LIFO: Location Interoperability Framework Observatory

2019 Country Factsheet

Belgium

This LIFO 2019 publication has been prepared by KPMG for the European Commission, Joint Research Centre (JRC) as part of the ELISE Action of the ISA2 Programme. The publication date is August 2020.

The monitoring information for Belgium has been provided by the INSPIRE Coordination Committee.

Table of Contents

1. Introduction

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

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

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

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

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

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

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

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

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

2. Structure of the document

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

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

Annexes to the document are:

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

The 2019 LIFO monitoring information for Belgium has been provided by the *INSPIRE Coordination Committee.*

3. Location Interoperability State of Play

3.1. Overview

Belgium has very good alignment with the EULF Blueprint recommendations and scores above average in comparison with the ten surveyed countries for the LIFO 2019 data collection, in all focus areas except “Policy and Strategy Alignment”, where it remains only slightly below the average.

The highest score for Belgium is in the “Return on Investment” focus area, due to the communications on the benefits of exploiting location information and to the efforts made to facilitate the use of public administrations’ location data by non-governmental actors. Belgium also scores highly in the “Standardisation and Reuse” focus area, where the country’s main strength is in the reuse of existing authentic data, data services and relevant technical solutions.

“Digital Government Integration” is also a strong focus area, as Belgium adopts a collaborative approach to involve different actors in location-related management and development and integrates location and statistical information effectively.

Belgium’s two lowest scores are in the “Policy and Strategy Alignment” and “Governance, Partnerships and Capabilities” focus areas. However, for “Policy and Strategy Alignment”, the Belgium score is only slightly below the European average and for “Governance, Partnerships and Capabilities”, even though it receives the country’s lowest overall score, this still places Belgium above the European average for the focus area.

The value of the overall LIFO index for Belgium is 0.68[2]. This compares with a LIFO European average of 0.54.

Figure 1 - Overall EULF Blueprint implementation

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

2 For the description of calculation method of the LIFO index and the other indicators and indexes see

Annex 1: LIFO 2019 Scoring methodology

3.2. Policy and Strategy Alignment

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

Table 1 - Focus Area "Policy and Strategy Alignment" - vision and recommendations

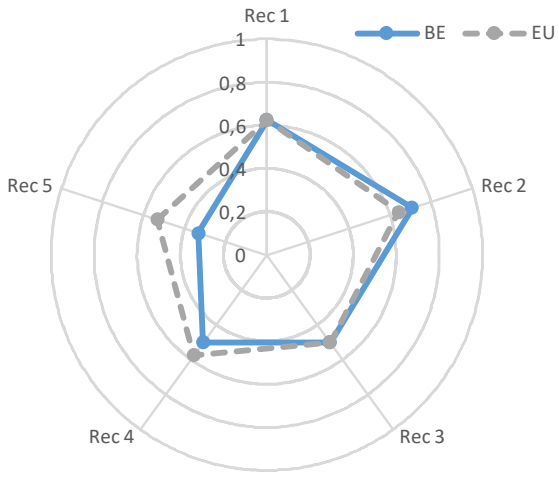

Figure 2 – Policy and Strategy Alignment – scores by recommendation

The “Policy and Strategy Alignment” focus area index for Belgium is 0.53, slightly under the European average of 0.57. Margins for improvement concern mostly the use of location-based evidence for policy making and of geospatial standards for public procurements.

The location strategy and digital government strategy[3] are aligned in many key elements. The use in digital government of authoritative location datasets is mandated by some thematic legislation (Recommendation 1).

With reference to Recommendation 2, on making location information policy integral to, and aligned with, wider data policy at all levels of government:

- most location data are available free of charge under an open licence without restrictions;

[3] See: http://digitalbelgium.be/wp-content/uploads/2017/07/compressed_NLStrategisch-dossier.pdf. For Regional strategies, see: https://bric.brussels/en/files/brussels-smart-city-strategy and https://smartcity.brussels/home (Brussels); https://overheid.vlaanderen.be/digitaal-leiderschap (Flanders); https://www.digitalwallonia.be/en/posts/wallonia-digital-strategy, https://www.digitalwallonia.be/fr/publications/2019-2024 and https://spw.wallonie.be/sites/default/files/CA_Livre1_20180905.pdf (Wallonia)

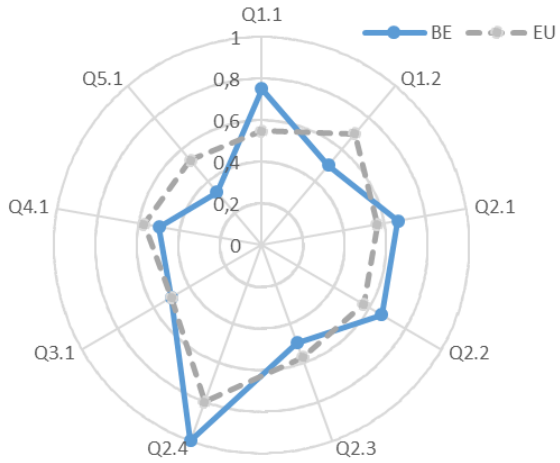

Figure 3 - Policy and Strategy Alignment - scores by indicator

- a wide range of location core reference datasets[4] are available for general use[5];
- many location datasets are available under the same licensing conditions but not as part of a national licensing framework;
- national guidelines on the publication of public sector data cover location aspects, at every responsible administrative level[6]. More precisely, every level is responsible for its own guidelines within its jurisdiction, and the various levels are coordinated through dedicated working groups and coordination committees.

Regarding location data privacy, the degree of preparedness for GDPR is variable, with only some organisations being fully prepared in their implementation response to the regulation (Recommendation 3).

Under Recommendation 4, location-based evidence and analysis is used to help in developing relevant policies and monitoring outcomes in certain relevant policy topics[7], but Belgium still lags slightly behind the average, where more extensive use of that evidence is made.

For public sector procurements of location information and/or services, Belgium uses the European Standard Procurement Document (ESPD). Even if public procurement laws and regulations do not make reference to INSPIRE, actual procurement documents often explicitly refer to INSPIRE and other national or international standards, but without relating the procured components to specific parts of INSPIRE or of those standards (Recommendation 5)[8].

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.

4 Core reference datasets are government-authorised geospatial data; particularly, data included in one of the core location registers, such as, addresses, geographical names, cadastral parcels and buildings, hydrography etc.

5 In Flanders the policy guidelines are fully developed and described. In the other regions and at the federal level these guidelines are currently being developed. For base registries at federal level, see: https://www.belgif.be/en. In Brussels, there is cooperation in interfederal structures (e.g. BestAd) but none of their own Base registries. For Flanders, see https://joinup.ec.europa.eu/collection/oslo-open-standards-local-administrations-flanders/about, https://joinup.ec.europa.eu/sites/default/files/inlinefiles/SEMIC_Linked%20Base%20Registries%20as%20a%20key%20enabler%20in%20Flanders%20%200_7.pdf - https://basisregisters.vlaanderen.be/ - https://github.com/Informatievlaanderen. For Wallonia, base registries are being developed and implemented according to https://www.digitalwallonia.be/en/posts/digital-wallonia-2019-2024;

6 See: https://data.gov.be/nl/info-faq (at the federal level); https://www.odwb.be/pages/home/ (Brussels and Wallonia); https://overheid.vlaanderen.be/informatiemanagement/hergebruik-overheidsinformatie and https://overheid.vlaanderen.be/omzetting-psi-richtlijn (Flanders).

7 See for instance the Hinderpremie, described on page 7

8 Belgium's procurement rules at the national level are: the law on public procurement (17 June 2016), the older law 2013, the Royal Decree (18 April 2017) and older royal decree (14 January 2013). See: https://www.publicprocurement.be/nl/publicprocurementbe-english-0 and https://overheid.vlaanderen.be/overheidsopdrachten-en-raamcontracten (specifically for Flanders).

Recommendation 6	Identify where digital government services and processes can be modernised and simplified through the application of location-enabled services and implement improvement actions
Recommendation 7	Use INSPIRE and SDI models, data and services for delivering cross-sector and cross-border digital public services to citizens, businesses, government and other parties
Recommendation 8	Adopt an open and collaborative methodology to design and improve location-enabled digital public services
Recommendation 9	Adopt an integrated location-based approach in the collection and analysis of statistics on different topics and at different levels of government

Table 2 - Focus Area "Digital Government Integration" - vision and recommendations

The “Digital Government Integration” focus area index for Belgium is 0.67, well above the European average of 0.54. All recommendations have higher scores than the European averages. Belgium is well aligned with the EULF Blueprint recommendations of this focus area, particularly, as highlighted in the Overview, concerning inter-sector collaboration and location-based statistics.

Concerning Recommendation 6, improvements of in digital public services and processes are usually pursued through incremental upgrades to the use of location information.

There are some examples of key digital public services using location information innovatively (i.e. for a ground-breaking contribution, such as to integrate processes, location-based analytics or AI algorithms):

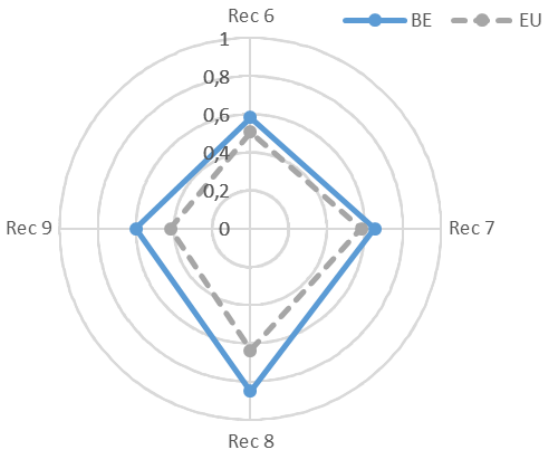

Figure 4 - Digital Government Integration - scores by recommendation

- Kabel en Leidingen internel portaal (KLIP), a platform in Flanders for exchanging digital utility network information based on INSPIRE specifications[9];
- Zonnepotentieelkaart[10], which uses Earth Observation (EO) data in combination with location data (buildings and digital health model) to calculate the potential of solar panels for citizens;
- Flexpub, an innovative strategic vision for location-based e-services[11];
- Hinderpremie[12] (nuisance compensation), a financial allowance for businesses who are confronted with serious nuisance caused by public works executed in front of their premises.

[9] See Best Practice BE1
[10] For Flanders Region, see: https://overheid.vlaanderen.be/bvk-zonnepotentieel-vlaanderen-voorbeeldprojecten. For Brussels Region, see: https://geodata.leefmilieu.brussels/client/solar/
[11] See Best Practice BE2
[12] See Best Practice BE3

With reference to Recommendation 7, the public sector SDI is used in a significant number of examples by the private sector and other organisations (e.g. NGOs) for delivery of new and innovative applications, products and services[13].

Datasets based on frameworks other than INSPIRE, are used for digital public services in domains such as transport, energy, smart cities, culture, education and tax policy. INSPIRE datasets are used in most cases for the domains of environment, property/land administration, local and regional planning.

Based on the INSPIRE country fiche[14], the implementation of the INSPIRE Directive is completed under the key obligations of identification of spatial datasets and 'documentation of these datasets (metadata); and well advanced for the provision of services for identified datasets (discovery, view, download). The implementation of the provision to make spatial datasets interoperable by aligning them with common data models is only half way to completion.

In some cases, Belgium is also involved in the delivery of cross-sector and cross-border digital public services using INSPIRE for harmonisation; examples are the Nuisance compensation initiative[15] and the Be-Good project[16], which also involves France, Luxembourg and the Netherlands.

Recommendation 8, is a particular strength, as mentioned above: an open and collaborative methodology to design and improve location-enabled digital public services (e.g. through consultations, user groups, feedback requests, iterative development) is applied extensively at all levels: local, sub-national and national.

External parties are also involved in the delivery of location-based public services under different circumstances, such as:

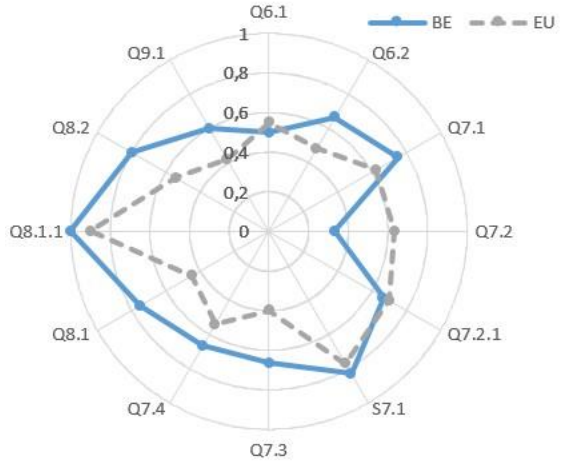

Figure 5 - Digital Government Integration - scores by indicator

- services contracted to the private sector or NGOs under public sector accountability;
- public authorities scaling back their role relying on models such as public/private partnerships;
- public authorities collecting data through particular processes or services to make the data openly available for external parties to develop their own products and services;
- government encouraging 'civic hacking' to develop new ideas, technologies or methodologies that help solve civic problems and improve the lives of citizens[17].

Concerning the integration of location and statistical information (Recommendation 9), Belgium implements the following actions:

[13] Some examples of private sector using the public sector SDI are: IKEA implementing a programme similar to the Zonnepotentieelkaart initiative (https://online.solarcentury.com/ikea-embed/be?lang=nl_BE); WAZE using the Flemish Street Network & addresses

[14] Currently the 2019 issue of the INSPIRE country fiche is available

[15] See pg. 7 and https://www.vlaio.be/nl/subsidies-financiering/hinderpremie/wat-is-de-hinderpremie

[16] https://en.vmm.be/projects/water/be-good

[17] For an example of collaboration with external parties involving location data see: https://be.okfn.org/2014/04/10/egov-mobility-hackathon/

- there is an accurate and up-to-date knowledge base containing information of where citizens and businesses are located;
- a common geospatial reference framework for statistics is used to enable timely, accurate and efficient production of location-based statistics;
- the location intelligence infrastructure is continuously kept relevant to growing and evolving needs based on a regular quality assessment of whether the infrastructure is fit for purpose;
- location based statistics are updated dynamically to give an up to date snapshot on which to make decisions;
- the spatio-temporal dimension of statistics is captured in a format enabling it to be used readily in a GIS for geostatistical analysis;
- relevant private sector data is included in the statistical information infrastructure.

3.4. Standardisation and Reuse

Vision Core data has been defined and a funding model has been agreed for its ongoing maintenance and availability. Consistent use of geospatial and location-based standards and technologies, enabling interoperability and reuse, and integration with broader ICT standards and technologies, including the standards and solutions promoted by the ISA2 programme. Use of these standards in all areas related to the publication and use of location information in digital public services, including metadata, discovery, view, exchange, visualisation etc.	
Recommendation 10	Adopt a common architecture to develop digital government solutions, facilitating the integration of geospatial requirements
Recommendation 11	Reuse existing authentic data, data services and relevant technical solutions where possible
Recommendation 12	Apply relevant standards to develop a comprehensive approach for spatial data modelling, sharing, and exchange to facilitate integration in digital public services
Recommendation 13	Manage location data quality by linking it to policy and organisational objectives, assigning accountability to business and operational users and applying a “fit for purpose” approach

Table 3 - Focus Area “Standardisation and Reuse” - vision and recommendations

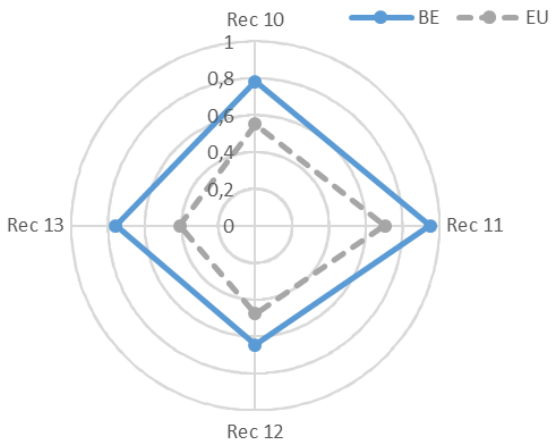

Figure 6 - Standardisation and Reuse - scores by recommendation

The “Standardisation and Reuse” focus area index for Belgium is 0.73, compared with a European average of 0.54. Belgium obtains the best scores of all surveyed countries in this focus area, due to its good practices in the reuse of existing authentic data, data services and relevant technical solutions.

The country strength in this focus area is the adoption of a common architecture to develop digital government solutions (Recommendation 10). The location data architectural approach in Belgium fits within a broader national ICT architectural framework based on the EIF / EIRA.

A clear approach is in place for monitoring, testing and upscaling of new technological developments, in collaboration with different stakeholders.

Furthermore, a series of location data APIs have been developed, documented and are freely accessible[18].

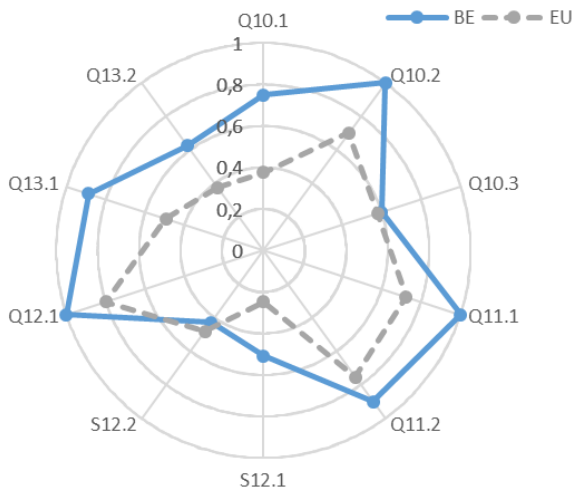

Figure 7 - Standardisation and Reuse - scores by indicator

Belgium reaches almost full alignment with Recommendation 11. In terms of reuse practices, one or more of the ISA² solutions have been implemented, e.g. secure data access mechanisms, the reuse of one or more of the core vocabularies. Furthermore, Belgium has implemented several registers of location information, i.e.:

- Addresses;
- Geographical names;
- Administrative units;
- Cadastral parcels;
- Buildings;
- Transport networks;
- Glossary:
- Code Lists;

plus, other registers both at federal and regional level [19]

As for the INSPIRE implementing rules, Belgium has, among the surveyed countries, one the highest percentages of datasets in conformity with Regulation (EU) No 1089/2010; on the other hand, the percentage of network services complying with Regulation (EC) No 976/2009

is slightly below the European surveyed average. The GeoDCAT-AP specification is used to facilitate discoverability of geospatial data and general data (Recommendation 12).

Concerning the management of location data quality (Recommendation 13), an array of actions is typically implemented to assure that quality.

During design, these actions include:

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

In terms of monitoring, actions implemented are:

- regular measurement of data conformity to quality parameters set out in the data policy;
- data quality dashboards for critical information such as authentic data;
- ex-post evaluation of existing data quality issues;
- assessment of the current business value of data quality.

Regarding location data quality governance, actions put in place consist of:

- alignment of data quality improvement roadmaps with the information governance vision and strategy;

18 See https://overheid.vlaanderen.be/webdiensten-ons-api-aanbod, https://data.gov.be/en/api-rss, https://geoportail.wallonie.be/API-geoviewer

19 See, for instance, https://dt.bosa.be/nl/gegevensuitwisseling/authentieke_bronnen/overzicht_authentieke_bronnen#fedgov

- well-defined data quality responsibilities;
- existence of a cross-unit or cross-organisation special interest group for data quality[20];
- definition of a data quality review process for various datasets;
- collection of feedback from users to report problems and help improve data quality.

3.5. Return on Investment

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

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

Table 4 - Focus Area "Return on Investment" - vision and recommendations

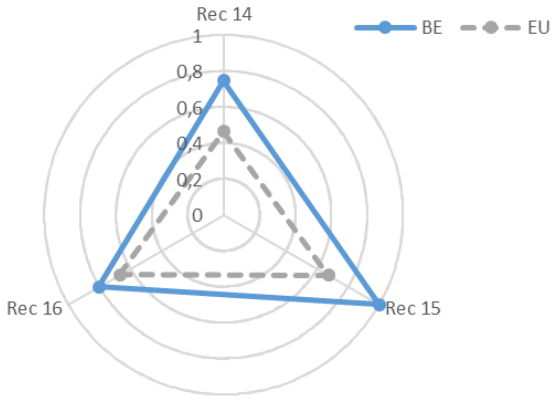

Figure 8 - Return on Investment - scores by recommendation

The "Return on Investment" focus area index for Belgium is 0.87, well above the European average of 0.60. Belgium is close to the highest score of all the surveyed countries for this focus area, due to its good practices on communications and its approach to fostering the reuse of public location data by non-governmental organisations.

Communication on the availability and benefits of location data and location-enabled digital public services, is based on a systematic approach in each relevant organisation, to raise awareness and understanding of such benefits [21] (Recommendation 15).

With reference to Recommendation 16, several measures are implemented to make the process of searching, finding and accessing location data and web services as easy as

[20] Examples of these organisations are: for Flanders, the GDI Netwerkoverleg group, that brings together all geographic data providers (https://overheid.vlaanderen.be/werkgroepen-onder-stuurorgaan-vlaams-informatie-en-ict-beleid); for Wallonia, the Comite Strategique de la Geomatique, which coordinates all actors, users, producers at every level and produces a strategic geomatics plan (https://geoportail.wallonie.be/CSG)

[21] An example at the national level is the annual BEGEO conference which brings together all actors in the location sphere in Belgium (https://begeo20.be/). At regional level, users days are organized in every region, e.g. Trefdag Digitaal Vlaanderen (https://overheid.vlaanderen.be/trefdag-digitaal-vlaanderen), Urbis users Club for Brussels (https://bric.brussels/en/news_publications/news/book-your-spot-for-the-last-urbis-user-club-of-2019)

possible for companies, research institutions, citizens and other interested parties. These measures include:

- an open data portal merging location data and non-location data;
- national discovery geoportal integrating INSPIRE and non-INSPIRE data;
- a geoportal harvested by the European Data Portal;
- thematic portals complementing general search facilities with “specialist” search;
- websites with exposition of data.

In order to support private, non-profit and academic actors in the development of new products and e-services, Belgium implements the following actions:

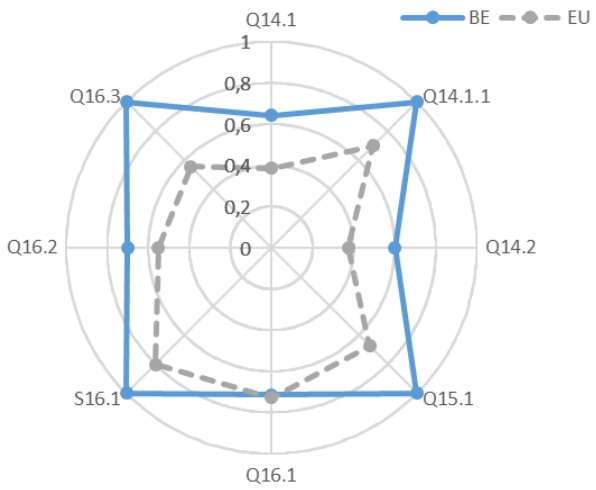

Figure 9 - Return on Investment - scores by indicator

- promotion of open data policy and brokering access to this data through hackathons;
- incorporation of non-government actors in the governance framework for public sector data;
- pilot projects;
- adding data and services from non-governmental actors to the public sector (spatial) data infrastructure;
- collecting requirements of businesses, research institutions and other (potential) users for consideration in further development of INSPIRE/SDI;
- collecting best practice examples of how private companies, citizens, academic institutions and other users make use of INSPIRE/SDI data and services;
- training in necessary skills to exploit the SDI[22]

Belgium adopts a strategic approach to funding public sector location reference data to make access at point of use cost effective.

Assessments of the efficiency and effectiveness of location-based services are carried out, at all levels (project or service, single organisation and SDI / national level), by evaluating their total cost of ownership, availability, responsiveness, return on investment, reusability, reduction in administrative burden, simplification of administrative processes, enhanced business opportunities and user satisfaction (Recommendation 14). Moreover, Belgium implements several actions for impact-based improvement in location-enabled processes and services:

- identification and monitoring of the benefits of location information;
- regular monitoring of “upstream” (i.e. production and dissemination) and “downstream” (i.e. use) aspects of location data and services;
- use of the monitoring information to fund improvements in particular location data or services and to prioritise investment across the governmental portfolio.

[22] See, for instance https://geoportail.wallonie.be/agenda

3.6. Governance, Partnerships and Capabilities

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

Table 5 - Focus Area "Governance, Partnerships and Capabilities" - vision and recommendations

The "Governance, Partnerships and Capabilities" focus area index for Belgium is 0.52, compared with the European average of 0.44. This is the lowest scoring focus area for Belgium. The positive comparison with all surveyed countries is due, mostly, to the effectiveness of the governance model.

With reference to Recommendation 17, the integrated governance of location information processes in Belgium includes precisely scoped decision-making and mandates on geospatial matters, as well as participation in relevant bodies of interested communities (location and digital government, thematic domain representatives, administrative levels (central and local) and sectors (public, private, academic, society).

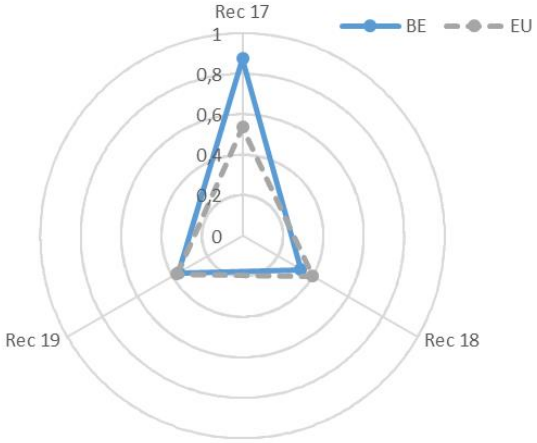

Figure 10 - Governance, Partnerships and Capabilities - scores by recommendation

Furthermore, the organisations respectively leading and coordinating the implementation of location information and digital government cooperate fully and actively. An example is the digital transformation collaboration project at the Federal level within the Belgian Federal Public Service Policy and Support (BOSA, the entity in charge of all support services at federal level), where the National Mapping agency is closely involved, together with other agencies, within the roadmap for the future evolution of the ICT landscape and the inclusion of geospatial technology in the Federal Administrative services.

Regarding Recommendation 18, only relatively few formal agreements between public authorities or public-private partnerships[23] exist to finance, build and operate location

[23] See however Best Practice BE1

data services or digital public services using location data. No formal agreements exist with other countries to finance, build and operate cross-border location data services or digital public services using location data.

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

With reference to Recommendation 19, some organisations undertake training and awareness raising activities on geospatial skills[24] as part of a recognised geospatial competency framework or within a public sector ICT or data competency framework. This includes:

- A public sector location information / GI champion, using the services of the Geoportail de Wallonie, Geo.brussels, Informatie Vlaanderen and the National Mapping Agency[25];
- Location information / GI champions in individual organisations where location information plays a significant role (in Belgium, every municipality has a GIS expert in house, and all administrations have some staff, or whole units, dedicated to location information);
- Spatial literacy awareness raising for non-specialists (e.g. policy makers, legal advisers, project managers)[26];
- Training for specialists (e.g. developers, data analysts, governed by the individual administrations, units or departments);
- Special interest group for knowledge sharing within the geospatial community, such as the Flemish Association for Geographic Information System (FLAGIS);
- Public or cross-government events specialising in location information / GI topics[27];
- INSPIRE training modules[28]

Moreover, the link between geospatial competencies and a broader ICT framework is demonstrated for instance by the creation in 2015, of the Informatie Vlaanderen agency, joining the GIS Flanders Support Center and the ICT support agency (VICTOR - Vlaamse ICT Coordinator)[29].

[24] The Flemish Association for Geographic Information System (FLAGIS) organizes a set of training activities; see, for instance, the FLAGIS training on the OGC API standards: https://www.flagis.be/

[25] https://geoportail.wallonie.be/API-geoviewer, http://geobru.irisnet.be/en/, https://overheid.vlaanderen.be/informatie-vlaanderen,

[26] See the Users day organised yearly by Vlaanderen. Meeting day Digital Flanders: https://overheid.vlaanderen.be/trefdag-digitaal-vlaanderen

[27] See the annual BEGEO conference

[28] Some were developed by the VMM in the framework of the international project eENVplus; http://www.eenvplus.eu/project/eenvplus-training/

[29] See also the digital transformation collaboration project at the Federal level within BOSA, mentioned above

4. Best practices

EULF Best Practice BE1	**Kabel- en Leidinginformatieportaal (KLIP)**
Policy domain: Utilities	
Process owners: Informatie Vlaanderen	
Short description: KLIP (Kabel- en Leidinginformatieportaal) is a platform aimed at improving the efficiency of underground operations and reducing excavation damage by sharing work plans and exchanging cable and pipe information before work starts. Contractors performing such works are required to submit a KLIP request. The portal forwards their request to all possibly involved cable and pipeline managers (KLBs) and draws up one clear digital plan with their answers. The data model used (IMKL) is an extension to the INSPIRE data model for utility and governmental services. Plans including all available underground infrastructure are not only available in the KLIP portal but also in the KLIP app for Android, iOS and Windows.	
Recommendations: Recommendation 6 (Digital Government Integration), Recommendation 18 (Governance, Partnerships and Capabilities)	
Link: https://overheid.vlaanderen.be/informatie-vlaanderen/producten-diensten/kabel-en-leidinginformatieportaal-klip	

EULF Best Practice BE2	**Flexpub, a strategy for location-based e-services**
Policy domain: Geospatial strategy	
Process owners: Katholieke Universiteit Leuven (KU Leuven), Université de Namur (UNamur), Institut Géographique National (IGN)	
Short description: A research project aimed at developing a strategic vision for 2018-30 for location-based e-services. In order to develop this Strategy, a baseline measurement of existing federal administrations' practices in terms of location-based e-services was conducted and was complemented with an analysis of stakeholders' requirements. The strategic framework is based on the pillars of Openness, Inclusion, Collaboration, and Geo-orientation.	
Recommendations: Recommendation 1 (Policy and Strategy Alignment), Recommendation 6 (Digital Government Integration)	
Link: https://cirb.brussels/fr/images/doc-actualites/doc-urbis-user-club-14-06-18/flexpub-the-development-of-flexible-and-innovative-location-based-e-services; https://www.belspo.be/belspo/brain-be/projects/FLEXPUB_en.pdf	

EULF Best Practice BE3	**Hinderpremie**
Policy domain: Road maintenance, Economic policy	
Process owners: Flanders Agency for Innovation and Entrepreneurship	
Short description: A geospatial-based solution supports the process for granting compensations to small businesses that are seriously hampered by ongoing works. The compensation is allocated through an automated procedure taking into account all	

roadworks (that have to be registered in the Platform for General Information of Public Domain (GIPOD) and associated addresses through the central registry of businesses.
Recommendations: Recommendation 6 (Digital Government Integration)
Link: https://www.vlaio.be/nl/subsidies-financiering/hinderpremie/wat-is-de-hinderpremie

Annex 1: LIFO 2019 Scoring methodology

The LIFO scoring methodology is based on a hierarchy of indicators and indexes, as represented in the figure below.

(Action) Indicators: A certain number of actions[30] have been selected in the EULF Blueprint as being representative of the scope of the recommendations to which they belong. For each of these actions, an indicator has been designed to measure how monitored countries are progressing towards the "vision" outlined in the EULF Blueprint. Each indicator is calculated on a specific scale, which best reflects the nature of the action (e.g. if it can be measured over a continuous or a discrete scale, if it is a binary phenomenon i.e. yes/no or similar, etc.). Indicators are then normalised over a scale 0-1, as follows:

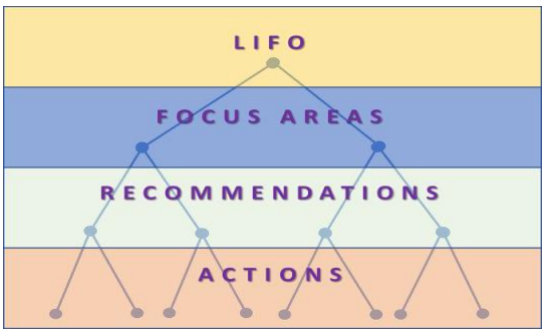

Figure 12 – Hierarchy of indicators and indexes hierarchy

Score attributed to the answer / Maximum Applicable Value: where the Maximum Applicable Value is the upper end of the scale that the non-normalised Value of the indicator can reach.

Note: Optional questions in the LIFO survey capture supplementary information relevant to corresponding mandatory questions about the actions. The mandatory questions (i.e. those marked '*' in the survey) are scored whereas the optional questions are not scored.

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

Level	No.	Scoring method
LIFO	1	Average of the 5 Focus area indexes
Focus area	5	Average of scores for all recommendations associated with a focus area
Recommendation	19	Average of normalised scores for all indicators associated with a recommendation[31]
Action	61	Scores calculated using different scoring methods, converted to standard normalised scores in range 0-1.

***Table 6** – Relationships between indicators and indexes*

Action indicators, Recommendation indexes and Focus Area indexes are thus equally weighted in the calculation of their respective upper level indexes.

Note: Some questions have a "don't know" response as an option. Respondents are encouraged to provide answers wherever possible. Where a "don't know" response is given, the question has a null score. This is shown as zero in the indicator charts and the question is ignored in calculating the index scores.

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

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

Annex 2: Glossary

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

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