



LIFO: Location Interoperability Framework Observatory

2020 COUNTRY FACTSHEET
NETHERLANDS



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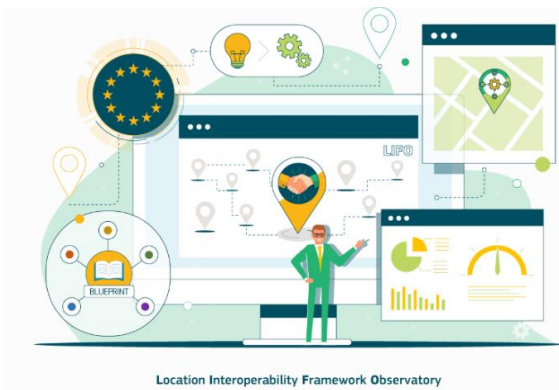
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1. Introduction



The Location Interoperability Framework Observatory (LIFO¹) monitors the implementation of location interoperability good practices in European public administrations.

The monitoring is based on the level of adoption of the recommendations set out in the five focus areas of the European Union Location Framework (EULF) Blueprint² (see [Figure 1](#)).


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


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

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



 **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 model⁷. This model is composed of primary indicators, calculated using information provided by respondents to the online questionnaire, and secondary indicators, reusing information from existing sources, for example, the monitoring under the INSPIRE Directive⁸. The indicators address good practices in the provision and use of location data in digital government and are shaped by the European policy context. They include measures relating to several EU directives and regulations including, for example, required datasets and means of access under both the INSPIRE Directive and the Open Data Directive⁹, obligations under the General Data Protection Regulation (GDPR)¹⁰, approaches under the Public Procurement Directive¹¹, and factors relevant to the EIF¹².

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

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

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



Figure 2 - LIFO online resources

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

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

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

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

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

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

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

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

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

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

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

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

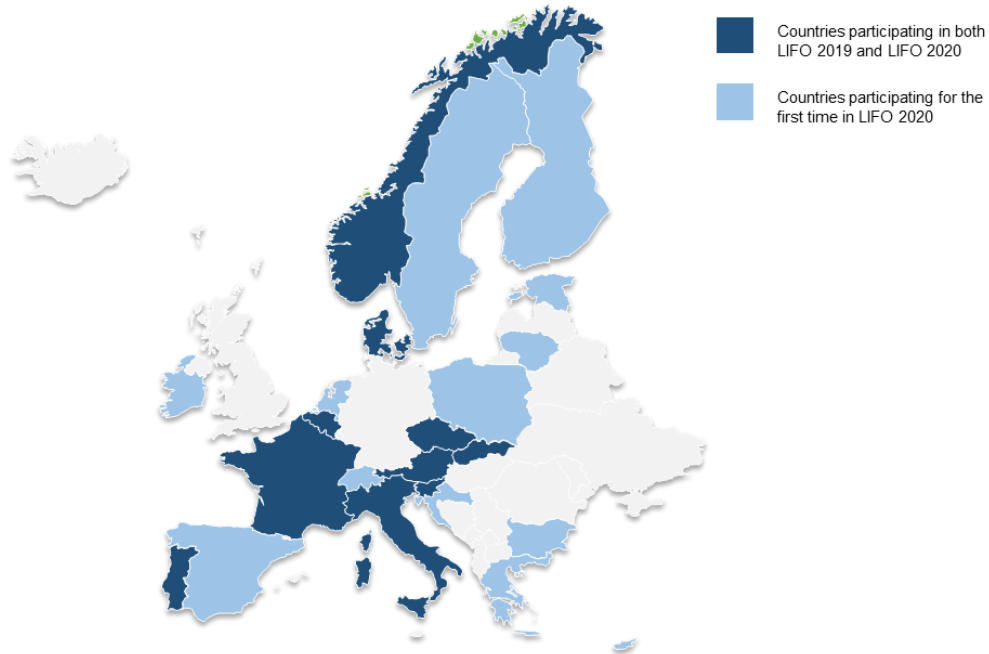


Figure 3 - LIFO participating countries in 2019 and 2020

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

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

2. Structure of the document

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

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

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

Annexes to the document are:

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

The 2020 LIFO monitoring information for the Netherlands has been provided by *Geonovum*.

3. Location Interoperability State of Play

3.1. Overview

The Netherlands has obtained good results in the implementation of actions defined under all focus areas in the EULF Blueprint, scoring consistently above the European average (see [Figure 4](#)).

In the “Policy and Strategy Alignment” focus area, the country performs above the European average thanks to a location information policy integral to, and aligned with, a wider data policy at all levels of government, and to the effective use of location-based analysis for evidence-based policy making. Most location data is available free of charge and without restrictions under an open licence making reference to a national licensing framework.

Under the “Digital Government Integration” focus area, a rigorous approach to service improvement and take-up of opportunities for new businesses/delivery models, and integration of different location and statistical datasets in the production of location-based statistics, all contribute to the Netherlands performing above the European average.

In the “Return on Investment” focus area, the Netherlands’ strengths are related to the extensive and consistent set of actions to facilitate the use of public administrations’ location data by non-governmental actors. This is accompanied by effective communication of the benefits of integrating and using location information in digital public services.

The Netherlands scores above the European average in the “Standardisation and Reuse” focus area due to the adoption of a common architecture to develop digital government solutions, and to the application of relevant standards to develop a comprehensive approach for spatial data modelling, sharing, and exchange.

The “Governance, Partnerships and Capabilities” focus area mixes very good with less positive results. The former relates to the strong level of involvement of relevant communities, domains and sectors in the governance of location information and to the large number of formal agreements between public authorities to finance, build and operate location data services and digital public services using location data. The latter concerns the limited span of actions dedicated to geospatial skills.



The gaps encountered in the practices adopted by the Netherlands are concentrated in a few domains. As such, applying targeted improvements may improve the overall positioning of the country in terms of location interoperability across Europe.

The value of the overall LIFO index combining the scores for all focus areas is 0.61, which confirms the good performance of the Netherlands in terms of location interoperability. This compares with a European average of 0.55.



Figure 4 - Overall EULF Blueprint implementation

The following table summarises the Netherlands’ main strengths and weaknesses across the five focus areas:

Focus Area	Strengths	Weaknesses
 <i>Policy and Strategy Alignment</i>	<ul style="list-style-type: none"> • Most location data (approx. 4100 location datasets) are available free of charge under an open licence, without restrictions • All public sector location datasets available under a national licensing framework. • A wide range of location core reference datasets available for general use • Most controllers and processors of public sector location data fully prepared for the GDPR 	<ul style="list-style-type: none"> • Only general reference to INSPIRE or other standards is made to public sector procurements of location information and services
 <i>Digital Government Integration</i>	<ul style="list-style-type: none"> • A rigorous approach has been adopted for the optimisation of key digital public services in their use of location information • Wide range of actions implemented for the integration of location and statistical information in the production of location-based statistics 	




Focus Area	Strengths	Weaknesses
 <p><i>Standardisation and Reuse</i></p>	<ul style="list-style-type: none"> • Common location architecture approach adopted, fitting within a broader national ICT architectural framework • The geospatial domain standards adopted are consistently mapped and organised in a catalogue 	<ul style="list-style-type: none"> • The array of location data quality initiatives needs to be extended and does not cover in particular the process and organisation dimensions
 <p><i>Return on Investment</i></p>	<ul style="list-style-type: none"> • Wide range of measures implemented to make the process of searching, finding and accessing location data and web services as easy as possible 	
 <p><i>Governance, Partnerships and Capabilities</i></p>	<ul style="list-style-type: none"> • Extensive level of involvement of relevant communities, domains, administrative levels, and sectors in the decision-making process • Large number of formal agreements between public authorities to finance, build and operate many location data services or digital public services using location data 	<ul style="list-style-type: none"> • Only some training or awareness raising are undertaken, with only a few initiatives, organised to raise awareness and develop geospatial skills

Table 1 - Strengths and Weaknesses by Focus Area

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

3.2. Policy and Strategy Alignment


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

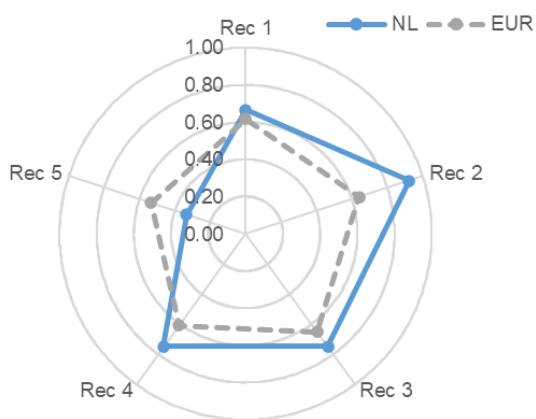


Figure 5 - Policy and Strategy Alignment - scores by recommendation

The "Policy and Strategy Alignment" focus area index for the Netherlands is 0.68 compared with a European average of 0.62.

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

The Netherlands is well-positioned under almost all recommendations in this focus area, particularly under [Recommendation 2](#) on location data policies.

[Recommendation 1](#) is a strength within the Netherlands digital government sector as authoritative location datasets and services are mandated by a cross-sector legislation, as a result of the steadfast legislative approach to base registers¹⁸. Each base register is set according to a law, which stipulates which data is authoritative¹⁹. According to law, a basic register is a registration officially designated by the government and containing high quality data (both authentic and non-authentic). In Netherlands, the term "authentic" is used when the government owns the source of a piece of data due to a legal requirement. For example, postal code is designated "non-authentic" data because PostNL (a private organisation) is responsible for its quality and not the municipal

¹⁸ The 2004 Legislative note on base registries ([Wetgevingsnota basisregistraties](#)) served as the starting point for base registries' development in the Netherlands up to today.

¹⁹ For example, the [Base RegistryPersons and the BRP law](#), the [Trade Registry Act](#), the [Basic Registry of Addresses and Buildings Act](#).

administration. However, these data can be generated automatically in the municipal system and used for process monitoring or history maintenance.

The characteristics of a key register are set out across twelve requirements, with the first three concerning the legal mandate of such a register²⁰. Legally mandated registers are organised in the “System of Key Registers²¹” which is made up of 10 basic registers.

[Recommendation 1](#) can improve its score by increasing the alignment between the Netherlands location strategy and the digital government strategy²²

The reference documents of the location strategy are:

- “Een visie op de geosector 2021-2025”²³ (“Vision of the geospatial sector 2021-2025”), which defines the measures to be implemented to achieve optimal use of location data from 2021-2025. Measures include:
 - bringing key geo-registers together into a coherent object register - firmly anchored in the Generic Digital Infrastructure;
 - expanding the range of data with dynamic and private sources;
 - working with artificial intelligence and building a digital twin of the Netherlands suitable for tackling current and future issues;
 - strengthening the existing public-private partnerships.
- “Locatiepact”²⁴ (“Location pact”), an action plan which commits to pursuing the following actions:
 - experimenting with location data-driven solutions and investigating the added value of AI and satellite data in field labs for social issues, e.g. energy transition and digitisation of construction;
 - drawing up a code of ethics for responsible use of location data;
 - evaluating the above actions for a new annual agenda and embedding them within the Dutch digitisation strategy.
- “Nationale Digitale Tweeling Infrastructuur voor de Fysieke Leefomgeving”²⁵ (“National digital twin infrastructure for the physical environment”), an investment proposal for the creation of a national digital twin infrastructure aimed at sharing the knowledge gained about creating and working with digital twins. Achieved by making data, calculation models, visualisation and participation models more 'open', increasing the accessibility of digital twins to society.
- “Regeerakkoord” (“Coalition Agreement”), which is the guiding principle for the Rutte-Asscher cabinet's policy. It sets out the government's vision on social issues and how it wants to best tackle them. In terms of geospatial information, the agreement aims to:
 - further streamline spatial laws and regulations in the Environment Act;
 - create a database for spatial data, making it easier to access information;
 - deliver efficiencies in basic registration and chain information.

²⁰ See <https://www.oicrf.org/documents/40950/43224/System+of+Key+Registers+in+the+Netherlands.pdf/75729fee-5e86-65fb-5ba8-fb7178c42d6b?t=1510190771680>

²¹ See <https://www.digitaleoverheid.nl/overzicht-van-alle-onderwerpen/basisregistraties-en-stelselafspraken/inhoud-basisregistraties/>

²² See <https://www.nederlanddigitaal.nl/nederlandse-digitaliseringsstrategie/documenten/publicaties/2019/10/03/nederlandse-digitaliseringsstrategie-2.0> and <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwiO78D3tjfsAhUK4YUKHeq0BJAQFjABegQIBRAC&url=https://zoek.officielebekendmakingen.nl/stcrt-2018-73549.odt&usq=AOvVaw01H3VkwZ9nh-whSBpXmvif>

²³ See <https://www.geosamen.nl/wp-content/uploads/2021/05/GeoSamen-Een-visie-op-de-geosector-2021-2025-1.pdf>

²⁴ See <https://www.geosamen.nl/locatiepact/>

²⁵ See <https://www.geonovum.nl/uploads/documents/Samenvatting%20Investeringsvoorstel%20Nationale%20Digitale%20Tweeling%20Infrastructuur.pdf>

The reason why the location strategy is not fully integrated with the digital government plan is firstly due to their respective areas of responsibility in government. The Digital government strategy is the responsibility of a different office of the Ministry of the Interior and Kingdom Relations (BZK) compared with the location strategy. Secondly, European directives, such as INSPIRE, pushed the government to be compliant on the location side. As a result, there is a more clearly defined National GeoInformation Infrastructure (NGII) as against a more generic digital infrastructure.

[Recommendation 2](#) presents several points of excellence. Most location data (approx. 4100 location datasets) are available free of charge under an open licence, without restrictions. Additionally, all public sector location datasets are available under a national licensing framework. Accessible licenses are:²⁶:

- Public Domain (open licence);
- CC-0 (open licence);
- Geo Shared licence (limited licence)²⁷;
- CC-BY (open licence)²⁸;
- CC-BY-SA (limited licence)²⁹.

A wide range of location core reference datasets are available for general use, such as:

- addresses and buildings³⁰;
- topography³¹;
- cadastral parcels³²;
- orthoimagery³³

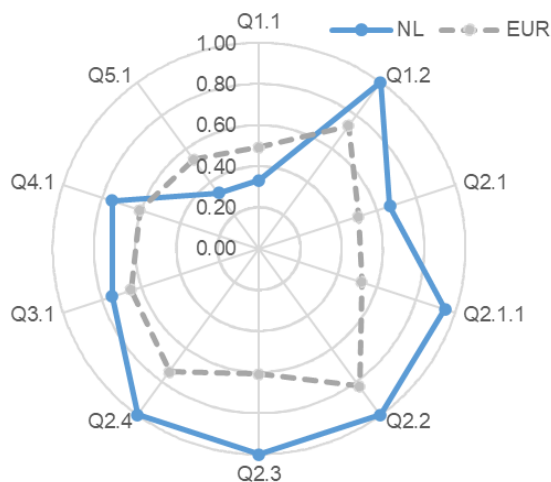


Figure 6 – Policy and Strategy Alignment – scores by indicator

Official documents state that the ambition of the Netherlands is to make the basic set of geographic government data available as open data “effective within the government, transparent for the citizen and provide economic benefit for the business community³⁴”. In this regard, priorities for the Netherlands are to make public sector geo-information widely accessible, to develop and manage the standards required for this aim, and to help the government to make better use of geo-information³⁵.

²⁶ See <https://data.overheid.nl/ondersteuning/data-publiceren/licentie-keuze>

²⁷ Used when Public Domain or CC-0 are not available

²⁸ Used when Public Domain or CC-0 are not available

²⁹ Used when Public Domain or CC-0 are not available

³⁰ See <https://www.pdok.nl/introductie/-/article/basisregistratie-adressen-en-gebouwen-ba-1>

³¹ See <https://www.pdok.nl/introductie/-/article/basisregistratie-topografie-brt-historie>

³² See <https://www.pdok.nl/introductie/-/article/basisregistratie-kadaster-brk->

³³ See <https://www.pdok.nl/introductie/-/article/luchtfoto-pdok>

³⁴ See <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwiO78D3tfjsAhUK4YUKHeq0BJAQFjABegQIBRAC&url=https%3A%2F%2Fzoek.officielebekendmakingen.nl%2Fstcrt-2018-73549.odt&usq=AOvVaw01H3VkwZ9nh-whSBpXmvif>

³⁵ See <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwiO78D3tfjsAhUK4YUKHeq0BJAQFjABegQIBxAC&url=https%3A%2F%2Fzoek.officielebekendmakingen.nl%2Fstcrt-2018-71467.odt&usq=AOvVaw1xih3sLsKMPXPsVQAihjK7>

Finally, it can be noted that pan-government guidelines³⁶ on the publication of public sector data cover the location dimension, addressing aspects such as metadata, formats, encoding, APIs and security.

The Netherlands is well positioned also under [Recommendation 3](#) as most controllers and processors of public sector location data are fully prepared for the GDPR. An example of best practice linked to this recommendation is represented by Geonovum, which drafted the “Guide to Rules of the Game for Data Collected in the Public Space” dealing with privacy with specific reference to the use of sensor data³⁷. Moreover, the Dutch Data Protection Authority expressed a strong concern about the use of telecom data for monitoring travel behavior and crowds. The reason is related to the fact that this process would impact too much on the privacy of individuals (assuming that with tracking - even on an anonymous basis - it becomes possible after a few days to trace personal data).

Regarding [Recommendation 4](#), location-based evidence and analysis is used to aid in developing relevant policies and monitoring outcomes on topics such as:

- spatial plans: an example is Ruimtelijkeplannen.nl, an online portal where the government provides access to digital spatial plans. These plans are shown as a single image so that it becomes clear at a glance which spatial plans have been made for a particular area³⁸; Ruimtelijkeplannen supports citizens engagement in and awareness of the spatial planning processes;
- environment: an example is an environmental impact report that has been drawn up for the change in the use and layout of Lelystad Airport³⁹;
- nitrogen: an example is where research was carried out to gain insight on the development of the Programmatic Approach to Nitrogen (PAS), on its deployment and on the legislative process before the PAS⁴⁰.

The main opportunity for improvement in this focus area is the limited extent to which INSPIRE or other geospatial standards are used for public sector procurements of location information and/or services ([Recommendation 5](#)). A detailed analysis of the application of geospatial standards in public procurement is provided in the annual report “Monitor Open Standards⁴¹” by the Standardisation Forum. The report shows that geospatial standards have been considered relevant for procurement in only 29% of public tenders, with a particularly low incidence at the level of local administrations. The central administration, on the contrary, makes consistent reference to such standards.

³⁶ See <https://forumstandaardisatie.nl/open-standaarden> and all the location standards at <https://www.geonovum.nl/themas/standaardisatie>

³⁷ See <https://www.geonovum.nl/themas/ethiek-en-privacy> and the guidelines <https://www.geonovum.nl/uploads/documents/Rapport%20Op%20weg%20naar%20een%20Sensorverordening%20%28eindversie%29%20201218.pdf>

³⁸ See <https://www.ruimtelijkeplannen.nl/> and best practice [NL4](#)

³⁹ See <https://www.commissiener.nl/adviezen/2792>

⁴⁰ See <https://www.tweedekamer.nl/downloads/document?id=92bd6435-b6b3-4a7d-af65-e6d155aa8db2&title=Beleidsvaluatie%20van%20het%20PAS%20en%20het%20wetstraject%20voorafgaand%20aan%20het%20PAS.pdf>

⁴¹ See https://www.forumstandaardisatie.nl/sites/default/files/BFS/4-basisinformatie/publicaties/Monitor/monitor_2019-met-duiding.pdf

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

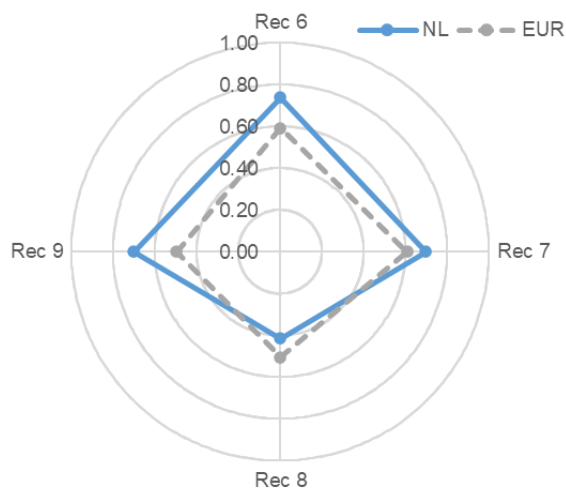


Figure 7 - Digital Government Integration - scores by recommendation

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

The "Digital Government Integration" focus area index for the Netherlands is 0.64, significantly above the European average of 0.57. The country is positioned above the European average to the highest degree under [Recommendation 9](#). This is due to the fact that the Netherlands implements a wide range of actions for the integration of location and statistical information in the production of location-based statistics. These include:

- an accurate and up-to-date knowledge base of where citizens and businesses are located; the data can be examined within the Statistics Netherlands Office (CBS) environment⁴²;
- a common geospatial reference framework for statistics to enable timely, accurate and efficient production of location-based statistics;
- use of INSPIRE to support the location reference framework for statistics;
- collection of census data based on the location reference framework for statistics;
- dynamic update of location-based statistics on which to make decisions;
- inclusion of relevant private sector data in the statistical information infrastructure;

⁴² <https://www.cbs.nl/en-gb/onze-diensten/customised-services-microdata/microdata-conducting-your-own-research>

- contribution to European projects aiming at establishing a data and production infrastructure for location-based statistics (e.g. GEOSTAT).

The Netherlands is well positioned under [Recommendation 6](#), due to the optimisation of using location information in key digital public services through a rigorous approach to both service improvement and take-up of opportunities for new businesses or delivery models. A significant number of key digital public services use location information comprehensively, or innovatively, as an important feature in performing the service in domains such as:

- agriculture: an example is Boer & Bunder⁴³, a service providing users with all available data about a plot of land, such as the plot location, height classification, cultivable area, what has been grown on the plot in recent years and how the soil type within the plot is divided. The growth can be followed based on satellite images and the cadastral map shows how a parcel is divided into cadastral parcels (with cadastral indication and area). Boer & Bunder is mainly used by farmers, stewards, brokers, contractors and governmental bodies.
- disaster Management and Civil Protection: an example is Risicokaart⁴⁴ (“Risk Map”), a map viewer providing information about possible risk situations such as earthquakes, flooding and risk of accidents with hazardous substances. Additionally, the Risk Map enables governments to communicate these risks more effectively with residents of the Netherlands. The Risk Map also helps governments to perform their statutory duties efficiently and effectively, including tasks in the field of spatial planning, supervision and enforcement of permits.
- environment: The Environmental Health Atlas of the National Institute for Public Health and Environment⁴⁵ offers information about the living environment, with a focus on topics such as air, noise and health, as well as suggestions for preventing or limiting health problems or nuisance.
- health: a recent example of innovative use of location information is the “coronavirus dashboard⁴⁶” which provides up-to-date information about developments surrounding coronavirus in the Netherlands. This information can help the government identify early signs of increased infection rates, allowing timely action to prevent the virus spreading.
- property and land administration: this domain is under the jurisdiction of the Kadaster⁴⁷ (the Netherlands’ Cadastre, Land Registry and Mapping Agency), which collects and registers administrative and spatial data of property (including ships, aircraft and telecom networks). Kadaster also collects information on energy certificates of buildings and underground cables and pipelines. With these actions, the Kadaster protects legal certainty. The information is available predominantly through online web services, but it can also be accessed as linked data and via REST APIs. The main user groups are civil law notaries, local authorities, businesses, financial institutions and private individuals.
- regional and urban development: an example of comprehensive use of location information is provided by publicly accessible Ruimtelijkeplannen.nl⁴⁸, which integrates information coming from municipalities, provinces and government.

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

⁴³ See <https://boerenbunder.nl/>

⁴⁴ See <https://www.risicokaart.nl/home>

⁴⁵ See <https://www.atlasleefomgeving.nl/check-je-plek>

⁴⁶ See <https://coronadashboard.rijksoverheid.nl/>

⁴⁷ See <https://www.kadaster.nl/zakelijk/producten/eigendom>

⁴⁸ See above, paragraph [3.2](#) and note [38](#)

- Funda⁴⁹: an online platform to rent, purchase, and sell houses, apartments, and commercial properties in the Netherlands;
- Spotinfo⁵⁰: a cloud-based data platform in which basic registrations, validated data sources and real-time data are combined. More than 260 themes of recent government data, integral for combining 2D and 3D property objects, provide comprehensive, reliable information on every area and building in the Netherlands. Spotinfo re-uses basic registrations on addresses and buildings, topographic registrations, and subsurface information;
- Topo GPS⁵¹: an application utilising the GPS functionality of a smartphone enabling navigation using a detailed topographic map of the Netherlands. Viewed maps can be stored on the smartphone so that Topo GPS can also be used without an internet connection;
- Tygron⁵²: cloud-based software that enables users to generate dynamic 3D models based on geodata and calculation models.

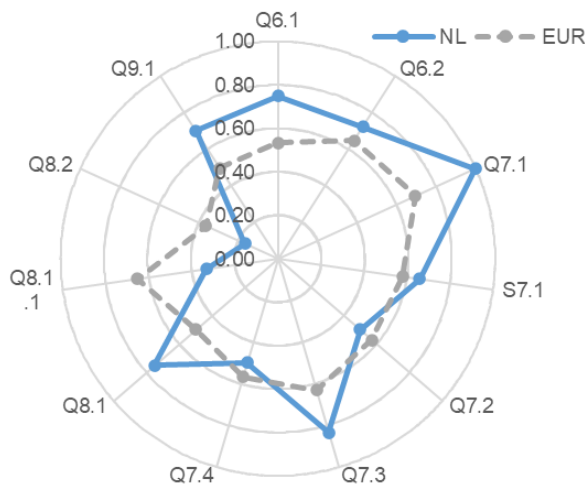


Figure 8 - Digital Government Integration - scores by indicator

In the Netherlands, the public sector SDI is widely used for delivering digital public services across public bodies in the country, and in some cases for delivering cross-border digital public services.

Two examples of reusing data from the SDI for delivering digital public services involving different public bodies are the Data Portal⁵³, which provides central access and visualisation of sensor data concerning the living environment measured by citizens, local and regional authorities, and the National Road Data Traffic Portal (NDW)⁵⁴, in which Dutch public bodies work together to collect, combine, store and distribute mobility data. This latter data is essential for traffic management, as it feeds countless

traffic information services and forms a solid basis for the mobility policy in the country.

An example of a cross-border digital public service is the [vaarweginformatie.nl](https://www.vaarweginformatie.nl)⁵⁵ website, where users can find current information about the availability of waterways, not only in the Netherlands (for example about changes in operating times of bridges and locks, obstructions, activities and changes to buoys and traffic regulations), but also about the restrictions on the main waterways in Germany, Austria, France, Belgium and Switzerland.

The domains where the SDI is most used are agriculture, disaster management and civil protection, environment, health, property and land administration and regional and urban development (the national geo registry reports the main framework used for each sector⁵⁶).

Regarding [Recommendation 8](#), an open and collaborative methodology relying on consultations, user groups, feedback requests and iterative development, is applied extensively to design and improve location-enabled digital public services in specific initiatives,

⁴⁹ See <https://www.funda.nl/>

⁵⁰ See <https://www.spotinfo.nl/wp/>

⁵¹ See <https://www.topo-gps.com/nl/>

⁵² See <https://www.tygron.com/nl/>

⁵³ See <https://www.samenmetenaanluchtkwaliteit.nl/dataportaal>

⁵⁴ See <https://ndw.nu/>

⁵⁵ See <https://www.varendoejesamen.nl/kenniscentrum/artikel/vaarweginformatie-raadplegen>

⁵⁶ See <http://www.nationaalgeoregister.nl/geonetwerk/srv/dut/catalog.search#/home>

both at a local and national level. A structured example of collaboration for sharing data and jointly develop solutions is Common Ground⁵⁷, an environment where Dutch municipalities facilitate the joint exploitation of common interest data and solutions, including location data and location-enabled solutions.

When delivering location-based digital public services, public authorities collect location data through a well-defined process and make the data openly available for external parties to develop their products and services.

⁵⁷ See best practice [NL6](#)

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

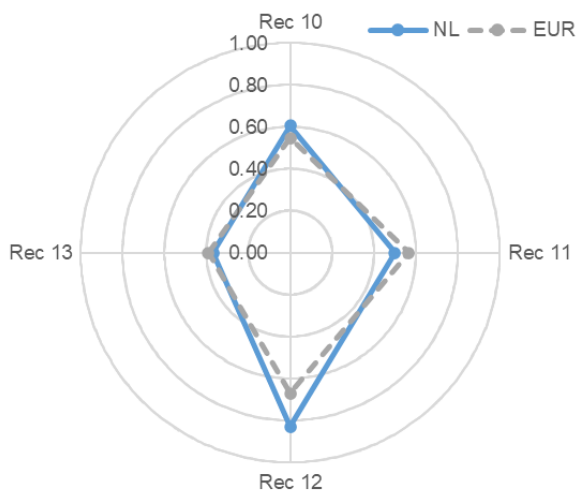


Figure 9 - Standardisation and Reuse - scores by recommendation

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

“Standardisation and Reuse” is another area of strength for the Netherlands, although less prominent, where the index is 0.58, compared with a European average of 0.55.

The Netherlands’ good positioning with respect to the European average, is due to the extensive and consistent geospatial domain standardisation process. Under [Recommendation 12](#), which concerns the

application of standards to the geospatial domain, the Netherlands is one of the top performers with regard to the conformity of the INSPIRE network services with Regulation (EC) No 976/2009.

The country excels in the adoption of a standardised approach for combining spatial and non-spatial metadata and for facilitating the joint discoverability of spatial and non-spatial data. This approach leverages on both national specifications and tools, and European specifications such as GeoDCAT-AP. In this regard, the national data portal⁵⁸ harvests the ISO metadata concerning the spatial data available in the national geoportal⁵⁹ and transforms the metadata automatically to DCAT (the DCAT output is also directly available at nationalegeoregister.nl).

⁵⁸ See <https://data.overheid.nl/>

⁵⁹ See <https://nationalegeoregister.nl>

All applicable standards, both national and international, are mapped in the Geonovum portal⁶⁰ where they are categorised in the following themes:

- 3D Environmental Information
- BGT | IMGeo
- BRO - Basic Subsurface Registration
- Digital accessibility of geo-information
- Terms of use
- Geo on the web
- Geography Markup Language (GML)
- GeoPackage
- Information model Sound
- Information Model Cables and Pipes
- Information models NEN3610 family
- INSPIRE - European living environment
- Metadata
- Metamodel Information Modeling (MIM)
- NEN 3610 basic model for information models
- environmental code
- RO Standards - Spatial Planning
- Services
- Exchange formats
- Real estate use

The only weakness under this recommendation is the insufficient conformity of metadata and spatial datasets with the applicable INSPIRE implementing regulation.

The Netherlands is also well positioned under [Recommendation 10](#). It adopts a common location architecture approach, fitting within a broader national ICT architectural framework, which is applied in the design, re-engineering, interconnectivity and reuse of ICT and data in digital public services.

A wide range of actions are taken to stimulate take-up of APIs and ensure that they are as useful as possible:

- user communities consulted in development/enhancement of APIs;
- APIs based on recognised standards (e.g. OGC API - Features, OGC SensorThings API);
- API design best practices used (e.g. REST APIs);
- APIs providing access to updates of both static (slow-moving) and dynamic (fast-moving) data;
- APIs discoverable in both public sector catalogues/portals and external catalogues (alongside non-public sector APIs);
- metrics on API impact, usage and performance used to ensure API services meet user needs.

APIs allow access to the following core "high value" location datasets (key location registers made available as linked data):

- addresses;
- buildings;

⁶⁰ See <https://www.geonovum.nl/geo-standaarden/alle-standaarden>

- cadastral parcels;
- geographical names;
- topography.

On reuse of technical solutions and authentic data registers ([Recommendation 11](#)), national and international generic ICT solutions are reused in the SDI, including ISA² solutions such as the INSPIRE validator, Re3gistry and GeoDCAT-AP or other solutions such as the ETF validator. Additionally, the Netherlands has implemented various registers of location information, all available via the Kadaster⁶¹, i.e.:

- addresses;
- administrative units;
- cadastral parcels;
- buildings;
- transport networks.

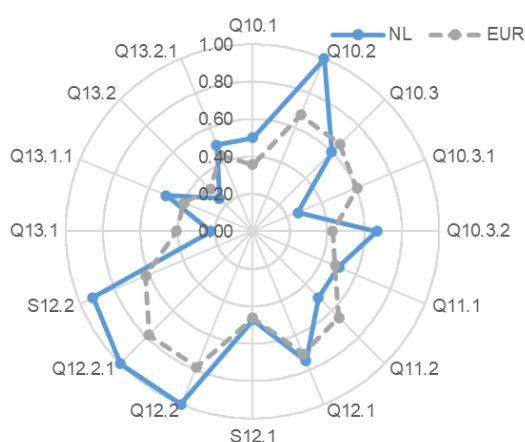


Figure 10 - Standardisation and Reuse - scores by indicator

Data quality management ([Recommendation 13](#)) is where there are more margins for improvement. The approach implemented to assure data quality is mostly based on the inclusion of the different dimensions of data quality in the standards adopted, the adoption of mandatory procedures for identifying and correcting incorrect data⁶², and the adoption of data quality standards⁶³. However, further actions both in design (e.g. adoption of a data quality framework) and measurement (e.g. data quality dashboards, ex-post evaluation of data quality issues) have not yet been adopted.

The data quality standards applied to location

data are:

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

Location data quality governance relies on the alignment of the data quality improvement roadmap with the information governance vision and strategy and on the collection of feedback from users to report problems and help improve data quality but is not based on formal quality management processes. In particular, feedback collection is fostered by:

- adopting licences for location datasets that typically request feedback on problems and changes made to improve quality (e.g. CC-BY 4.0);
- implementing a collaborative platform that allows stakeholders to provide feedback and collaborate to improve the SDI;
- setting up communities/discussion forums to collect feedback from users and stakeholders.

⁶¹ All are available via <https://www.kadaster.nl/zakelijk/registraties/basisregistraties>

⁶² See <https://www.digitaleoverheid.nl/overzicht-van-alle-onderwerpen/basisregistraties-en-stelselafspraken/stelsel-van-basisregistraties/twaalf-eisen-stelsel-van-basisregistraties/#Eis%202>

⁶³ See <https://www.digitaleoverheid.nl/overzicht-van-alle-onderwerpen/basisregistraties-en-stelselafspraken/stelsel-van-basisregistraties/kwaliteit-en-terugmelden/>

3.5. Return on Investment

Vision	
	<p>There is a strategic approach to national and European funding, procurement, and delivery of location information and location-based services to minimise costs and maximise benefits for government, businesses and citizens, recognising best practices, and building on INSPIRE and standardisation tools. The funding and sourcing model for collection and distribution of core location data takes into account user needs from different sectors and the strategic importance of continued supply of data at a suitable quality. Procurement recognises INSPIRE and other standardisation tools in a meaningful way. There are compelling impact assessments and business cases, a rigorous approach to targeting and tracking benefits, and good evidence that benefits are being achieved.</p>
Recommendation 14	Apply a consistent and systematic approach to monitoring the performance of location-based services.
Recommendation 15	Communicate the benefits of integrating and using location information in digital public services.
Recommendation 16	Facilitate the use of public administrations' location data by non-governmental actors to stimulate innovation in products and services and enable job creation and growth.

Table 5 - Focus Area "Return on Investment" - vision and recommendations

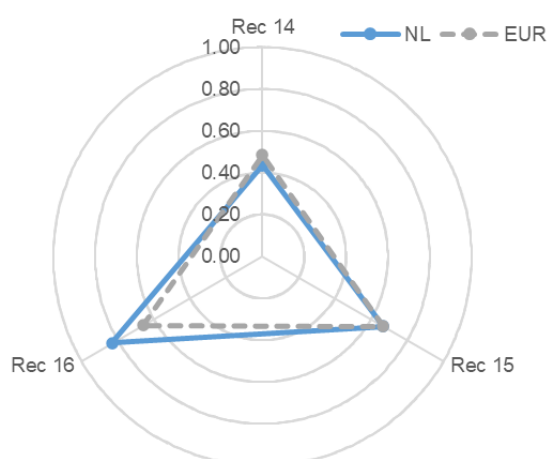


Figure 11 - Return on Investment - scores by recommendation

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

The focus area index for the Netherlands is 0.64, above the European average of 0.58. The country scored well above the European average in [Recommendation 16](#), slightly above in [Recommendation 15](#), and slightly below in [Recommendation 14](#).

[Recommendation 16](#) shows the best results in this focus area. A wide range of 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. These include:

- a national data portal⁶⁴ merging location data and non-location data;
- a national discovery geoportal⁶⁵ integrating INSPIRE and non-INSPIRE data;
- geodata harvested by the European Data Portal⁶⁶;
- thematic portals⁶⁷ complementing general search facilities with "specialist" search;
- websites with the exposition of data⁶⁸;

⁶⁴ See <https://data.overheid.nl/>

⁶⁵ See <https://www.nationaalgeoregister.nl/geonetwork/srv/dut/catalog.search#/home>

⁶⁶ See <https://www.europeandataportal.eu/data/datasets?locale=nl&country=nl&minScoring=0&page=1>

⁶⁷ See <https://www.atlasleefomgeving.nl/> and <https://www.atlasnatuurlijkkapitaal.nl/> and <https://www.nationaleenergieatlas.nl/kaarten>

⁶⁸ See <https://www.volksgezondheidenzorg.info/onderwerp/atlas-vzinfo/inleiding>

- availability of spatial data sets on web search engines⁶⁹.

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

- an open data policy;
- the inclusion of non-government actors in the governance framework for public sector data;
- adding data and services from non-governmental actors to the public sector spatial data infrastructure;
- 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;
- 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.

Examples of actions that have been implemented are:

- a support section in the National Data Portal⁷⁰, which provides support to both data users and data owners;
- the Geoforum⁷¹, where people can share skills, knowledge and interests about geographic information and software;
- Samenmeten.rivm.nl⁷², a data portal that provides central access and visualisation to sensor data of the living environment measured by citizens, local authorities and others;
- PDOK⁷³ or “Public Services On the Map”, a platform where users can find information about services (e.g. Web Map Service (WMS), Web Feature Service (WFS), Web Map Tile Services (WMTS)) and APIs.

The Dutch Ministry of Inland Affairs funds the key registries related to location data, where the use of this data is free.

Communication of availability and benefits of location data and location-enabled digital public services to raise awareness and understanding of such benefits is performed frequently using, for example, news articles⁷⁴, newsletters⁷⁵ and mailing campaigns⁷⁶. ([Recommendation 15](#))

The score is slightly below the European average with respect to the assessment of the efficiency and effectiveness of location-based services ([Recommendation 14](#)). This is done at the SDI / national level under a few dimensions such as return on investment, total cost of ownership, adaptability, availability and user satisfaction. However, the assessments do not consider the much wider range of criteria potentially available for that purpose.

The overall approach may be improved by extending the set of actions implemented for impact-based improvement in location-enabled processes and services, which at the moment is

⁶⁹ See <https://www.pdok.nl/>

⁷⁰ See <https://data.overheid.nl/support>

⁷¹ See <https://geoforum.nl/>

⁷² See <https://www.samenmetenaanluchtkwaliteit.nl/dataportaal>

⁷³ See <https://www.pdok.nl/services-en-api-s> and best practice [NL5](#)

⁷⁴ See <https://www.pdok.nl/-/actueel-3d-basisbestand-van-heel-nederland-beschikbaar?redirect=/nieuws>

⁷⁵ See <https://www.geonovum.nl/over-geonovum/actueel/linked-data-geeft-basisregistraties-meer-samenhang>

⁷⁶ See <https://us1.campaign-archive.com/home/?u=cf7440392e44812eb0a1644c7&id=708fcc3dd2>

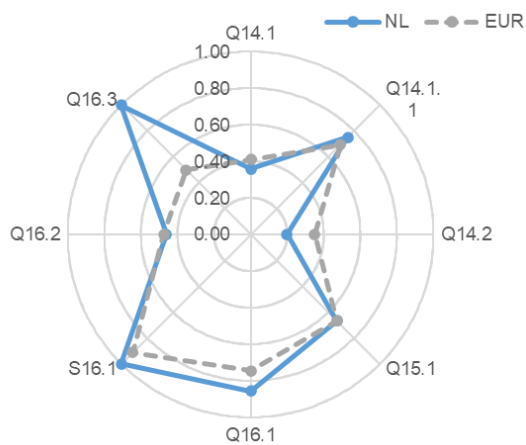


Figure 12 - Return on Investment - scores by indicator

limited to the regular monitoring of “upstream” (i.e. production and dissemination) and “downstream” (i.e. use) aspects of location data and services and does not consider other relevant factors such as using common maturity assessment methods or exploiting impact monitoring information to direct efforts and investments. However, the country acknowledges the importance of assessing the quality of digital government for citizens, businesses and institutions. Since 1991, the Court of Audit has been investigating digitisation and the use of ICT in government, such as in the field of cybersecurity and information security, digitisation of central

government, ICT lifecycle management and IT management⁷⁷.

The country also carried out a study⁷⁸ about the system of key registers for citizens and businesses, coming up with the following recommendations to improve the system:

- a central reporting point should be set up, where citizens and companies can report problems with all key registers. The central reporting point must be able to solve problems and correct errors involving multiple registers or that transcend the organisation;
- the Minister of the Interior and Kingdom Relations should provide central management for determining and monitoring joint milestones for five subjects: access to data, correction of data, reuse of data, transparency / public nature in relation to privacy and data protection, and quality management;
- the Minister of the Interior and Kingdom Relations should determine a clear direction for the further development of the system of key registers, in the form of a concrete future picture for the short, medium and long term.

⁷⁷ See <https://www.rekenkamer.nl/onderwerpen/ict-en-digitalisering>

⁷⁸ See <https://www.rekenkamer.nl/binaries/rekenkamer/documenten/rapporten/2019/06/18/grip-op-gegevens-het-stelsel-van-basisregistraties-voor-burgers-en-bedrijven/Basisregistraties+WR.pdf>

3.6. Governance, Partnerships and Capabilities


Vision	
	<p>There is high level support for a strategic approach to the funding and availability of location information at Member State and EU level, based on INSPIRE and other tools to achieve interoperability. Effective governance, partnerships, work programmes, responsibilities and capabilities to progress such an approach have been established, taking into account the needs and expectations of stakeholders at Member State and EU level. Governments recognise the importance of 'location' understanding and skills and invest in awareness raising, training and resourcing. Service design takes account of user capabilities. Specialists form communities to share knowledge and develop new ideas related to location information. As a result, there is a sufficient level of understanding and skills to develop, deploy and use effective location-based services.</p>
Recommendation 17	Introduce 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

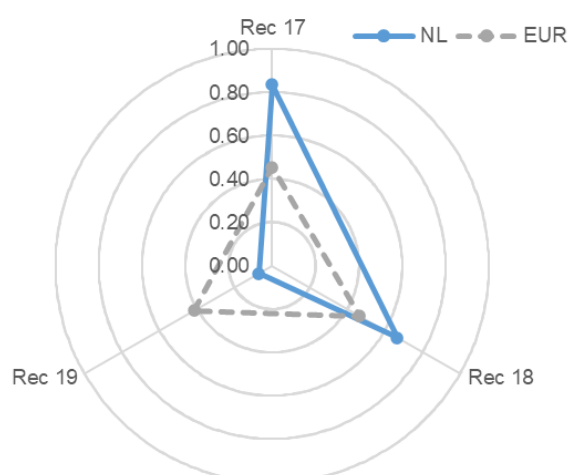


Figure 13 - Governance, Partnerships and Capabilities - scores by recommendation

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

The "Governance, Partnerships and Capabilities" focus area index for the Netherlands is 0.52, above the European average of 0.45. It is worth noting that, in the Dutch case, this positioning is the combined result of excellent scores on governance and partnerships with significant gaps in capacity building.

In the governance of location information processes ([Recommendation 17](#)), relevant communities (location and digital government), domains (thematic), administrative levels (central and local) and sectors (public, private, academic, society) are extensively involved in the decision making process on the SDI. In this regard, among the initiatives adopted for the involvement of stakeholders and communities, the Geo-Information Council⁷⁹ and Geo Together⁸⁰ share a vision on the geo-sector's future across the government, industry and scientific domains.

Geonovum⁸¹ is responsible for leading and coordinating the actions and policies related to the role of the SDI in Digital Government, with cross-fertilisation of membership on governance bodies.

⁷⁹ See <https://zoek.officielebekendmakingen.nl/stcrt-2006-112-p20-SC75499.html>

⁸⁰ See <https://www.geonovum.nl/uploads/documents/Visie%20GeoSamen%20Definitief.pdf>

⁸¹ See <https://www.geonovum.nl/over-geonovum>

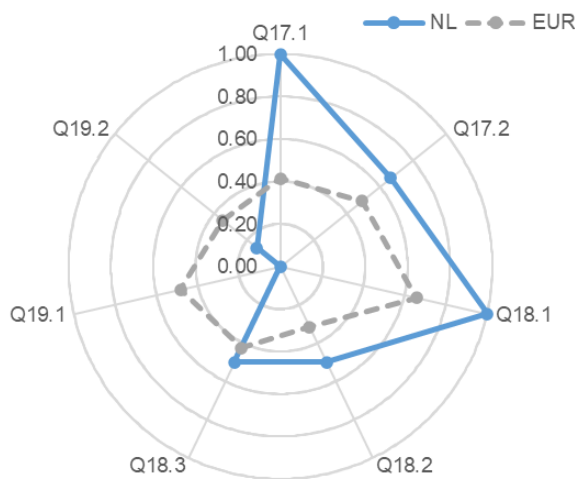


Figure 14 - Governance, Partnerships and Capabilities - scores by indicator

There is a large number of formal agreements between public authorities in the Netherlands to finance, build and operate a large number of location data services or digital public services using location data ([Recommendation 18](#)). An example is PDOK, the 'Public Services On the Map' platform previously mentioned under paragraph [3.5](#).

Another example comes from the Digital System Environment Act (DSO), which has established the "Environment counter online" (Omgevingsloket), that supports online applications and notifications for environment and water permits. Under this framework, local administrations are responsible for aligning their local systems to the relevant parts specified in the DSO, a

coherent system of digital facilities, standards, data, sources and mutual agreements⁸². In order to receive permit applications and notifications, to publish environmental documents, and to deliver applicable rules, the local administration must connect the following systems: licensing; spatial planning; and rule management system.

There is a limited number of examples of formal agreements with public authorities in other countries or at a supranational level. One of these is represented by the Joint Research Centre (JRC). The same is true for the public-private partnerships aimed at funding digital public services using location data. In this context, an example is the National Road Data Traffic portal⁸³, where the Dutch public administrations work together to collect, combine, store and distribute mobility data. These data are essential for traffic management, as they feed various traffic information services and form a solid basis for the mobility policy in the Netherlands.

An area for improvement is developing a more concrete strategic approach to skills and training for innovative geospatial solutions ([Recommendation 19](#)). Some training or awareness raising is undertaken by organisations to meet specific needs but this not as part of a recognised competency framework. Similarly, types of initiatives organised for training or raising awareness and developing geospatial skills are:

- a special interest group, GEOforum, for knowledge sharing within the geospatial community (an example is provided by Geoforum⁸⁴);
- public or cross-government events specialising in location information / geospatial intelligence (GI) topics.

⁸² A broader description of the DSO and of its components, as well as of the local systems that have to be connected to it, is available at <https://aandeslagmetdeomgevingswet.nl/digitaal-stelsel/introductie/kort/>

⁸³ See <https://ndw.nu/en/>

⁸⁴ See <https://geoforum.nl/> and <https://www.pdok.nl/how-to-faq1>

4. Best practices

Best Practice NL1	Boer&Bunder - Data-driven services for growers and agribusiness
Policy domain: Agriculture	
Process owner: Dacom Farm Intelligence	
<p>Short description: The service provides users with all available data about a plot, such as the location of the plot, height classification, cultivable area, what has been grown on it in recent years and how the soil type within the plot is divided. The growth can be followed based on satellite images and the cadastral map shows how an area of land is divided into cadastral parcels (with a specific cadastral indication and area).</p> <p>The information made available through the service aids the work of farmers and those involved in agriculture and the environment, who can find information of value for their soil type and topography, check on their farming methods and see what is working on other farms and adapt their own farming practices.</p>	
Recommendation: Digital Government Integration (6), Return on Investment (16)	
Link: https://boerenbunder.nl/	
Best Practice NL2	Risicokaart - How to spot risk situations that can lead to disasters and crises
Policy domain: Disaster Management and Civil Protection	
Process owner: Interprovincial Consultation / Ministry of Infrastructure / Ministry of Justice	
<p>Short description: Risicokaart is a map viewer providing information on possible risk situations such as earthquakes, accidents with hazardous substances or flooding. In addition, the Risk Map enables governments to make risk communications more effectively to all Dutch residents and perform their (statutory) duties efficiently and effectively, including tasks in the field of Spatial Planning (RO) and Permits, Supervision and Enforcement (VTH).</p>	
Recommendation: Digital Government Integration (6), Return on Investment (16)	
Link: https://www.risicokaart.nl/home	
Best Practice NL3	Corona dashboard
Policy domain: Health	
Process owner: Central government	
<p>Short description: Interactive dashboard which provides up-to-date information on the developments surrounding coronavirus in the Netherlands. This information helps the government in picking up early warning signs that the rate of infection is increasing, allowing them to act in time to stop the virus from spreading further.</p>	
Recommendation: Policy and Strategy Alignment (4), Digital Government Integration (6)	
Link: https://coronadashboard.rijksoverheid.nl/	

Best Practice NL4 Access to spatial data plans**Policy domain:** Regional and urban development**Process owner:** Dutch cadastre (Kadaster) / Geonovum**Short description:** Ruimtelijkeplannen is the online counter with which the government provides access to digital spatial plans. The spatial plans are displayed as a single image so that it becomes clear at a glance which plans have been made for a particular area.

Since May 2010, the Land Registry and Geonovum have been jointly responsible for the management of this national facility. Spatial plans are available also as linked data and REST APIs.

Recommendation: [Policy and Strategy Alignment \(4\)](#), [Digital Government Integration \(6\)](#), [Return on Investment \(16\)](#)**Link:** www.Ruimtelijkeplannen.nl**Best Practice NL5 Public Services On the Map (PDOK)****Policy domain:** Open geographical data**Process owner:** Dutch cadastre (Kadaster)**Short description:** PDOK is a central distribution platform used for deploying geographical datasets (geo datasets) and making them available as web services and geographical information files. These geo datasets are supplied by government and public administrations. They are guaranteed to be up-to-date, reliable and free, with more than 275 web services currently available. In October 2020, PDOK reached the milestone of 20 billion hits.

The web services make it possible for all users to view the geographical data on any internet browser. They are used by municipalities and other public agencies, businesses, schools and also private citizens. In this way, the Dutch government is stimulating innovation and the (re-)use of geo-information.

Recommendation: [Policy and Strategy Alignment \(2\)](#), [Return on Investment \(16\)](#), [Governance, Partnerships and Capabilities \(18\)](#)**Link:** <https://www.pdok.nl/>**Best Practice NL6 Common Ground****Policy domain:** Data integration for local administrations**Process owner:** Association of Dutch Municipalities**Short description:** Common Ground is a concept and an environment developed under the umbrella of the Association of Dutch Municipalities to provide local administrations with a joint information facility for the exchange of data. This is disconnected from work processes and applications and queried at the source, instead of copying and storing it frequently.

The environment is based on five layers, from bottom to top:

- 1) Data: Components that store or archive data, e.g. data from national key registers, sectoral registrations, municipal core registrations, process-specific data storage;
- 2) Service: Components that offer APIs enabling access to data from the data layer;

- 3) Integration: A nationwide data exchange facility, called the “Common Ground data landscape”;
- 4) Process: The services and business processes with which municipalities ultimately serve their residents. Processes generally include:
 - a. processing user input,
 - b. consulting, checking and storing data,
 - c. process status tracking;
- 5) Interaction: Websites and apps interacting with end users

Location data and services are important components of this environment. An example is “Signalen” (Signals), a solution enabling residents to report about public space conditions and municipalities to deal with these reports in a structured manner. “Signalen” uses AI to automatically categorise and route notifications based on information from previous notifications, for processing by the appropriate handler.

The solution was initially developed for Amsterdam and was then made available to all municipalities as open source through Common Ground. The team currently maintaining the solution is composed of the municipalities of 's-Hertogenbosch, Amsterdam, Almere and of the Foundation for Public Code.

Recommendation: [Policy and Strategy Alignment \(2\)](#), [Digital Government Integration \(8\)](#), [Return on Investment \(16\)](#), [Governance, Partnerships and Capabilities \(18\)](#)

Link: <https://commonground.nl/>

List of abbreviations and definitions

Abbreviations

Abbreviation	Meaning
AI	Artificial Intelligence
API	Application Programming Interface
CSW	Catalogue Service – Web
DCAT-AP	Data Catalogue vocabulary – Application Profile
DQV	Data Quality Vocabulary
DSO	Digitaal Stelsel Omgevingswet (Digital System Environment Act)
ECDIS	Electronic Chart Display and Information System
EFQM	European Foundation for Quality Management
EIF	European Interoperability Framework
ELISE	European Location Interoperability Solutions for e-Government
EULF	European Union Location Framework
GDPR	General Data Protection Regulation
GI	Geographic Information
GML	Geography Markup Language
GPS	Global Positioning System
G2B	Government to Business
G2C	Government to Citizen
G2G	Government to Government
ICT	Information and Communication Technology
JRC	Joint Research Centre
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
MIM	Metamodel Information Modeling
NDW	Nationaal Dataportaal Wegverkeer (National Road Data Traffic Portal)
NGO	Non-Governmental Organisation
NIFO	National Interoperability Framework Observatory
NMA	National Mapping Agency
OGC	Open Geospatial Consortium
PAS	Programmatic Approach to Nitrogen
PDOK	Publieke Dienstverlening Op de Kaart (Public Services On the Map)
PSI	Public Sector Information
REST	Representational state transfer
SDI	Spatial Data Infrastructure
WCS	Web Coverage Service
WFS	Web Feature Service
WMS	Web Map Service
WMTS	Web Map Tile 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
European Single Procurement Document	The European Single Procurement Document (ESPD) is a self-declaration by economic operators providing preliminary evidence replacing the certificates issued by public authorities or third parties. As provided in Article 59 of Directive 2014/24/EU, it is a formal statement by the economic operator that it is not in one of the situations in which economic operators shall or may be excluded; that it meets the relevant selection criteria and that, where applicable, it fulfils the objective rules and criteria that have been set out for the purpose of limiting the number of otherwise qualified candidates to be invited to participate. Its objective is to reduce the administrative burden arising from the requirement to produce a substantial number of certificates or other documents related to exclusion and selection criteria.	Commission Implementing Regulation (EU) 2016/7 of 5 January 2016
Evidence-based policy making	The development of public policy which is informed by objective evidence, e.g. through data related to the content of the policy.	Evidence-based policy making Joinup (europa.eu)
GeoDCAT-AP specification	Data Catalogue vocabulary (DCAT) Application Profile extension for describing geospatial datasets, dataset series, and services.	GeoDCAT-AP Joinup (europa.eu)
Geographical Information (GI) Champion	The GI Champion can be appointed to drive through the changes related to running a major GI improvement programme, promoting public sector modernisation through the use of GI, and ensure that the organisation is aware of and convey the benefits of geospatial information and technologies. A GI champion may also be appointed with a pan-government remit.	LIFO Guidelines and Recommendations
Key digital public services	The most frequently accessed and sometimes mandatory public services which are delivered with the extensive use of ICT, e.g. registration of land and property, health and welfare, civil status registration, transport, environmental protection, energy production and distribution, public safety, transport, public education etc. National legislation may define which services must be considered key.	https://joinup.ec.europa.eu/collection/european-union-location-framework-eulf/document/recommendation-6
Location data framework	Location data framework describes all the elements – including data assets, standards and technologies, policies and guidance, people and organisations – that are required to unlock the power of location. An SDI is a location data framework.	LIFO Guidelines and Recommendations Unlocking the Power of Location: The UK's geospatial strategy 2020 to 2025
Location information strategy	A strategic approach for managing and maximising the value of location information.	Location information strategy Joinup (europa.eu)

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

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Annex 1: LIFO 2020 Scoring methodology

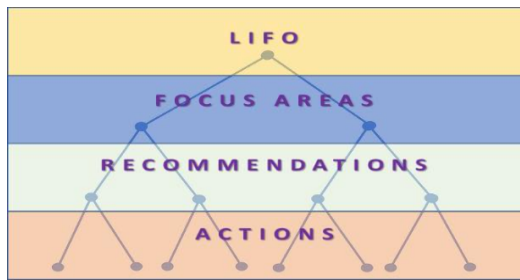


Figure 15 - Hierarchy of indicators and indexes

The LIFO analytical model, described in the *LIFO 2020 Guidelines and recommendations*⁸⁵, is based on a hierarchy of indicators and indexes, as represented in [Figure 15](#): from bottom to top, (action) indicators, recommendation indexes, focus area indexes and LIFO index.

(Action) Indicators: A number of actions⁸⁶ 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.

⁸⁵ https://joinup.ec.europa.eu/sites/default/files/inline-files/2020_LIFO_Guidelines_2.pdf

⁸⁶ Described in the “How” section of each Recommendation.

Annex 2: LIFO 2020 Indicators

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

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

Focus Area: Digital Government Integration			Changes vs 2019
No.	Indicator	Question	
Recommendation 6			
Q6.1	Improvement of location information use in digital public services	To what extent is there a process for identifying opportunities and implementing improvements to key digital public services in their use of location information, including considering new business and delivery models?	Change in scale
Q6.2	Optimal use of location information is used optimally in key digital public services	Please select up to 6 sectors where location information has the most significant role to play in digital public services. For these sectors, please specify how well 'optimised' is the use of location data in digital public services. In this respect, 'optimisation' relates to extent of use and contribution to innovation and quality of service.	Change in scale
Recommendation 7			
Q7.1	Use of SDI in cross-government digital services	To what extent is the SDI used in delivering digital public services across government (in different sectors and levels of government)?	Change in scale
S7.1	Implementation status of the INSPIRE directive	Average of indicators for the following five actions in the INSPIRE country fiche: <ul style="list-style-type: none"> - Availability of spatial data and services - Conformity of metadata - Conformity of spatial data sets - Accessibility of spatial data sets 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 services using their spatial data infrastructure (SDI)?	Change in scale
Q7.3	SDI approach used	Please specify the main SDI approach used for delivery of key digital public services in the sectors selected in 6.2.	New question
Q7.4	Use of the public sector SDI by private sector and other organisations (e.g. NGOs)	To what extent is the public sector SDI used by the private sector and other organisations (e.g. NGOs) for delivery of 'new and innovative' applications, products and services?	
Recommendation 8			
Q8.1	Use of an open and collaborative methodology in location-enabled digital public services	To what extent is an open and collaborative methodology applied, to design and improve location-enabled digital public services at local, sub-national or national level (e.g. through consultations, user groups, feedback requests, iterative development)?	
Q8.1.1	Level of government where a collaborative approach is used	At what level of government is the collaborative approach applied?	Single choice in 2019, multiple choice in 2020
Q8.2	Collaboration with external parties in service delivery	When developing or delivering location-based digital public services, in what ways are external parties involved? This includes the private sector, NGOs and citizens.	Change in scale
Recommendation 9			
Q9.1	Approach for integration of statistical and location information	What actions are implemented for the integration of location and statistical information in the production of location-based statistics?	

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

		incorporate new technological features or emerging technologies.	
Q10.3	Status of development of APIs for INSPIRE / SDI	Please describe the status of development of APIs for SDI / INSPIRE.	
Q10.3.1	Access to high-value location datasets through APIs	Which core "high value" location datasets can be accessed using APIs?	New question
Q10.3.2	Action to foster APIs take-up	Where there are APIs for location datasets, what steps are commonly taken to stimulate take-up and ensure they are as useful as possible?	New question
Recommendation 11			
Q11.1	Reuse of generic ICT solutions in the SDI	Please describe the reuse status of generic ICT solutions in the SDI.	Single choice in 2019, multiple choice in 2020
Q11.2	Implementation of location information registers	What registers of location information are implemented?	
Recommendation 12			
Q12.1	Use of geospatial standards	What type of geospatial domain standards are used in your country?	Change of question
S12.1	Conformity of spatial data sets to INSPIRE implementing rules	Conformity of spatial data sets with Regulation (EU) No 1089/2010 (from INSPIRE monitoring)	
Q12.2	Use of a standardised metadata approach	To what extent is a standardised metadata approach adopted to facilitate discoverability of spatial and non-spatial data through joint access mechanisms such as those listed in the question Q16.1?	New question
Q12.2.1	Use of specifications for combining spatial and non-spatial metadata	Where an approach to facilitate a joint discoverability of spatial and non-spatial data is adopted, what specifications and tools are used to a significant degree to combine spatial with non-spatial metadata in national implementations?	New question
S12.2	Conformity of the INSPIRE network services with INSPIRE implementing rules	Conformity of the INSPIRE network services with Regulation (EC) No 976/2009 (from INSPIRE monitoring)	
Recommendation 13			
Q13.1	Approach to location data quality	What actions are typically implemented to assure quality of location data in your country?	
Q13.1.1	Use of data quality standards	What data quality standard is applied to location data?	New question
Q13.2	Approach to location data quality governance	What type of actions relating to location data quality governance are put in place in your country?	
Q13.2.1	Collection of feedback from users	Where feedback is obtained from users, what approach is taken?	

Focus Area: Return on Investment			Changes vs 2019
No.	Indicator	Question	
Recommendation 14			
Q14.1	Performance monitoring of location-enabled digital public services	What of the following elements are evaluated to assess the efficiency and effectiveness of location-based services in your country?	
Q14.1.1	Performance monitoring scope	Are the measurements done: <input type="checkbox"/> At a project or service level <input type="checkbox"/> At an organisational level <input type="checkbox"/> At an SDI / national level <input type="checkbox"/> A combination of the above	
Q14.2	Approach to impact-based improvement	What actions are implemented for impact-based improvement in location-enabled processes and services in your country?	
Recommendation 15			
Q15.1	Approach to communication of benefits	Is communication delivered on the availability and benefits of location data and location-enabled digital public services to raise awareness and understanding using, for example, factsheets, news articles, web-based communication, videos, events?	Change of question
Recommendation 16			
Q16.1	Ease of searching, finding and accessing location data	What measures are implemented to make the process of searching, finding and accessing location data and web services as easy as possible for companies, research institutions, citizens and other interested parties?	
S16.1	Existence of policies supporting the reuse of PSI	Existence of policies supporting the reuse of Public Sector Information by the private sector (from 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 2020 LIFO compared with LIFO 2019⁸⁷, with the aim to improve the capability of the LIFO analytical model to represent consistently the state

⁸⁷ 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>



of play of location interoperability at country and European level. The main changes, and the focus areas / recommendations impacted are:

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

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

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

Annex 3: LIFO 2020 Additional information: Netherlands

Title	Attachment ⁸⁸
LIFO Survey questionnaire 2020 – Netherlands	 LIFO Survey 2020 Netherlands
LIFO Survey questionnaire 2020 scores and charts – Netherlands	 LIFO 2020 scores and charts Netherlands

⁸⁸ 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.