process of searching, finding and accessing location data and web services as easy as possible for companies, research institutions, citizens and other interested parties.

3.5. Governance, Partnerships and Capabilities

Vision	
	There is high level support for a strategic approach to the funding and availability of location information at Member State and EU level, based on INSPIRE and other tools to achieve interoperability. Effective governance, partnerships, work programmes, responsibilities and capabilities to progress such an approach have been established, taking into account the needs and expectations of stakeholders at Member State and EU level. Governments recognise the importance of 'location' understanding and skills and invest in awareness raising, training and resourcing.
Service design takes account of user capabilities. Specialists form communities to share knowledge and develop new ideas related to location information. As a result, there is a sufficient level of understanding and skills to develop, deploy and use effective location-based services.	
Recommendation 17	Introduce an integrated governance of location information processes at all levels of government, bringing together different governmental and non-governmental actors around a common goal
Recommendation 18	Partner effectively to ensure the successful development and exploitation of Spatial Data Infrastructures
Recommendation 19	Invest in communications and skills programmes to ensure sufficient awareness and capabilities to drive through improvements in the use of location information in digital public services and support growth opportunities

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

3.6.1 2020 Results

- The "Governance, Partnerships and Capabilities" focus area index for Norway is 0.63, well above the European average of 0.45, and with higher than average scores for all recommendations. 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.
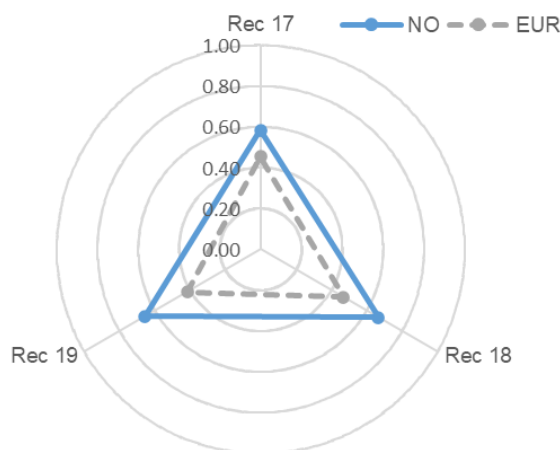
Figure 18 - Governance, Partnerships and Capabilities – scores by recommendation

Formal agreements are in place between public authorities to finance, build and operate many location data services or digital public services using location data (Recommendation 18).

An example is *Norway Digital*[61], a collaboration between organisations responsible for providing established NSDI information and major users of such information. The participation of each partner is formalised by means of a standard agreement. The parties pay an annual fee to assist with financing basic data sets and agree to share their own data in the infrastructure by adopting a common technical framework and set of standards.

Formal agreements with public authorities in other countries and public private partnerships are in place for a number of services or applications. Two examples are:

---

[61] See Best Practice NO3

- establishment of connection points between Norway and neighbouring countries to enable cross-border spatial data sharing. These have been established for electric lines, roads, railways, rivers and lake boundaries that cross the national border between Norway and Finland and between Norway and Sweden.
- sharing of data for the emergency services on the borders between Norway and Sweden.

As a part of the Norway Digital initiative, there are private companies that co-finance core reference data (FKB) for a certain set of themes[62]. Examples are:

- Geointegration[63]: a framework consisting of interfaces to the land register and planning register. It was developed as a standard and has been designed, developed and tested in broad collaboration between municipalities, suppliers (also from the private sector) and government agencies.
- Geosyncronization[64]: a service that ensure that local copies of geospatial information are synchronised with national databases. It was developed as a standard and has been designed, developed and tested in broad collaboration between municipalities, suppliers (also from the private sector) and government agencies.
- Geolett[65]: a project aimed at contributing to cost savings and increased quality in the construction industry.
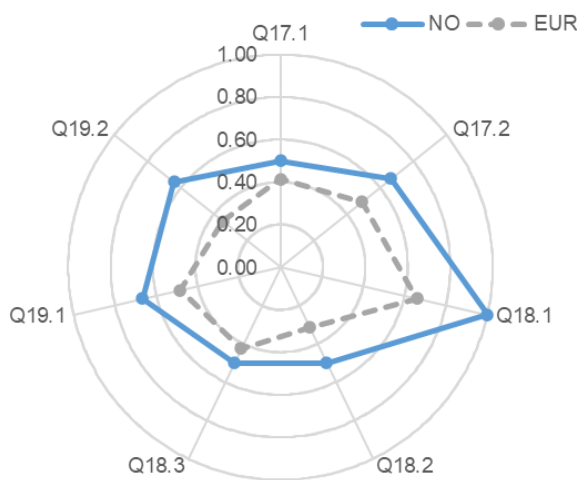

Figure 19 - Governance, Partnerships and Capabilities-scores by indicator

Integrated governance of location information processes in Norway includes participation and collaboration in decision making processes through a consortium of relevant communities (location and digital government), domains (thematic), administrative levels (central and local) and sectors (public, private, academic, society)(Recommendation 17)[66].

An integral role in the above process is played by the Norwegian Mapping Authority, which is responsible for the coordination of location information and the SDI.

Training and awareness raising on geospatial skills are undertaken by some organisations as part of a recognised geospatial competency framework (Recommendation 19).

Several initiatives are organised to raise awareness and develop geospatial skills, i.e.:

- a public sector location information / GI champion – an example is provided by the leadership award as the best national Geospatial Agency hosted by "Geospatial World"[67];
- location information / GI champions in individual organisations where location information plays a significant role – an example is provided by the Geodata council/ministers competition on innovation[68];

---

[62] https://www.kartverket.no/en/geodataarbeid/geovekst
[63] http://geointegrasjon.no/
[64] https://www.kartverket.no/globalassets/geodataarbeid/standardisering/standarder/standarder-geografisk-informasjon/geosynkronisering-1.0-standarder-geografisk-informasjon.pdf
[65] See note 55
[66] https://lovdata.no/dokument/SF/forskrift/2012-08-08-797
[67] https://geospatialworldforum.org/virtual-awards/agenda.html
[68] https://www.regjeringen.no/no/aktuelt/diplom-for-geodata-mot-korona-og-strandsoppel/id2789852/

- 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;
- public or cross-government events specialising in location information / GI topics INSPIRE training modules;
- online self-learning tools;
- national guidelines on digital skills.

3.6.2 2019/2020 Comparison

Figure 20 - Governance, Partnerships and Capabilities - 2019/ 2020 comparison
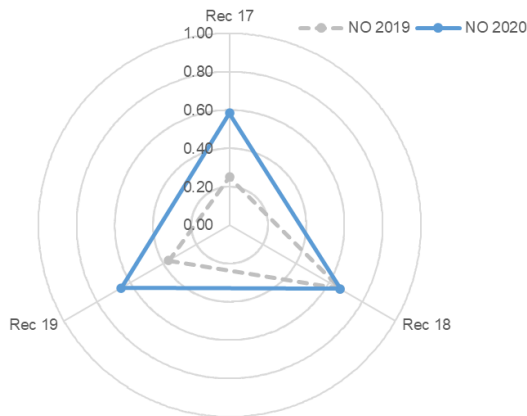
Norway continues to report considerable involvement of relevant communities (location and digital government), domains (thematic), administrative levels (central and local) and sectors (public, private, academic, society) in decision making on the role of location information in Digital Government (Recommendation 17). This is due to Norway's new strong joint leadership and coordination on actions and policies related to the role of the SDI in Digital Government.

In 2020 Norway has not shown any increase in the number of formal agreements signed between Norwegian public authorities or with public authorities of other countries or with the private sector (Recommendation 18).

As for Recommendation 19 an equivalent emphasis on the strategic approach to skills and training for innovative geospatial solutions is in place. An additional initiative to raise awareness and develop geospatial skills is the adoption of national guidelines on digital skills.

For Recommendation 19, final scores report a higher value compared with the previous year mainly because of the changes in the indicators used in 2020.

4. Best Practices

Best Practice NO1	Road data exchange in Norway and Sweden

Policy domain: Intelligent Transport Systems

Process owner: Norwegian Road Authorities and Mapping Agencies

Short description: The EULF Transportation pilot, focused on Norway and Sweden, established an up-to-date flow of road safety data between road authorities and commercial map providers, and provided guidance on linear referencing and exchange standards (the TN-ITS protocol), supporting the aims of the ITS (Intelligent Transport Systems) Directive and drawing on INSPIRE.

This work highlighted: (i) the value of timely road safety updates for commercial map providers and users; (ii) the need for public road authorities to make each step in their data processing as timely as possible, to minimise the time taken from making a physical change to disseminating the information about that change; (iii) the need to put in place effective data sharing and collaboration agreements between public and private parties, complementing the tested technical solution (iv) the need to agree on a common location referencing method to facilitate road data exchange (v) the importance of relying on INSPIRE transport network data when national road databases are not available.

Recommendation: Digital Government Integration (6, 7, 8); Standardisation and Reuse (11, 12); Return on Investment (15, 16); Governance, Partnerships and Capabilities (17, 18)

Link: https://joinup.ec.europa.eu/sites/default/files/inline-files/EULF%20Factsheet%20Transportation%20Pilot%20v1%20final.pdf

Best Practice NO2	Fellestjenester BYGG

Policy domain: Construction

Process owners: Directorate for Building Quality

Short description: Fellestjenester BYGG (Joint Services BUILD) is a toolkit for service providers in the ICT industry who want to develop commercial application solutions for building applications for both professional and public users. With the help of Joint Services BUILD, all digital building applications will come to the municipalities in a common format and appearance regardless of which application system is selected.
Joint services BUILD offers automatic control of a building application before submission to the municipality. In addition, digital dissemination of applications and further dialogue between the applicant and the municipality in connection with the processing of the application is ensured.

Recommendation: Digital Government Integration (7); Return on Investment (16); Governance, Partnerships and Capabilities (18)

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

Best Practice NO3	Geointegration

Policy domain: ICT and Geodata

Process owners: Norwegian Mapping Authority; Norwegian Association of Local & Regional Authorities (KS)

Short description: Geointegration is a framework consisting of interfaces to the land register and planning register. It has been developed as a standard, consensus-based process, with funding on certain costs provided by the private sector for design, development and testing.

Recommendation: Digital Government Integration (8); Standardisation and Reuse (12); Return on Investment (16); Governance, Partnerships and Capabilities (17, 18)

Link: http://geointegrasjon.no/standard/

Best Practice NO4	Registration of avalanches

Policy domain: Disaster forecasting and management

Process owners: NVE - Norges vassdrags- og energidirektorat (Norwegian Water Resources and Energy Directorate)

Short description: The monitoring of landslides and avalanches includes an overview of spatial and temporal distribution of such events, their number, type and size. An event inventory is particularly critical after a warning for risks of landslides or avalanches, to evaluate if the warning level and the warning area were correct and to improve the forecasting capabilities. NVE operates a national database, in cooperation with other national institutes, where everybody can register landslide events. Due to the diverse level of expertise of users registering the event, data is reviewed and validated by NVE experts.

Recommendation: Policy and Strategy Alignment (4) Digital Government Integration (8); Governance, Partnerships and Capabilities (18)

Link: https://www.skredregistrering.no/

Best Practice NO5	Norway Digital

Policy domain: Geospatial

Process owners: Norwegian Mapping Authority

Short description: *Norway Digital* is a formal collaboration between organisations that are responsible for providing established NSDI information and / or who are major users of such information. The partners in the collaboration are municipalities, counties and national agencies that are suppliers and users of geographical data and online services. There are common technical and administrative obligations based on the Geodata Act[69] and common agreed requirements in the cooperation.

Recommendation: Governance, Partnerships and Capabilities (17, 18)

Link: https://www.geonorge.no/Geodataarbeid/Norge-digitalt/

---

[69] https://lovdata.no/dokument/NL/lov/2010-09-03-56

List of abbreviations and definitions

Abbreviations

Abbreviation	Meaning
BIM	Building Information Modelling
CSW	Catalogue Service – Web
DBGT	Geo-Topographic Data Base
DCAT-AP	Data Catalogue vocabulary – Application Profile
DQV	Data Quality Vocabulary
DOK	Det offentlige kartgrunnlaget (Public Map Basis)
EFTA	European Free Trade Association
EIF	European Interoperability Framework
EIRA	European Interoperability Reference Architecture
ELISE	European Location Interoperability Solutions for e-Government
EPSG	European Petroleum Survey Group
ESPD	European Single Procurement Document
EULF	European Union Location Framework
FKB	Felles kartdatabase (Fundamental Geospatial Data)
GDF	Geographic Data Files
GDPR	General Data Protection Regulation
GI	Geographic Information
GML	Geography Markup Language
G2B	Government to Business
G2C	Government to Citizen
G2G	Government to Government
ICT	Information and Communication Technology
IETF	Internet Engineering Task Force
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
NLOD	Norwegian Licence for Open Government Data
NSDI	National Spatial Data Infrastructure
NVE	Norges vassdrags- og energidirektorat (Norwegian Water Resources and Energy Directorate)
OGC	Open Geospatial Consortium
REST	Representational state transfer
SDI	Spatial Data Infrastructure
W3C	World Wide Web Consortium
WCS	Web Coverage Service
WFS	Web Feature Service
WMS	Web Map Service

Definitions

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

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

List of figures

List of tables
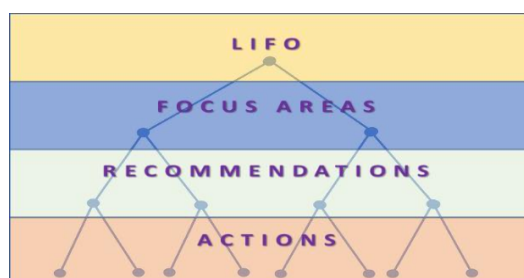
Annex 1: LIFO 2020 Scoring methodology

Figure 7 – Hierarchy of indicators and indexes

The LIFO analytical model, described in the *LIFO 2020 Guidelines and recommendations*[70], 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 actions[71] 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.

---

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

[71] Described in the "How" section of each Recommendation.

Annex 2: LIFO 2020 Indicators

Focus Area: Policy and Strategy Alignment			Changes vs 2019
No.	Indicator	Question	
Recommendation 1			
Q1.1	Alignment between location and digital government strategies	Is there a location strategy in your country that is closely connected to your digital government strategy?	Change in scale
Q1.1.1	Link to strategies	Please supply links to the location strategy and digital government strategy.	
Q1.2	Use in digital government of authoritative location datasets and services	To what extent is the use in digital government of authoritative location datasets and services regulated by legislation and/or binding agreements?	
Recommendation 2			
Q2.1	Licensing policy	To what extent is location data available free of charge under an open licence without restrictions or with minimum restrictions?	Change in scale
Q2.1.1	Licensing policy – covered datasets	Which of the following core location datasets with high importance for multiple external users (also known as "high value datasets" in national and European open data strategies) can be accessed (e.g. through APIs or downloads) free of charge under an open licence without restrictions or with minimum restrictions?:	New question
Q2.2	Core reference data policy on location data	Are core location reference datasets (for the list of core location datasets please refer to Q2.1.1) made available as part of a broader core reference data policy (which also includes people, businesses, vehicles etc.)?	Change in scale
Q2.3	Use of common data licensing frameworks	To what extent is location data available under a common licensing framework for all government data?	Change in scale
Q2.4	Coverage of location data by national guidelines on the publication of Public Sector Information	Do your pan-government guidelines on the publication of public sector data cover location aspects? "Cover location aspects" means that in the guidelines some specific geospatial topics are highlighted (e.g. formats, encoding, accessibility trough specific web services, specific legislation,).	
Recommendation 3			
Q3.1	Preparedness for GDPR under location aspects	How well-prepared are controllers and processors of public sector location data in your country for GDPR, including awareness of potential location data privacy issues	

		and processes in place to comply with the rights of data subjects?	
Recommendation 4			
Q4.1	Use of location-based analysis for evidence-based policy making	Is location-based evidence and analysis used to help in developing relevant policies and monitoring outcomes?	
Recommendation 5			
Q5.1	References to INSPIRE and relevant standards in procurement documents	For public sector procurements of location information or services, what references are made to INSPIRE and relevant standards in the procurement documents?	

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

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

Focus Area: Standardisation and Reuse			Changes vs 2019
No.	Indicator	Question	
Recommendation 10			
Q.10.1	Adoption of a common architectural approach	In your country, does the architecture for location data and services in the SDI fit within a broader national ICT architecture approach that is applied in the design, re-engineering, interconnectivity and reuse of ICT and data in digital public services?	
Q10.2	Procedure to incorporate new technological features	Please describe the approach (if any) to discover, explore and incorporate new technological features or emerging technologies.	
Q10.3	Status of development of APIs for INSPIRE / SDI	Please describe the status of development of APIs for SDI / INSPIRE.	

Q10.3.1	Access to high-value location datasets through APIs	Which core "high value" location datasets can be accessed using APIs?	New question
Q10.3.2	Action to foster APIs take-up	Where there are APIs for location datasets, what steps are commonly taken to stimulate take-up and ensure they are as useful as possible?	New question
Recommendation 11			
Q11.1	Reuse of generic ICT solutions in the SDI	Please describe the reuse status of generic ICT solutions in the SDI.	Single choice in 2019, multiple choice in 2020
Q11.2	Implementation of location information registers	What registers of location information are implemented?	
Recommendation 12			
Q12.1	Use of geospatial standards	What type of geospatial domain standards are used in your country?	Change of question
S12.1	Conformity of spatial data sets to INSPIRE implementing rules	Conformity of spatial data sets with Regulation (EU) No 1089/2010 (from INSPIRE monitoring)	
Q12.2	Use of a standardised metadata approach	To what extent is a standardised metadata approach adopted to facilitate discoverability of spatial and non-spatial data through joint access mechanisms such as those listed in the question Q16.1?	New question
Q12.2.1	Use of specifications for combining spatial and non-spatial metadata	Where an approach to facilitate a joint discoverability of spatial and non-spatial data is adopted, what specifications and tools are used to a significant degree to combine spatial with non-spatial metadata in national implementations?	New question
S12.2	Conformity of the INSPIRE network services with INSPIRE implementing rules	Conformity of the INSPIRE network services with Regulation (EC) No 976/2009 (from INSPIRE monitoring)	
Recommendation 13			
Q13.1	Approach to location data quality	What actions are typically implemented to assure quality of location data in your country?	
Q13.1.1	Use of data quality standards	What data quality standard is applied to location data?	New question
Q13.2	Approach to location data quality governance	What type of actions relating to location data quality governance are put in place in your country?	
Q13.2.1	Collection of feedback from users	Where feedback is obtained from users, what approach is taken?	

Focus Area: Return on Investment			Changes vs 2019
No.	Indicator	Question	
Recommendation 14			
Q14.1	Performance monitoring of location-enabled digital public services	What of the following elements are evaluated to assess the efficiency and effectiveness of location-based services in your country?	
Q14.1.1	Performance monitoring scope	Are the measurements done: [ ] At a project or service level [ ] At an organisational level [ ] At an SDI / national level [ ] A combination of the above	
Q14.2	Approach to impact-based improvement	What actions are implemented for impact-based improvement in location-enabled processes and services in your country?	
Recommendation 15			
Q15.1	Approach to communication of benefits	Is communication delivered on the availability and benefits of location data and location- enabled digital public services to raise awareness and understanding using, for example, factsheets, news articles, web-based communication, videos, events?	Change of question
Recommendation 16			
Q16.1	Ease of searching, finding and accessing location data	What measures are implemented to make the process of searching, finding and accessing location data and web services as easy as possible for companies, research institutions, citizens and other interested parties?	
S16.1	Existence of policies supporting the reuse of PSI	Existence of policies supporting the reuse of Public Sector Information by the private sector (from the Open Data Maturity Report)	
Q16.2	Support to the development of products and services by external parties	Which of the following actions are implemented in your country to actively support private, non- profit and academic actors in the development of new products, services or research using public sector location data?	Change of scale
Q16.3	Existence of a strategic approach to funding location reference data	Is there a strategic approach to funding public sector location reference data to make access at point of use cost effective?	

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

Note: Some indicators have been modified in LIFO 2020 compared with LIFO 2019[72], 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:

---

[72] 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

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

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

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

Annex 3: LIFO 2020 Additional information: Norway

Title	Attachments[73]
LIFO Survey questionnaire 2020 – Norway	📎 LIFO Survey 2020 Norway
LIFO Survey questionnaire 2020 scores and charts – Norway	📎 LIFO 2020 scores and charts Norway

FOCUS AREA	NO 2020 v NO 2019			NO 2020 v EUR 2020 (all countries)			NO 2020 v EUR 2020 (2019 countries)			NO 2019 v EUR 2019		
	NO 2019	NO 2020	+/-	EUR 2020	NO 2020	+/-	EUR 2020	NO 2020	+/-	EUR 2019	NO 2019	+/-
Policy and strategy alignment	0.78	0.83	0.05	0.62	0.83	0.21	0.68	0.83	0.15	0.57	0.78	0.21
Digital government integration	0.59	0.65	0.06	0.57	0.65	0.08	0.59	0.65	0.06	0.54	0.59	0.05
Standardisation and reuse	0.62	0.76	0.14	0.55	0.76	0.21	0.62	0.76	0.14	0.54	0.62	0.08
Return on investment	0.85	0.81	-0.04	0.58	0.81	0.23	0.64	0.81	0.17	0.60	0.85	0.25
Governance, partnerships and capabilities	0.43	0.63	0.20	0.45	0.63	0.18	0.49	0.63	0.14	0.44	0.43	-0.01
LIFO INDEX	0.65	0.74	0.09	0.55	0.74	0.19	0.60	0.74	0.14	0.54	0.65	0.11

---

[73] 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.