Open Data
Maturity Report
2024

2024 Open Data Maturity Report

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Executive summary

The 2024 open data maturity (ODM) assessment evaluated the maturity of countries in the field of open data. In particular, the assessment measured the progress of European countries in making public sector information available and stimulating its reuse, in line with the open data directive (Directive (EU) 2019/1024). A total of 34 countries participated in this 10th consecutive annual assessment, including the 27 EU Member States, 3 European Free Trade Association (EFTA) countries (Iceland, Norway and Switzerland) and 4 candidate countries (Bosnia and Herzegovina, Albania, Serbia and Ukraine).

This report aims to help readers better understand the level of ODM of the participating countries, to identify areas for improvement and to enable participating countries to learn from one another. As an annual publication, the ODM report also captures the progress made by countries over time, with the 2024 report providing the latest information. Moreover, it gives an overview of best practices implemented across Europe that could be transferred to other national and local contexts.

The assessment methodology defines ODM using four dimensions.

- **Policy** investigates the open data policies and strategies in place in the participating countries, the national governance models for managing open data and the measures applied to implement policies and strategies.
- **Portal** investigates the functionality of national open data portals, the extent to which users' needs and behaviour are examined to improve the portal, the availability of open data across different domains and the approach to ensuring the portal's sustainability.
- **Quality** assesses the measures adopted by portal managers to ensure the systematic harvesting of metadata, the monitoring of metadata quality and compliance with the DCAT-AP metadata standard, and the quality of deployment of the published data on the national portal.
- **Impact** analyses the willingness, preparedness and ability of countries to measure both the reuse of open data and the impact created through this reuse.

Open data maturity scores in 2024

Figure 1 and Figure 2 show the ODM scores of all 34 participating countries for 2024. Highlights from these results include the following points.

- A total of 18 countries increased their ODM year-on-year; 1 country scored the same overall as in 2023; and 15 countries experienced a decrease in their maturity score (for 11 countries, the decrease was less than 5 percentage points (pp)).
- Maturity scores remain concentrated at the higher end of the spectrum, with most countries (26 out of 34; 76 %) having a maturity score above 73 %.
- The Member States maintained their average maturity score at the same level as in 2023, at 83 %.
- The most mature Member States are **France** (100 %), **Poland** (98 %) and **Slovakia** (96 %). The most mature EFTA country is **Norway** (89 %). The most mature candidate country is **Ukraine** (97 %).
- The biggest climbers are **Latvia** (+ 10 pp), **Croatia** (+ 9 pp), **Serbia** (+ 9 pp) and **Czechia** (+ 6 pp).

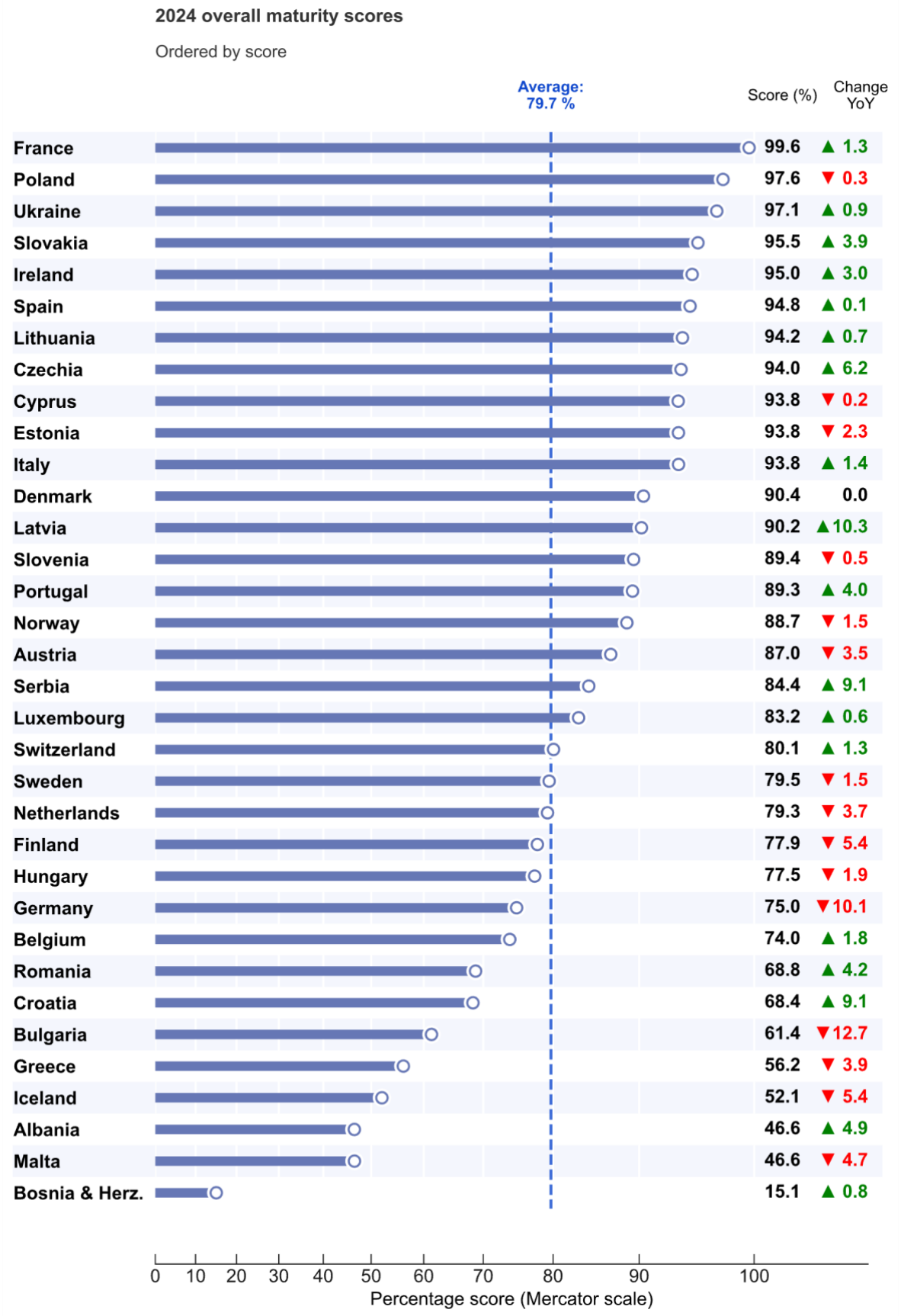

Figure 1: The average overall maturity score increased from 79 % in 2023 to 80 % in 2024 (YoY: year-on-year).

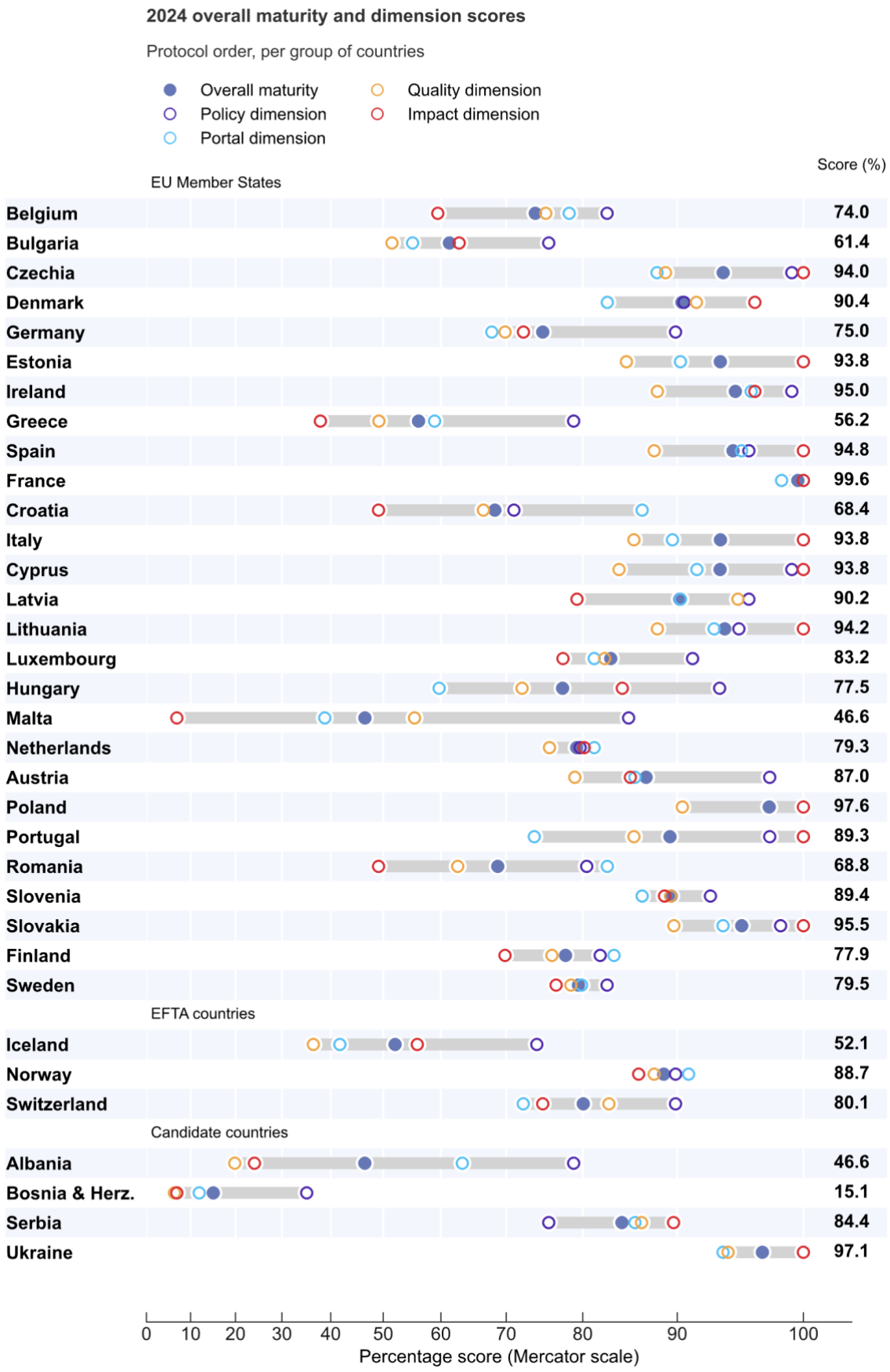

Figure 2: The overall maturity score is the average of the scores for each of the four underlying dimensions

Highlights from the four dimensions of the 2024 open data maturity assessment

Figure 3 shows the average scores over time on the four maturity dimensions for the Member States.

1. **The policy dimension remains (as it has been since 2015) the most mature dimension on average (91 %) in the EU, with a 2 pp increase since 2023. This growth reflects ongoing improvements in the framework for open data policies (+ 2 pp) and the implementation of open data initiatives (+ 4 pp).**
   - Compared with 2023, more countries report that their governance structures ensure that local and regional open data initiatives are facilitated and supported nationally (up from 20 to 23 Member States). This suggests that there is a growing commitment to cohesive open data policy and stronger national coordination across multiple levels of government.
   - More countries report that their national policy/strategy outlines measures to incentivise the publication of and access to citizen-generated data (up from 11 to 14).
   - All Member States report that:
     — they have an open data policy;
     — they are working towards applying the implementing regulation on high-value datasets (HVDs) (Commission Implementing Regulation (EU) 2023/138);
     — the national open data team and the wider network of open data officers in their countries have regular exchanges;
     — public sector bodies and open data reusers in their countries regularly exchange knowledge and experiences;
     — they have plans for publishing open data at the public body level;
     — they have processes in place to ensure that their open data policies and strategies are implemented.
   - Key practices and trends are as follows:
     — countries create structured training programmes to develop their civil servants' data competencies;
     — countries' national policies and strategies aimed at promoting citizen-generated data often include sector-specific initiatives;
     — establishing working groups is a particularly common method that countries use to facilitate exchanges between the national open data team and the wider network of open data officers.
2. **The portal dimension remains the second-most-mature category, although the average score has declined compared with 2023. This decrease is partly due to the introduction of new questions that set higher standards for countries. Overall, while data availability continues to improve, advancements in portal features have not kept pace with increased expectations.**
   - This year, 17 Member States (62 %) report allowing the publication of non-official data on their portal. This represents a sharp increase from 2023, when only 12 Member States reported that non-official providers could contribute data to national portals. Two out of the four candidate countries also allow this.
   - 24 Member States (88 %; 2 more than in 2023), 1 EFTA country and 3 out of 4 candidate countries report monitoring the characteristics of the data published on the portal, such as the distribution across categories, static versus real-time data and how these change over time.
   - 20 Member States (70 %) report actively promoting HVDs on their national portals. In many cases, countries have a specific labelling system or a section to make the HVDs findable for users.

- All Member States report:
  - having a national portal that enables users to search for open datasets and download open data;
  - monitoring the portal's traffic (e.g. the number of unique visitors, visitor profiles, the percentage of machine traffic, the number of downloads for each dataset);
  - taking measures to optimise the searchability and discoverability of content (data and editorial);
  - having metadata available on the portal in clear, plain language to enable both humans and machines to read and understand it;
  - identifying the data providers that are not yet publishing data on the national portal.
- Key practices and trends are as follows.
  - More countries have implemented mechanisms for users to rate datasets on their national portals. The rating system is usually star based or grade based.
  - More countries report that their national portal showcases reuse cases in a designated section.
  - More countries report monitoring their portal's traffic and performing other activities to better understand the behaviour and needs of portal users. For instance, countries use various analytics tools to monitor the popularity of datasets, and this tracking method is used to gain insights into how to improve the quality of datasets.

3. **The quality dimension is the least mature (79 %). The average score has decreased since 2023 but is still higher than in 2022.**
   - Compared with 2023, a greater proportion of metadata on Member States' national portals is now sourced automatically rather than edited manually. Specifically, more than half of Member States now report that at least 50 % of the metadata on their national portal is automatically sourced (up from 13 to 18 Member States).
   - More countries (up from 14 to 17 Member States) report that more than 90 % of their datasets are provided in an open and machine-readable format.
   - Key practices and trends are as follows.
     - Countries report the use of data quality assessment techniques that either combine or go beyond the widely used 5-star open data model or the FAIR principles (findability, accessibility, interoperability and reusability).
     - Some countries report that their automatic metadata harvesting process operates on a centralised model, with multiple subportals interconnected under a single catalogue.
     - Countries report that they ensure compliance with DCAT-AP by leveraging existing technical platforms or plug-ins designed with built-in DCAT-AP support.
4. **The impact dimension ranked as the third best-performing category this year. It outranked the quality dimension for the first time and achieved the greatest year-on-year improvement for the second consecutive year.**
   - Nearly all Member States (96 %) – along with the majority of EFTA countries (two out of three) and candidate countries (three out of four) – now report having a national definition of open data reuse.
   - Nearly all Member States (92 %) – along with all EFTA countries and three out of four candidate countries – report having a definition of open data impact.
   - Compared with 2023, more Member States (up from 21 to 23) – along with two out of three EFTA countries and three out of four candidate countries – report having a methodology in place to measure the impact of open data in their country. These efforts are usually integrated into a general national strategy on open data.

- Key practices and trends are as follows.
  - Compared with 2023, there has been an increase in collaboration between government, civil society and academia to create open data impact in countries.
  - Compared with 2023, more countries report performing activities to understand which open datasets are being reused and how. The activities performed include, among others, conducting workshops with reusers, fielding surveys, leveraging web analytics and running feedback sessions with portal users.
  - Awareness of reuse cases in the environmental domain has increased across the EU, EFTA and candidate countries, highlighting the importance of data on biodiversity, environmentally friendly cities, climate change and related disasters, and energy consumption and renewables.

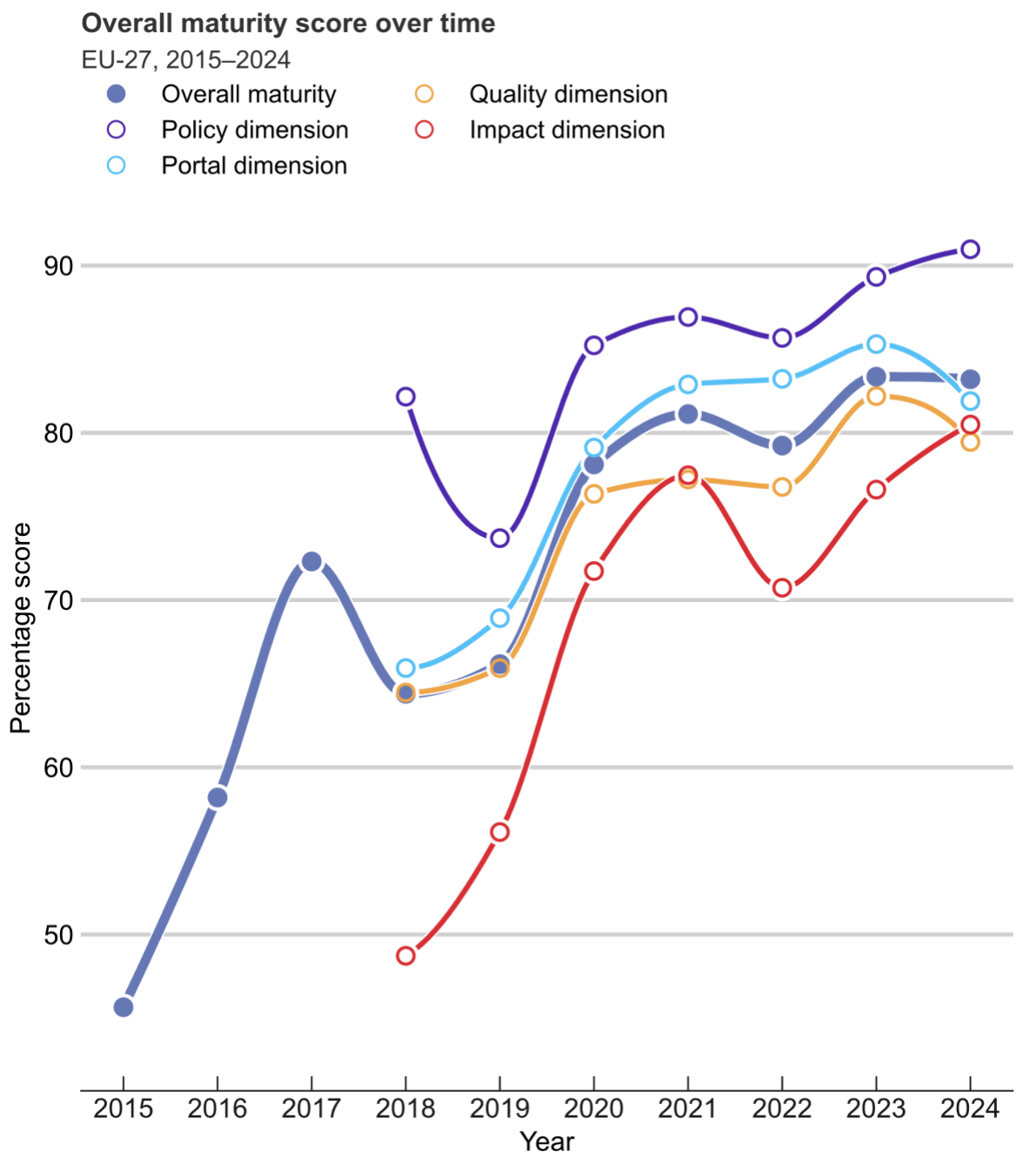

Figure 3: Average EU-27 overall maturity score and score on each dimension, 2015–2024

Spotlight on high-value datasets

Member States are progressing towards applying the implementing regulation on HVDs, especially by inventorying datasets and preparing statistical, geospatial and meteorological datasets.

The implementing regulation on HVDs, which entered into force in June 2024, is a legislative framework established to enhance the availability and usability of certain datasets with significant value. **Estonia**, **Lithuania**, **Denmark**, **Latvia**, **Slovenia** and **Finland** are leaders among the Member States in implementing the HVD requirements. On average, Member States are making the most progress with **statistical** (80 %), **geospatial** (77 %) and **meteorological** (75 %) datasets. Of the underlying technical and legal requirements, identifying and inventorying HVDs (83 %), addressing legal barriers (77 %) and setting up new roles and workflows (77 %) are the most advanced. In general, requirements related to technical progress, such as metadata quality (71 %), machine-readable formats through application programming interfaces (69 %) and bulk download (66 %) are less advanced. Nonetheless, these are significant increases compared with 2023.

In 2024, 20 Member States (70 %) reported actively promoting HVDs on their national portals. Portals use editorial tools such as labels or tags to promote their visibility and encourage reuse by allowing users to select them specifically. Common approaches to promoting HVDs on national portals include incorporating filtering options to help users easily locate these datasets and deep-dive into one of the six HVD categories. Several countries have also created dedicated sections within their portals to allow users to scroll through all available HVD datasets and to inform them about HVDs, their significance and the latest developments in the field.

Moreover, 17 Member States (63 %) report that they have implemented the DCAT-AP HVD tag on their open data portals. Countries report integrating existing HVDs in existing geoportals, providing seamless access to geospatial data. Furthermore, several countries with advanced geospatial and environmental data initiatives report using the infrastructure for spatial information in Europe directive (Directive 2007/2/EC) to ensure cross-border interoperability. Those who do not report implementing the DCAT-AP HVD tag report challenges regarding compliance across all public bodies and adapting their Comprehensive Knowledge Archive Network systems to implement requirements for HVDs.

In addition, 21 Member States (78 %) report that they have implemented other measures to ensure that HVDs are interoperable with datasets from other countries. Member States report communicating directly with other countries' data providers and utilising standardised licences or data formats to encourage cross-border reuse.

Furthermore, 19 Member States (70 %) report having implemented structured processes to monitor the reuse of data from HVDs. These monitoring practices generally involve leveraging national data portals. Many countries monitor the use of HVDs similarly to that of other datasets, employing usage analytics and portal monitoring frameworks to track engagement and access. Additionally, several Member States adopt more proactive measures, such as holding ad hoc meetings with public institutions to gain insights into HVD use, conducting interactive workshops to better understand user needs and mapping various use cases, particularly those that highlight the application of HVDs in scientific research.

Outlook

The dimensions of ODM are connected and, to some extent, have a sequential order. Policies must be in place to initiate the process of making data open and to establish the mandate of national open data teams. Portals can then be funded and developed to make the opened data discoverable. As more data is made available, more robust requirements for interoperability emerge. As the reuser community grows, it expects higher-quality data for more sophisticated reuse cases. These and other efforts encourage reuse of the available data. Some reuse cases have an impact on society.

Regarding open data **policy**, all Member States have transposed the open data directive (Directive (EU) 2019/1024) in national law. Member States have established governance structures for open data, assigned civil servants specifically to open data topics and built systems to assist data holders and address policy challenges. In the year ahead, Member States will continue to work to fully implement the implementing regulation on HVDs.

Several Member States continue to modernise their portals or launch new ones with more advanced features. However, open data **portal** features remain similar to those available in 2023, with the decrease in the maturity score probably related to the higher requirements set in this year's questionnaire and the removal of some questions about high-maturity features. The method underwent a planned revision to ensure its continued relevance in light of a changing open data ecosystem, and policy and technological developments.

Member States report having numerous workflows and automated processes for harvesting metadata and monitoring its **quality** on their portals. Nonetheless, the maturity score has decreased on average compared with 2023. Several countries had lower metadata quality scores on the same questions asked last year, perhaps reflecting more accurate insights from their processes and monitoring tools. Nonetheless, computed metrics of metadata quality can objectively assess the metadata. In the first attempt to do so, this year's report used the metadata quality assessment tool of data.europa.eu to evaluate the metadata harvested by the initiative. The results are summarised in this report as a pilot indicator.

Finally, performance on the **impact** dimension continues to improve. Member States are further increasing their activities to document the reuse of open data, which has translated into a greater awareness of available reuse cases. Although countries have a fair collection of examples of open data being reused for new purposes, systematic assessments of the impact created through this reuse are largely unavailable at the country level.

Chapter 1: Introduction

Background: open data policy in the European Union

The open data directive (Directive (EU) 2019/1024) encourages EU Member States to make as much publicly accessible information as possible available for reuse. The directive is 'recast', meaning it brings together the original directive on public sector information (Directive 2003/98/EC) and all the amendments made to it in a single legal act.

The core principle of the directive is to promote the reuse of information that is already being collected for government purposes, thus generating additional value once it is reused for different purposes. Therefore, the directive sets out a minimum standard for harmonising national rules and practices, aiming to reduce obstacles and promote reuse of public sector information to drive innovation. When it entered into force in 2019, the directive also answered the need to update the legislative framework in line with the fast-paced evolution of digital technologies, especially artificial intelligence.

Furthermore, the open data directive embraces the potential to generate important social, economic and environmental benefits through innovative applications of generally accessible public information. These benefits are pursued in particular by introducing the concept of high-value datasets (HVDs). The implementing regulation on HVDs (Commission Implementing Regulation (EU) 2023/138) specifies six specific categories of HVDs: geospatial, earth observation and environment, meteorological, statistics, companies and company ownership, and mobility. Due to the importance of these datasets, the regulation lays down rules ensuring their accessibility free of charge and in machine-readable formats. HVDs must be made available for reuse with minimal legal and technical restrictions. Moreover, public sector bodies have the obligation to make them available through application programming interfaces and, where relevant, as a bulk download. The implementing regulation entered into force in June 2024, and EU Member States will report on their progress in applying it to the European Commission every two years starting from February 2025.

Not all public sector information can be released as open data. For example, some information is classified as confidential and sensitive, or the public administration that holds it may not have all the necessary rights to permit others to reuse it. Other legislation, such as the Data Governance Act (Regulation (EU) 2022/868) and the Data Act (Regulation (EU) 2023/2854), includes measures to stimulate the reuse of public sector information through specific access regimes. The European Register for Protected Data held by the Public Sector provides relevant information on what data is held by public authorities in the Member States, and registers are progressively being made available at data.europa.eu.

Measuring open data in Europe

Under the data.europa.eu initiative, the Publications Office of the European Union and the Directorate-General for Communications Networks, Content and Technology have conducted an annual benchmarking exercise, by means of a survey of national representatives, since 2015 to assess the maturity of the open data landscape in Europe. The objective of this open data maturity (ODM) assessment is to evaluate the development of countries in the field of open data and to document their year-on-year progress. The assessment measures each country's progress in making public sector information available and stimulating its reuse. The assessment furthermore supports the development of open data best practices across Europe, serving as a tool for knowledge sharing.

Thirty-four European countries participated in the 2024 ODM assessment. These countries are grouped into Member States of the European Union (the EU-27), European Free Trade Association (EFTA) countries and candidate countries for EU membership.

- The **Member States** are Belgium, Bulgaria, Czechia, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Croatia, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, the Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland and Sweden.
- The **EFTA countries** are Iceland, Norway and Switzerland.
- The **candidate countries** are Bosnia and Herzegovina, Albania, Serbia and Ukraine.

The structure of this report

This report provides an analysis of the 2024 survey data. The findings of this analysis are presented in several chapters.

- **Chapter 2** summarises how the assessment measures ODM.
- **Chapter 3** describes the overall results of the assessment.
- **Chapters 4–7** discuss the findings of the assessment for each of the four dimensions of ODM:
  - **policy** (Chapter 4),
  - **portal** (Chapter 5),
  - **quality** (Chapter 6),
  - **impact** (Chapter 7).
- **Chapter 8** clusters the participating countries into four groups according to their overall performance and outlines recommendations for each cluster.
- **Chapter 9** concludes with the key messages of the 2024 assessment.

In addition to this report and the method appendix, the associated raw and processed data are published online. Furthermore, factsheets are published giving an overview of the situation in each participating country.

Chapter 2: Methodology

The open data maturity (ODM) assessment evaluates progress and effectiveness of open data initiatives across four thematic dimensions that are intended to capture the end-to-end value chain of open data: **policy**, **portal**, **quality** and **impact**. The annual assessment was conducted for the first time in 2015, and this is the 10th edition. The four dimensions in the current methodology have been used since 2018. Over time, the questions asked to assess the four dimensions have been revised to adapt to policy changes and the progress of European countries in their ODM. Each of the four dimensions is subdivided into indicators, which are subthemes of the dimensions. The definitions of the four open data dimensions are summarised in Table 1.

Table 1: Dimensions of the ODM methodology and their indicators

Dimension	Description
Policy	Investigates the open data policies and strategies in place in the countries, the national governance models for managing open data, and the measures applied to implement those policies and strategies. To evaluate these elements, the dimension comprises three indicators: (a) **policy framework**, (b) **governance of open data** and (c) **open data implementation**.
Portal	Investigates the functionality of national open data portals, the extent to which users' needs and behaviour are examined to improve the portal, the availability of open data across different domains and the approach to ensuring the portal's sustainability. To evaluate these elements, the dimension comprises four indicators: (a) **portal features**, (b) **portal usage**, (c) **data provision** and (d) **portal sustainability**.
Quality	Assesses the measures adopted by portal managers to ensure the systematic harvesting of metadata, the monitoring of metadata quality and compliance with the DCAT-AP metadata standard, and the quality of the deployment of the published data on the national portal. This dimension provides an overarching incentive for portal managers and policymakers to ensure that open data on the national portal has suitable formats and correct licences, is machine-readable, is high quality and is amenable to a linked data approach. To evaluate these elements, the dimension comprises four indicators: (a) **metadata currency and completeness**, (b) **monitoring and measures**, (c) **DCAT-AP compliance** and (d) **deployment quality and linked data**.
Impact	Analyses the willingness, preparedness and ability of countries to measure both the reuse of open data and the impact created through this reuse. To evaluate these elements, the dimension comprises three indicators: **strategic awareness**, (b) **measuring reuse** and (c) **created impact**, within the areas of (i) government, (ii) society, (iii) environment and (iv) economy.

Data for the assessment is collected through a voluntary questionnaire sent to the open data representatives of the participating countries, working in collaboration with the European Commission and the Expert Group on Public Sector Information. Countries are asked questions about their

processes, activities, initiatives and other demonstratable outputs that characterise a mature open data ecosystem. Questions with available data from the previous year were pre-filled in the questionnaire, allowing respondents to either confirm the validity of last year's answers or provide updated information. This feature was newly introduced in 2024 to support year-on-year consistency in responses.

Once the completed questionnaires are submitted, the research team validates the responses based on the explanations and supporting evidence provided by the survey respondents for each question. The reviewers assess whether the explanations accompanying the answers are complete, relate to the question and sufficiently justify the response selected. A consultation round is held with the survey respondents to gain clarifications on the survey data and to give them the opportunity to validate the results.

In 2024, the methodology underwent an update, as it does periodically. The dimensions and indicators remain unchanged from the previous version of the methodology. However, some questions were removed, some questions were revised or the requirements for evidence reformulated, and some new questions were added. This was done to ensure that the questions remain relevant, do not overlap and reflect the evolution of the open data ecosystem over time. Moreover, the allocation of scores to questions within each dimension was rebalanced to ensure that questions are equally weighted, with a limited number of exceptions having higher or lower weighting.

The following are the main changes for each dimension. In the **policy** dimension, more detailed explanations were requested regarding the national governance structure, and a question was added about the processes in place to update policies/strategies. In the **portal** dimension, some mature portal functionalities, such as search and download, were removed from the questionnaire. More detailed explanations were requested regarding how data about portal usage and user feedback are used to improve the portal. In the **quality** dimension, more detailed explanations were requested regarding the workflows and activities of the portal team to ensure that several aspects of high-quality metadata are achieved. Some questions about the type of support offered to data providers were merged due to overlapping responses from survey respondents. No major changes were made to the **impact** dimension, except that survey respondents needed to provide only one example of a reuse case for each category (instead of a maximum of three) and explain that case in more detail. Questions about high-value datasets were added across all dimensions.

In addition, two automated pilot indicators were introduced to complement the qualitative survey data with quantitative metrics. One pilot indicator used automated web-based tests to evaluate the performance of portals on metrics related to mobile friendliness, speed and performance, security, and web content accessibility. The other pilot indicator used calculated metrics from the metadata quality assessment to evaluate the quality of metadata harvested by data.europa.eu. The methodology underlying the assessment is undergoing recalibration. However, it is a promising approach that could help in assessing metadata quality in an automated way. The tool would need to undergo further scrutiny to ensure more objective reporting in the future. These pilot indicators did not contribute to countries' maturity scores. Please refer to the method appendix for full details of the methodology.

Chapter 3: Overall open data maturity

In 2024, countries across Europe continued, on average, to improve their open data maturity (ODM). The average score for all participating countries rose by 1 percentage point (pp) from 2023, reaching 80 % in 2024. The EU-27 average remained the same as in 2023, at 83 %, despite an update to the method for the assessment that introduced stricter requirements and some new questions (Figure 4). **France** (100 %), **Poland** (98 %) and **Ukraine** (97 %) remain in the top three positions. The fourth spot in 2024 is taken by **Slovakia** (96 %), which increased its score by 4 pp from the previous year. **Czechia**, in eighth position (94 %), is the only new entrant into the top 10 since last year. The maturity scores of countries in the top 10 are within a 6 pp range of each other, demonstrating the similarly high levels of maturity of these countries. This narrow range also arises from countries continuing to improve year-on-year. Overall, 18 participating countries improved their maturity level over the past year, one country remained at the same level and 15 countries experienced a drop in their overall maturity score.

3.1. EU Member State trends

The stability of the EU average overall maturity score at 83 % is attributed to a mixed performance across the dimensions, with some showing increases while others experiencing declines. Specifically, increases were experienced in the **impact** (+ 4 pp) and **policy** (+ 2 pp) dimensions, while decreases were experienced in the **portal** (– 3 pp) and **quality** (– 3 pp) dimensions. The **policy** dimension remains the most mature dimension (91 %), followed by the **portal** (82 %) and **impact** (80 %) dimensions. The **quality** dimension is the least mature dimension on average (79 %).

The biggest climber is **Latvia**, which increased its score by 10 pp compared with 2023. Latvia's rise in overall score is driven by increases in its scores on the **impact** (+ 21 pp) and **quality** (+ 14 pp) dimensions. Latvia also improved in the **policy** (+ 7 pp) and **portal** (+ 3 pp) dimensions. The second-largest climber is **Croatia**, which increased its score by 9 pp. Croatia improved the most in the **impact** dimension (+ 17 pp), followed by the **portal** (+ 14 pp) and **policy** (+ 10 pp) dimensions. The third-largest climber is **Czechia**, which increased its score by 6 pp compared with 2023. There was no change in the **quality** and **impact** dimensions; this increase in Czechia's score was driven by a significant improvement in the **portal** dimension (+ 20 pp) and a 5 pp increase in its score on the **policy** dimension.

The largest decreases were experienced by **Bulgaria** (– 13 pp), **Germany** (– 10 pp) and **Finland** (– 5 pp). The update to the assessment method could have influenced these decreases in maturity scores. In total, 13 Member States experienced decreases in their overall maturity scores.

3.2. European Free Trade Association country trends

In this year's ODM assessment, **Switzerland** increased its overall score by 1 pp to an overall maturity score of 80 % in 2024. This increase in Switzerland's overall score was driven by its improvement of 5 pp in the **policy** dimension, 3 pp in the **impact** dimension and 1 pp in the **quality** dimension. Although **Iceland's** overall maturity score decreased, the country did report increases in its scores on the underlying **policy** and **impact** dimensions.

3.3. Candidate country trends

All four candidate countries participating in this year's ODM assessment improved their overall maturity score from the previous year. **Ukraine** (97 %) remains the most mature candidate country, followed by **Serbia** (84 %). Among the candidate countries, **Serbia** had the most significant annual increase in overall score (+ 9 pp). This increase was driven by notable improvements in the **impact**

(+ 16 pp) and **quality** (+ 17 pp) dimensions. **Albania** also improved its overall maturity score by 5 pp, achieving a maturity score of 47 %.

Read the analyses by dimension in the following chapters for further details on the factors underlying these trends.

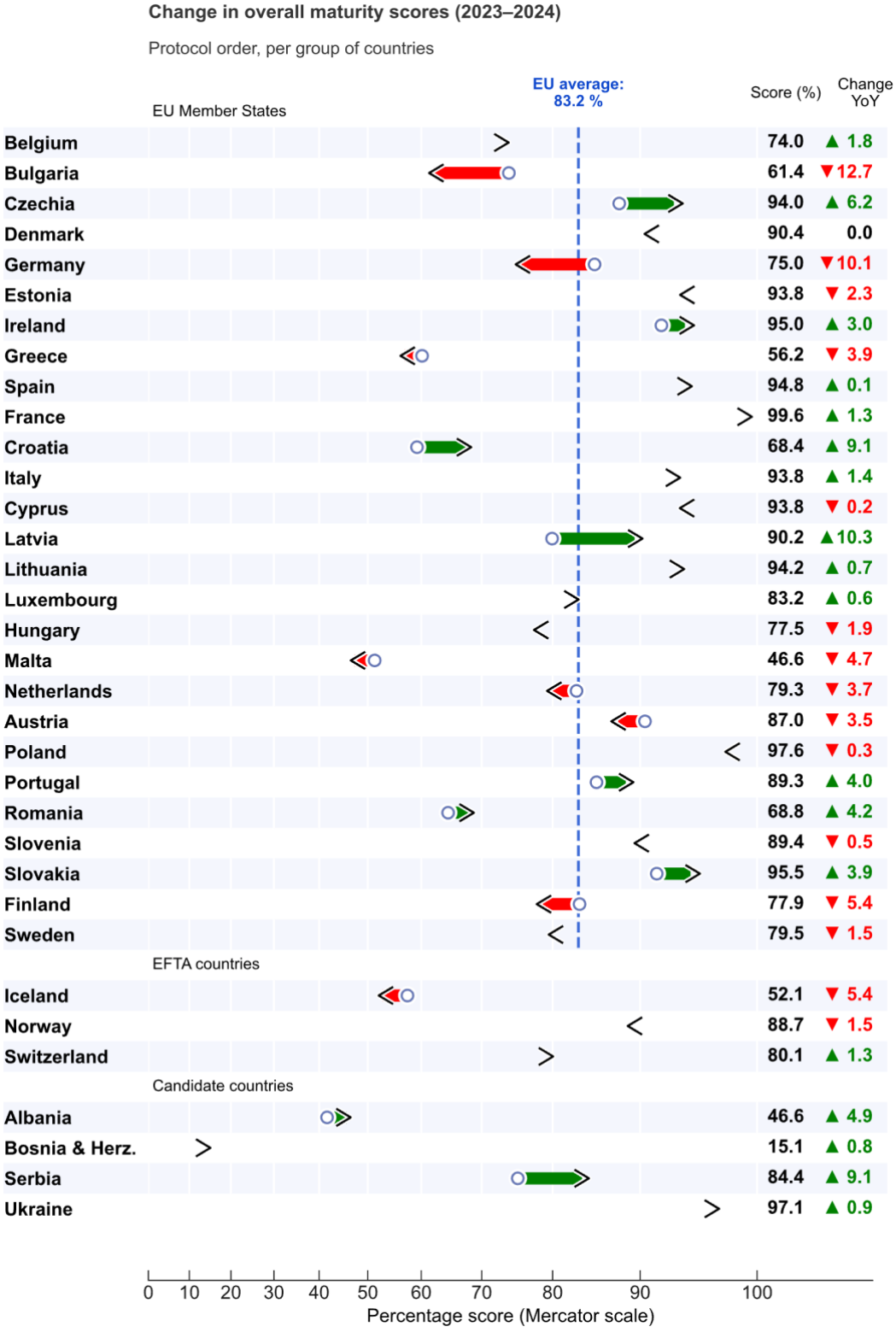

Figure 4: In 2024, the EU average remained at 83 %, and the average for all participating countries increased by 1 pp to 80 %. (EFTA: European Free Trade Association; YoY: year-on-year).

Chapter 4: Open data policy

Over the years, the EU has developed a comprehensive policy framework to accelerate the opening of data held by the public sector, namely to enhance its accessibility and usability for citizens, businesses and researchers. The open data directive (Directive (EU) 2019/1024) is the most recent framework for open data policy in the EU. The directive, which had to be transposed into EU Member States' national laws by July 2021, aims to enhance the openness and utility of public sector data through requirements such as:

- stimulating the publishing of dynamic data and the uptake of application programming interfaces (APIs);
- limiting the exceptions under which public bodies may charge more than the marginal costs of dissemination for the reuse of their data;
- strengthening the transparency requirements for public–private agreements involving public sector information;

The directive applies to a wide range of information (e.g. written texts, databases and audio files) held by Member States' public sector bodies, public authorities, publicly owned companies and publicly funded research initiatives.

The directive also introduced the concept of high-value datasets (HVDs), which are public datasets associated with important socioeconomic benefits for society, the environment and the economy. The related implementing regulation (Commission Implementing Regulation (EU) 2023/138) sets out rules to ensure that certain datasets included in the thematic categories defined in the regulation are made available free of charge, in machine-readable formats, through APIs and, where relevant, as a bulk download.

The **policy** dimension of the open data maturity (ODM) assessment is designed to encourage the practical implementation of policy measures. Governance structures, operating models, processes and activities are needed to realise the ambitions outlined in policies and strategies.

In brief, the **policy** dimension investigates countries' policies and strategies regarding open data, the national governance models for managing open data and the measures deployed to implement the policies and strategies. Table 2 summarises the key elements of the policy dimension.

Table 2: Indicators of the policy dimension

Indicator	Key elements
Policy framework	An open data policy and strategy are in place at the national level to provide a long-term strategic vision and action plan for open data. The strategies incentivise open data reuse in both the public and private sectors and access to real-time, geospatial and citizen-generated data. Activities regarding HVDs are in place.
Governance of open data	Governance models and regular coordination activities across public sector bodies are in place to ensure open data publication at all government levels and to support local and regional open data initiatives. Regular exchanges occur between open data providers and reusers from academia, businesses and other non-governmental organisations.
Open data implementation	Data publication plans and implementing processes exist. The number of public bodies that charge above the marginal costs of dissemination for the reuse of their open data is monitored. Training activities for civil servants working with data are organised, as are society-wide open data literacy initiatives.

This chapter will first present overall performance on the policy dimension and then provide a summary of the results and best practices for each indicator.

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4.1. Overall performance on the policy dimension

According to the EU-27 average in 2024, the policy dimension remains the most mature dimension of the ODM assessment, scoring 9 percentage points (pp) higher than the second-ranked portal dimension. The average maturity of Member States in the policy dimension in 2024 is 91 % (**Error! Reference source not found.**). This represents a 2 pp increase from 2023, marking the first time that the maturity score for this dimension has surpassed 90 %. This increase has primarily been driven by the 4 pp rise in the open data implementation indicator, which showed the largest growth among the three policy indicators, reaching 92 %. The policy framework indicator also increased (+ 2 pp), reaching 90 % maturity (Figure 5). Only the governance of open data indicator experienced an average decrease among the EU-27 (– 2 pp). This may have been influenced by this year's method update, namely a request for more detailed reporting on countries' governance structures.

In terms of individual country performance, **Estonia** (100 %), **France** (100 %), **Italy** (100 %), **Poland** (100 %) and **Ukraine** (100 %) are tied for first place in this dimension (Figure 6). **Czechia** (99.2 %), **Ireland** (99.2 %) and **Cyprus** (99.2 %) are a close second, all scoring full points on the policy framework indicator. **Cyprus** scored full points on the policy governance indicator, and **Czechia** and **Ireland** scored full points on the open data implementation indicator. Overall, 16 Member States scored above the EU-27 average of 91 %.

Highlight from Estonia – training programmes for civil servants' data competencies

An important practice observed as part of this year's report is that countries are creating structured training programmes to develop their civil servants' data competencies.

One notable example is **Estonia**, which is implementing a comprehensive strategy for strengthening the data skills of its civil servants and ensuring effective data management and open data practices across the public sector.

In 2024, Estonia aimed to train over 2 500 data specialists across 10 targeted training sessions and between one and four online courses. This training aimed to cover key areas such as data quality and open data publication, contributing to improved national open data standards. Already, open data licensing training by Creative Commons and a data working group webinar have been held.

Estonia has also introduced detailed competency profiles for data engineers and analysts and is currently developing a profile for data stewards. These profiles serve as the foundation for nationwide training programmes and provide input for higher education curricula, ensuring future civil servants are equipped with relevant skills.

This best practice contributes to Estonia's excellence across all three policy dimension indicators, particularly in the policy implementation indicator. **Read more about this trend in Section 4.3.**

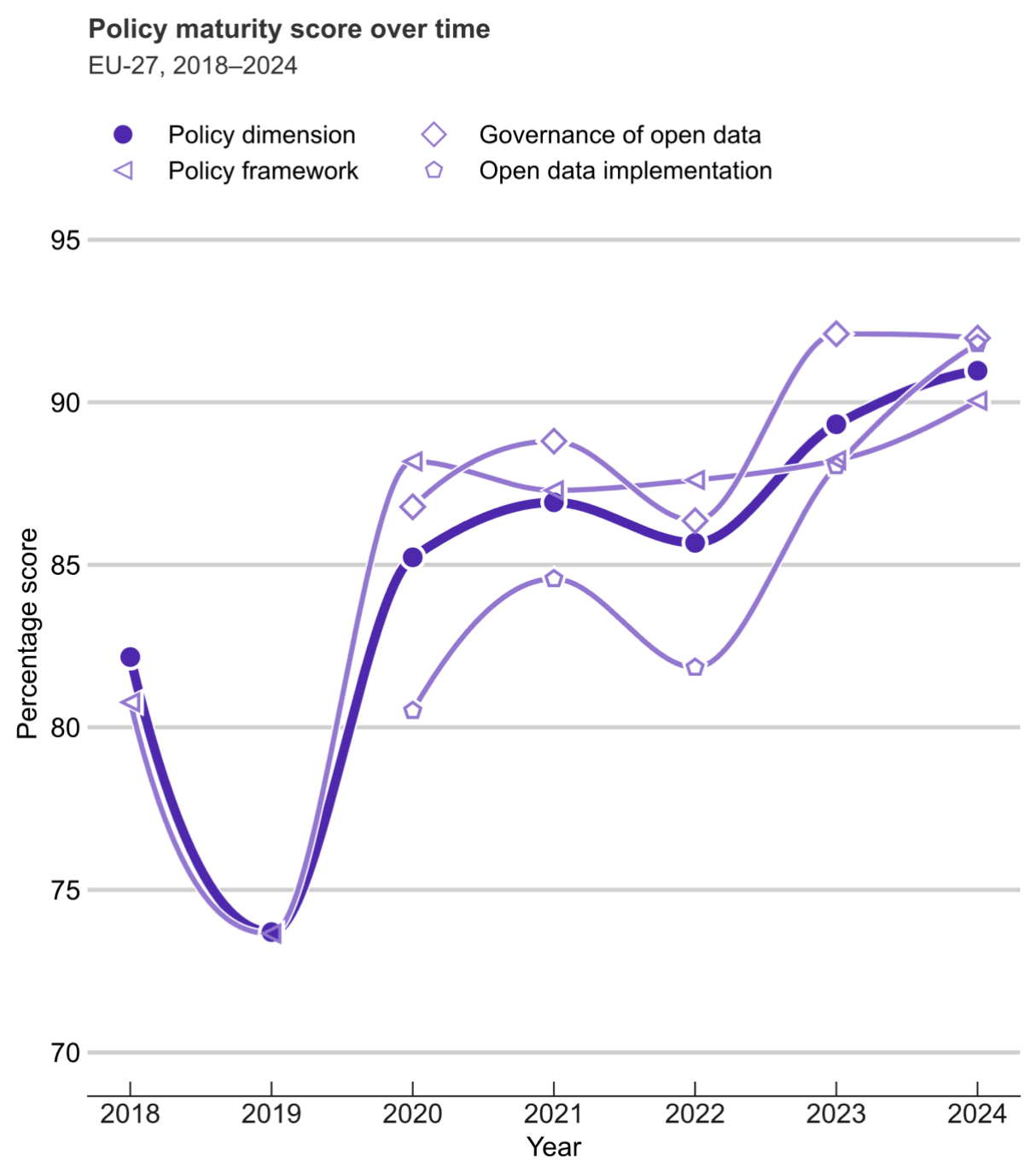

Figure 5: The EU-27 average score on the policy dimension has risen steadily over the past three years (2022–2024)

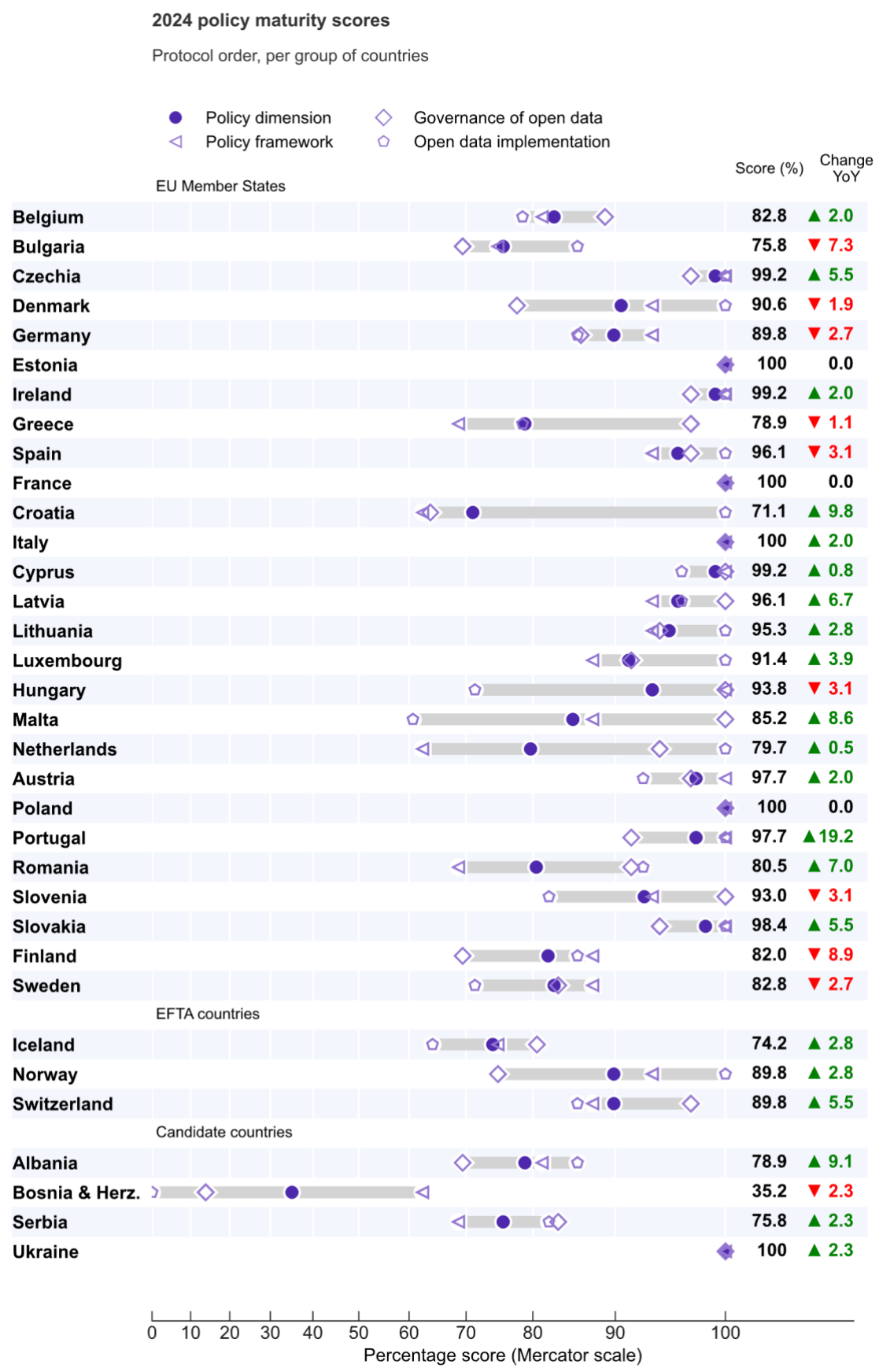

Figure 6: Twenty participating countries improved their score on the policy dimension in 2024. (EFTA: European Free Trade Association; YoY: year-on-year).

Portugal (+ 19 pp), **Croatia** (+ 10 pp) and **Albania** (+ 8 pp) showed the greatest year-on-year improvement in the policy dimension. **Portugal's** increased score can be attributed to its significant progress across all three indicators. Namely, it achieved the second-highest improvement in the policy framework indicator, which can be attributed to its recent addition of an open data strategy and its open data policies outlining measures to incentivise the publication of and access to citizen-generated data, fostering the discoverability of open data on data.europa.eu and outlining measures to support the reuse of open data by the private sector. Portugal also achieved the second-highest increase in the open data implementation indicator, which can be attributed to the recent addition of its governance structure ensuring the facilitation of local and regional open data initiatives at the national level and a publicly accessible document outlining their country's open data governance structures. Finally, Portugal achieved the greatest improvement in the governance of open data indicator, which can be attributed to its recent addition of having publication plans for open data at the public body level and processes for ensuring that its open data policies and strategy are implemented.

Highlight from Portugal – sector-specific citizen-driven data initiatives

One of the trends highlighted in this year's report is the inclusion of sector-specific initiatives in national policies and strategies aimed at promoting citizen-generated data.

For example, **Portugal** has outlined key measures to ensure open data and data reuse in its transversal action plan for public administration digital transformation (part of the broader strategy for public administration digital transformation for 2021–2026). A central priority is establishing and maintaining an open data ecosystem that actively engages multiple stakeholders. Portugal promotes this initiative, in part, through citizen science projects that encourage public participation and collaboration in the open data space. In the field of marine biology, several entities in Portugal, both governmental and non-governmental, including non-profit organisations, collaborate with public bodies to actively involve citizens in data-generation efforts.

A notable example is the Algarve Centre of Marine Sciences (CCMAR), one of Portugal's leading marine research centres, which collaborates closely with the public Portuguese Institute for Sea and Atmosphere (IPMA). The Algarve Centre of Marine Sciences encourages citizens to contribute to marine conservation efforts. For example, the New Marine Species of the Algarve (NEMA) project invites citizens to report sightings of non-native marine species in the Algarve. At the same time, the Algarve Stranding Network (RAAIg) gathers public reports of stranded marine animals, such as dolphins and turtles, to monitor marine health. Citizens are also encouraged to report algal blooms, which can indicate ecological disturbances, and to document benthic species for the Marine Forests project via platforms like iNaturalist. Additionally, the Biomares programme fosters community involvement by inviting public observations of marine life in the Professor Luiz Saldanha Marine Park, promoting biodiversity conservation efforts.

Read more about this trend in Section 4.2.

Croatia's increased score on the policy dimension can be attributed to its 19 pp increase in the policy framework indicator, which was the highest increase among all countries, as well as its reporting of a regular exchange of knowledge and experiences between its national open data team and the wider network of open data officers. **Albania's** increased score on the policy dimension can be attributed to its 27 pp increase in the open data implementation indicator, which was the second-highest increase among all countries, as well as its recent addition of measures for supporting the reuse of open data by the public sector in its national policies/strategy.

Highlight from Croatia – Working Group for the Coordination of State Information Infrastructure Projects and Digital Transformation
Establishing working groups is a particularly common method that countries use to facilitate exchanges between the national open data team and the wider network of open data officers. For example, **Croatia** fosters collaboration across government bodies through the Working Group for the Coordination of State Information Infrastructure Projects and Digital Transformation. This group, which includes representatives of various governmental entities responsible for digitalisation such as the open data team and open data officers, meets regularly to discuss updates and share progress on digital transformation initiatives. **Read more about this trend in Section 4.2.**

Ten countries' scores on the policy dimension decreased year-on-year. In general, such decreases may have been influenced by new questions in the survey that asked for further details about governance structures and by the updating of policies and strategies compared with the previous year.

4.2. Policy framework

The policy framework indicator evaluates open data policies, strategies and action plans at the national, regional and local levels. Specifically, this indicator investigates whether concrete mechanisms are in place to support the publication of, access to, discoverability of and reuse of several data types, including real-time, geospatial and citizen-generated data.

Open data policies and strategies

National open data policies are formalised rules and guidelines that govern open data within a country. In the case of Member States, national policies should include legislative measures to comply with the open data directive, ensuring the reuse of public sector information and promoting interoperability and fair access to open data across the EU. On the other hand, open data strategies are principles and goals that countries want to achieve in the field of open data based on their open data policies. Furthermore, regional and local policies and strategies play a crucial role in promoting open data initiatives that reflect local priorities. In addition, they are often effective in addressing the unique barriers to open data publication and reuse faced by subnational governments and their constituents. These subnational initiatives can complement national policies, focusing on the implementation and execution of open data practices tailored to regional governance structures. Table 3 presents an overview of how countries responded to the questions on this topic.

Table 3: Countries' responses to questions on open data policies and strategies

	Is there a national open data policy?	*Is there a national open data strategy?*	*Is there an open data policy/strategy at the regional or local level?*
EU-27	All 27 (100 %) Member States report having an open data policy.	26 Member States (96 %) report having a stand-alone national open data strategy or relevant open data-related objectives, actions and timelines incorporated within broader national policies. **Portugal** is a recent addition to the group. **Romania** did not report having an open-data strategy.	20 Member States (74 %) report having an open data policy/strategy at the regional or local level. Four Member States (14 %) responded 'not applicable' due to the specific governance structures in place (e.g. having a small country size).
EFTA	All three participating EFTA countries report having an open data policy.	**Norway** and **Switzerland** report having a national open data strategy, while **Iceland** reports that relevant open-data-related objectives are incorporated within its broader national policies.	**Iceland** and **Switzerland** report having an open data policy/strategy at the regional or local level. **Norway** responded 'not applicable', as its national strategy is developed in collaboration with relevant local and regional authorities.
Candidate	All four participating candidate countries report having an open data policy.	**Albania** and **Ukraine** report having a national open data strategy, while **Serbia** reports that relevant open-data-related objectives are incorporated within its broader national policies.	**Serbia** and **Ukraine** report having an open data policy/strategy at the regional or local level.

(Questions P1, P2 and P3)

Almost all participating countries have either a dedicated national open data policy or a national framework addressing data, digitalisation, artificial intelligence (AI), e-government or similar areas that explicitly incorporates open data within its text and scope. In particular, all Member States have implemented the open data directive, either as stand-alone policies (e.g. the **Netherlands's** Law on the Reuse of Public Information) or as amendments to existing laws (e.g. **Croatia's** amendment of its Free Access to Information Act No 106/1999 Col.).

Several countries take a broader approach by incorporating open data provisions within wider legislative frameworks on data and digital transformation. For example, **Bulgaria** has integrated its open data initiatives into a comprehensive legal framework through the Access to Public Information Act, which aims to enhance transparency and accessibility across the public sector. This trend extends

beyond the Member States, with countries such as **Serbia** also incorporating open data policies into their broader digital governance strategies through legislation (the Law on Electronic Government).

A similar trend is seen in open data strategies. Although several countries develop specific strategies in line with their commitment to their open data policies, several do this as part of broader plans. For example, **Denmark** notes that its national open data strategy is to be expressed through one of seven themes making up its comprehensive *National Strategy for Digitisation* (2024–2027). This is seen at both the national and the regional/local level, such as strategies relating to general development, as seen in Ponferrada (**Spain**) and Reykjavik (**Iceland**); smart cities, exemplified by Budapest (**Hungary**), Prague (**Czechia**) and Priboj (**Serbia**); or general digitalisation of government, such as in Utrecht (**Netherlands**), Helsinki (**Finland**) and Geneva (**Switzerland**).

Most national open data policies commit to making public sector data openly available by default. This trend is then reflected in the goals and principles outlined in many national open data strategies. Often, in cases such as **Cyprus**, **Czechia**, **France**, **Ireland**, **Lithuania**, **Slovenia**, **Sweden** and **Ukraine**, this is established through public information laws legally mandating citizens' rights to request and obtain data. This 'open by default' principle is also frequently cited in national strategies. Namely, strategies in **Austria**, **Czechia**, **Germany**, **Ireland**, **Norway**, **Slovenia** and **Ukraine** explicitly advocate for treating official documents as public resources that should be readily available to citizens (with exceptions for restricted data) when outlining priorities and objectives.

National policies also often cite the promotion of innovation as a driver for implementing open data legislation (e.g. in **Albania**, **Finland**, **Lithuania**, **Slovenia** and **Sweden**). These policies emphasise that greater access to data can help stimulate research, improve public services and facilitate the development of data-driven solutions across various sectors.

Many national open strategies share the following key themes.

1. **Collaboration with stakeholders**

One frequently cited aspect of national strategies is engaging citizens more. There tends to be a focus on engaging the public and raising awareness about the importance and benefits of open data, often involving educational initiatives and participatory platforms. For example, **Switzerland** emphasises the importance of involving the public and stakeholders in implementing its open government data (OGD) master plan, including fostering transparency and data accessibility. **Slovenia's** strategy includes specific plans to raise public awareness and enhance digital skills, recognising that informed citizens are crucial for utilising open data effectively. **Lithuania** aims to promote open data literacy among the public, focusing on education and engagement to ensure citizens understand open data's benefits.

Establishing a 'data ecosystem' is another recurring theme, which involves engaging groups of stakeholders beyond individual citizens. The national strategies of **Norway** and **Slovenia**, for example, use the term data ecosystem when outlining objectives for fostering digital collaborations between data providers, analysts and developers with a common set of information technology solutions to enhance data quality. On the other hand, **Spain** and **Portugal** mention data ecosystems in the context of intending to generate connections between the actors of the national and international open data ecosystems (e.g. European data system), ensuring an alignment with standards of data and enhancing opportunities for innovation.

2. Sector-specific data

Another common theme across both national and regional/local strategies is the emphasis on specific sectors and the creation of targeted datasets tailored to the needs of particular stakeholders. This trend is most prominent at the national level in terms of reuse and API access to geospatial data. The infrastructure for spatial information in Europe (Inspire) directive (Directive 2007/2/EC), an EU initiative, plays a central role in establishing a spatial data infrastructure to support environmental policies and activities. This directive ensures that spatial datasets, such as maps and geographical information, are accessible via network services. Countries such as **Italy**, **Norway** and **Slovenia** have highlighted access to and the promotion of geospatial data reuse as key priorities in their national strategies.

This trend is also observed at the regional level. For example, **Prague's** 2030 strategy outlines plans to promote open data to leverage it for innovations by public and private sector organisations in sectors like mobility, energy and tourism. Furthermore, the municipality of Cēsu's (**Latvia**) strategic plan for data outlines its objective of publishing open data, mentioning that the private sector reuse of data from the health, transport and environment sectors can enable innovations for public benefit.

3. Ethical guidelines and other protections

Open data policies, such as those from **Albania**, **Finland**, **Ireland**, **Lithuania** and **Ukraine**, emphasise the importance of privacy and data protection within the context of their open data policies. The policies often note that safeguarding sensitive and personal information, as well as the overall privacy rights of citizens, is a fundamental right to balance with the aim of promoting transparency and open public data. The development of legal frameworks and ethical guidelines to govern the use of open data is also reflected in many national open data strategies.

Open data action plans

An open data action plan typically outlines the specific measures and steps that need to be implemented to achieve the goals set by the national open data strategy or policy. It includes detailed actions, timelines and the responsible parties for carrying out these measures. Countries frequently use their action plans to enhance data publication, ensure quality, improve accessibility and promote reuse while also incorporating innovative aspects, for example emerging technologies such as AI. Table 4 presents an overview of how countries responded to the question on this topic.

Table 4: Countries' responses to the question on open data action plans

	Does the national strategy/policy include an action plan with measures to be implemented in the open data field?
EU-27	25 Member States (92 %), **all except Croatia** and **Romania**, report that their national strategy/policy includes an action plan with measures to be implemented in the open data field.
EFTA	**Iceland**, **Norway** and **Switzerland** report that their national strategy/policy includes an action plan with measures to be implemented in the open data field.
Candidate	All four participating candidate countries report that their national strategy/policy includes an action plan with measures to be implemented in the open data field.

(Question P4)

The most common element of action plans is a strong focus on publishing more open data, ensuring that data is accessible, reusable and regularly updated. Several countries also emphasise the importance of maintaining high-quality standards for open datasets and their corresponding metadata. **Czechia**, **Ireland** and **Slovakia** highlight that prioritising the publication of HVDs is a key part of their action plans. **Czechia** and **Luxembourg** also highlight action points for enhancing data accessibility by ensuring interoperability between systems.

Some countries also emphasise the importance of monitoring the usage and impact of open data and of providing public dashboards and reports on the effectiveness of their open data policies. For example, **France** and **Iceland** require each ministry or public body to set up data roadmaps and timed plans for data disclosure. **Czechia**, **Germany**, **Luxembourg** and **Poland** undertake regular reporting and progress monitoring and emphasise that these are key components of their open data, with **Luxembourg** even publishing the results of its monitoring via a public dashboard. Similarly, **Ireland** and **Spain** place emphasis on tracking the impact and quality of open data usage in their countries, with **Spain** publishing Microsoft Power BI reports on the activity of its national open data platform and its national open data catalogue, while **Ireland** provides insight reports into how open data is being used.

Several action plans have points regarding data reuse, helping users derive insights from open data. Namely, **Ireland** plans to create data visualisation capability in its national open data portal, and **Malta** has measures to improve the readability of open data. In addition, **Spain's** action plan includes presenting research studies on its portal website, which provides a step-by-step account of how to perform analyses and create visualisations using open data, outlining which analytical tools to use.

Many countries also include innovative action points in their plans. Specifically, **Luxembourg** wants to collaborate with its AI4Gov programme to foster the availability of open datasets that can be used for AI. **Norway** outlines actions such as developing a strategy for AI and establishing a national toolbox for data sharing. Additionally, **Spain** has action points for improving its national open data portal by incorporating capabilities relating to data spaces, further aligning with EU data rules.

Highlight from Spain – promoting open data through social media

As part of **Spain's** 2024–2025 action plan for the national open data policy, the country has adopted an innovative approach to raise awareness of open data's value among younger generations. This involves using social media to disseminate open data content, specifically targeting audiences aged 16 to 35 years. This strategy expands the reach of open data and fosters greater engagement with younger citizens, promoting the value of data as a public asset.

In addition, Spain is leveraging the power of podcasts by developing interviews with open data experts. These interviews, lasting 15 to 20 minutes, will be accompanied by short promotional videos (three to four minutes) for use on social media platforms.

This multifaceted approach positions Spain as a leader in modernising open data communication, blending education and outreach to connect with diverse audiences in the digital age.

Incentives for data publication and access

Legal frameworks and open data infrastructure (e.g. open data portals) can be effective incentivisation mediums for encouraging the publication of dynamic, real-time or citizen-generated data. Dynamic data is data that changes asynchronously over time and is periodically updated as new information becomes available. Real-time data is data that changes and needs updating at very frequent intervals, in most cases several times a minute. Access to dynamic and/or real-time data is most commonly provided via APIs. On the other hand, citizen-generated data is the data that people or their organisations produce to directly monitor, demand or drive change on issues that affect them. Table 5 presents an overview of how countries responded to the questions on this topic.

Table 5: Countries' responses to questions on incentives for data publication and access

	Does the national strategy/policy outline measures to incentivise the publication of and access to real-time or dynamic data?	*Does the national strategy/policy outline measures to incentivise the publication of and access to citizen-generated data?*
EU-27	22 Member States (81 %) report that their national strategy/policy outlines measures to incentivise the publication of and access to real-time or dynamic data. **Bulgaria** is a new addition to this group.	14 Member States (51 %) report that their national strategy/policy outlines measures to incentivise the publication of and access to citizen-generated data. **Czechia, Portugal and Slovakia** are the newest countries in this group.
EFTA	**Iceland**, **Norway** and **Switzerland** report that their national strategy/policy outlines measures to incentivise the publication of and access to real-time or dynamic data, with **Switzerland** being the most recent addition.	None of the three participating candidate countries reports that its national strategy/policy outlines measures to incentivise the publication of and access to citizen-generated data.
Candidate	**Albania** and **Ukraine** report that their national strategies and policies outline measures to incentivise the publication of and access to real-time or dynamic data.	**Ukraine** reports that its national strategy/policy outlines measures to incentivise the publication of and access to citizen-generated data.

(Questions P5 and P6)

Legal frameworks play an important role in enabling the publication of and access to dynamic and/or real-time data, as well as citizen-generated data. Many countries, in their transposition of the open data directive, mandate the immediate publication of dynamic and/or real-time data for reuse. Typically, this publication is mandated to be made accessible through appropriate APIs. **Denmark** and **Luxembourg** mentioned in their survey responses that they also require the option of mass download when appropriate.

Some countries' open data legal frameworks establish consent mechanisms for sharing citizen-generated data. This transparency fosters greater trust, thus empowering citizens and potentially increasing their willingness to share data for public benefit. Namely, **Denmark**, **Estonia** and **Cyprus**

note that they have a process whereby citizens can digitally inform the government if they consent to their personal data being processed or shared with others.

Some countries leverage an open data infrastructure, such as open data portals, to incentivise publication and access to various types of data. Specifically, **Spain**, **Luxembourg** and **Finland** highlight measures to improve (semantic) interoperability of dynamic data on their portals. Additionally, **Bulgaria**, **Estonia**, **France** and **Poland** highlight the user-friendliness aspect of their national open data portals and that everyone has the ability to publish data. **France** specifically notes that the tools and processes for publishing data are the same for all types of providers; however, a badge is provided to what the portal identifies as official sources (i.e. public sector organisations).

Highlight from Iceland – the secure national data exchange infrastructure Straumurinn

Iceland is in the process of implementing Straumurinn, a cutting-edge national data exchange infrastructure based on the X-Road technology. This system facilitates secure, real-time data exchange between government agencies, municipalities and private companies, thereby enhancing the quality and efficiency of public services.

Straumurinn serves as the backbone for a central service portal through which Icelandic citizens can access a wide range of public services in one secure location. This initiative emphasises equality by providing universal access to services for all citizens.

Developed in collaboration with Estonia and Finland through the Nordic Institute for Interoperability Solutions, Straumurinn offers several critical features:

- **data security** – all communications are encrypted to ensure secure data exchanges;
- **data integrity** – data remains up to date, with direct, authorised communication between service providers and recipients;
- **traceability** – each transaction is traceable and timestamped, ensuring transparency and accountability.

As public administrations may encounter technical and financial constraints in the publication process, some countries include measures to help make it easier for them to publish open data. For example, **Cyprus** provides both internal and external consulting services and technical support to organisations aiming to publish dynamic data. **Slovenia** provides funding to promote accessibility and the use of data on its national portal, and this includes dynamic data. **Bulgaria** also includes a clause in its national open data law whereby public bodies that do not have the necessary technical and financial capabilities to make dynamic data available for reuse immediately are allowed to publish data within a longer time frame and with temporary technical constraints.

Countries often encourage the publication of and access to dynamic and/or real-time data and citizen-generated data through sector-specific (e.g. health, environment and public transport) initiatives. For example, initiatives such as the DataDonor initiative (**Denmark**), Donate Your Speech (**Estonia**) and GelAvista (**Portugal**) encourage citizens to create data for research in various fields. For real-time data access, **Denmark** and **Ireland** have initiatives that display all public electronic car-charging stations in real time. In Berlin, the Jelbi app provides bus and train timetable data using real-time transport data and geodata from participating sharing partners.

Highlight from Germany – the Jelbi mobility app
The Jelbi mobility app from Berliner Verkehrsbetriebe (BVG) combines the mobility offers of numerous partners in a single app with a user profile and thus provides a large selection of transport options. It also includes important information such as fares, vehicle locations and journey times to the destination directly in one place. The app uses real-time transport data and geodata from the participating sharing partners and the Berlin-Brandenburg Transport Association (VBB), whose bus and train timetable data (lines, departure times, routes, etc.) are regularly provided via the Berlin Open Data portal.

Supporting the reuse of open data

The primary aims of the open data directive are to encourage the opening of public sector information and to stimulate its reuse. Therefore, measures in the country's open data strategy or policy that support the reuse of open data by the public and private sectors can support the downstream activities of making data openly available. Table 6 presents an overview of how countries responded to the questions on this topic.

Table 6: Countries' responses to questions on supporting the reuse of open data

	Does the national strategy/policy foster the discoverability of data from your country on data.europa.eu?	*Does the national strategy/policy outline measures to support the reuse of open data by the public sector?*	*Does the national strategy/policy outline measures to support the reuse of open data by the private sector?*
EU-27	23 Member States (85 %) report that their policies and strategies involve the publishing of data on data.europa.eu. **Portugal** is the newest country to report doing this. Nonetheless, the other Member States tend to make their data discoverable on data.europa.eu in practice, even though this is not explicitly fostered in a policy or strategy.	26 Member States (96 %), **all except Belgium**, report that their open data policies and strategies outline measures to support the reuse of open data by the public sector.	23 Member States (85 %), **all except Bulgaria**, **Croatia**, **Luxembourg** and the **Netherlands**, report that their open data policies and strategies outline measures to support the reuse of open data by the private sector. **Portugal** is the newest country to report this.
EFTA	**Norway** reports that its policies and strategies involve the publishing of data on data.europa.eu to foster discoverability.	All three participating EFTA countries report that their open data policies and strategies outline measures to support the reuse of open data by the public sector.	All three participating EFTA countries report that their open data policies and strategies outline measures to support the reuse of open data by the private sector.

	Does the national strategy/policy foster the discoverability of data from your country on data.europa.eu?	*Does the national strategy/policy outline measures to support the reuse of open data by the public sector?*	*Does the national strategy/policy outline measures to support the reuse of open data by the private sector?*
Candidate	**Ukraine** reports that its policies and strategies involve the publishing of its country's data on data.europa.eu to foster discoverability.	All four participating candidate countries report that their open data policies and strategies outline measures to support the reuse of open data by the public sector, with **Albania** being the most recent country to report this.	All four participating candidate countries report that their open data policies and strategies outline measures to support the reuse of open data by the private sector.

(Questions P7, P8 and P9)

A prominent trend in country responses about enhancing the reuse of open data by both the private and the public sectors is ensuring that open data is accessible and of high quality. For example, many countries have committed to using standardised formats and ensuring common architectural principles and standards across all providers (e.g. by adhering to the findable, accessible, interoperable and reusable (FAIR) data principles). For example, the Irish open data strategy for 2023–2027 emphasises the importance of ensuring data is fit for purpose, standardised and held in a condition that makes it FAIR. The national Irish data repository for Ireland's humanities, cultural heritage and social sciences digital data also commits to ensuring that open data adheres to FAIR principles. Several countries also focus on improving interoperability capabilities to improve accessibility. Specifically, the **Netherlands** is creating a federative system that connects and integrates open data from various sources within the country. **Denmark** and **Poland** are improving their open data infrastructures, with **Denmark** working to modernise its basic data registries and **Poland** funding projects to improve its open data portal. Several countries report that the data.europa.eu platform is a popular outlet for open data reuse. This is because it is an easily accessible central hub with built-in interoperability features, offering countries a unified space for seamless data sharing across borders.

Another prominent trend is the use of training and capacity-building initiatives to improve data quality and reuse. Many countries prioritise educating officials from the public sector to enhance data literacy. For instance, **Croatia** focuses on training public officials to monitor compliance with open data laws, while **Cyprus**, **Estonia**, **Ireland**, **Lithuania**, **Slovenia** and **Switzerland** offer dedicated training programmes to build competencies within government institutions. Additionally, **Serbia** and **Slovenia** report that they actively organise training sessions with a broad audience, including the private sector, to encourage data reuse. In addition, **Portugal** is providing free data analysis and visualisation tools on its open data portal to upskill reusers.

Finally, collaborative efforts and community engagement are further recurring trends in the promotion of data reuse among both the private and the public sectors. Countries such as **Estonia**, **Ireland**, **Greece**, **Croatia** and **Portugal** report that they are promoting open data reuse by organising a range of public events, workshops and networking opportunities. **Greece**, **Slovenia** and **Ukraine** also note that they organise events such as hackathons and competitions to increase open data reuse.

Highlight from Austria – the Cooperation Open Government Data initiative
Established as a pivotal component of Austria's open data strategy, Cooperation OGD Austria serves as a collaborative platform between the Federal Chancellery of Austria and major cities such as Vienna, Linz, Salzburg and Graz. This initiative is designed to include cross-border partners from Germany, Liechtenstein and Switzerland in the near future, expanding its influence and reach. It encompasses a diverse array of stakeholders, namely from communities, academia, culture and the economy, all of which are committed to enhancing the open data landscape in Austria. Cooperation OGD Austria fosters an environment that promotes effective collaboration among local communities, including citizens, businesses and researchers. The initiative facilitates knowledge exchange and encourages active participation from various stakeholders within the open data ecosystem through regular meetings and networking events, such as the Vienna open data meet-ups. These gatherings serve as vital opportunities for sharing insights, challenges and best practices related to open data. The Austrian government reports that this cooperation has created significant synergies among the cities involved and has led to a marked increase in open data reuse across the four cities.

Data inventories

A data inventory is a comprehensive catalogue of the datasets held by an organisation and can be used to plan the opening of appropriate datasets. Data inventories can also include data collected by public bodies that cannot be published as open data (e.g. in relation to the EU data governance regulation (Regulation (EU) 2022/868)). Table 7 presents an overview of how countries responded to the questions on this topic.

Table 7: Countries' responses to questions on data inventories

	Do policies and strategies mandate that public bodies carry out and maintain a data inventory, whether at the national or local level?	*Do these data inventories include the data collected by public bodies that cannot be published as open data?*
EU-27	26 Member States (96 %), **all except** the **Netherlands**, report that their open data policy or strategy mandates that public bodies maintain a data inventory.	25 Member States (92 %), **all except** **Bulgaria** and the **Netherlands**, report that their data inventories include the data collected by public bodies that cannot be published as open data.
EFTA	**Norway** and **Switzerland** report that their open data policy or strategy mandates that public bodies maintain a data inventory.	**Norway** and **Switzerland** report that their data inventories include the data collected by public bodies that cannot be published as open data.
Candidate	**Albania**, **Bosnia and Herzegovina** and **Ukraine** report that their open data policy or strategy mandates that public bodies maintain a data inventory.	**Albania**, **Bosnia and Herzegovina** and **Ukraine** report that their data inventories include the data collected by public bodies that cannot be published as open data.

(Questions P10-a and P10-b)

Data inventories are often part of broader efforts in countries' national policies/strategies to manage data efficiently, ensure interoperability across systems and reduce redundant data collection. Regular data audits are often mandated to ensure data inventories are up to date and accurate, particularly in the context of open data and compliance with the general data protection regulation (Regulation (EU) 2016/679).

Highlight from Finland – the Finnish comprehensive data inventory framework

In **Finland**, maintaining a data inventory is federally mandated. Specifically, most public sector organisations are legally required to maintain a data inventory, as specified in the Act on Information Management in Public Administration (906/2019). In addition, since 2021, Finnish public sector entities have been required to maintain an information management model that outlines the management of datasets, the implementation of rights and restrictions relating to access to information, the implementation of interoperability of information systems and information pools, and the maintenance of information security.

The Ministry of Finance of Finland maintains the public sector information management map, which describes the data resources to utilise and the procedures for accessing data from the data resources. The information management model includes both open data and data resources that are not available or that are not possible to publish as open data.

In addition, the Act on the Openness of Government Activities (621/1999) mandates that the catalogues listing the data inventories be published as open data. These catalogues give an indication of what each data or information repository holds, for example the City of Vantaa's catalogues of information systems. The dataset provides a list of all of the information systems in use in the city, information on system ownership and technical responsibility, and a brief description of each information system.

Highlight from Slovakia – data inventory for enhanced transparency and accountability

In **Slovakia**, it is mandated that data inventories must include detailed records for all datasets managed by public institutions, not just those available to the public. This comprehensive approach ensures transparency about datasets, even if they are restricted for reasons such as privacy, commercial confidentiality, statistical confidentiality, national security or intellectual property.

Key elements of Slovakia's practice include the following.

- **Inclusive data inventory.** Slovakia's data inventory encompasses all datasets managed by public institutions, ensuring that both open and non-open data are documented. This includes maintaining records of datasets that cannot be publicly accessed, with clear reasons provided for their restricted status.
- **Detailed metadata and documentation.** The data inventory model in Slovakia is designed to include detailed metadata for all datasets. This documentation provides an insight into the nature of each dataset, including non-public ones, and explains why certain data cannot be released. This practice supports transparency by informing stakeholders about the data held by public bodies, even if it is not openly accessible.
- **Model structure and public accessibility.** The Data Unit at the Ministry of Investments, Regional Development and Informatization has developed and published a model structure for data inventories. This model is publicly accessible and includes documentation for datasets, contributing to a transparent data management process.

Prioritising high-value datasets

HVDs are datasets that hold significant potential for economic, social or environmental benefits when made openly available. Commission Implementing Regulation (EU) 2023/138, adopted in December 2022 and published in January 2023, lays down a list of specific HVDs and the arrangements for their publication and reuse.

The ODM questionnaire included two questions to inquire about countries' progress with implementing the EU regulation on HVDs. Table 8 presents an overview of how countries responded.

Table 8: Countries' responses to questions on implementing the EU regulation on HVDs

	Is your country applying Commission Implementing Regulation (EU) 2023/138 on HVDs?	*Have the public bodies in your country denoted relevant datasets as HVDs in their metadata?*
EU-27	All Member States (100 %) report that they are working towards applying Commission Implementing Regulation (EU) 2023/138 on HVDs.	21 Member States (77 %) report that their public bodies with HVDs have denoted this in the dataset's metadata.

(Questions P11 and P12)

Non-EU countries were not surveyed on this question, since this regulation applies only to EU Member States.

On average, progress is most advanced for **statistics** (80 %) and **geospatial** (77 %) datasets (Figure 7). In contrast, the high-value category of 'companies and company ownership' (69 %) has seen the lowest average progress, followed by **mobility** datasets (70 %).

Turning to the underlying requirements, the most advanced progress is seen in terms of identifying and inventorying HVDs (technical progress) (83 %), followed by addressing legal barriers (legal progress) (77 %) and setting up new roles and workflows (organisational progress) (77 %). Requirements related to technical progress score the lowest, with the requirements of quality metadata (71 %), machine-readable formats via APIs (69 %) and bulk download (66 %) showing the lowest average progress.

Estonia, **Lithuania**, **Latvia**, **Denmark**, **Slovenia, Poland** and **Finland** are highly mature in terms of their implementation of the HVD regulation, achieving above 90 % maturity on average. On the other hand, **Bulgaria**, **Croatia** and **Greece** report the least progress in implementing the HVD regulation, scoring less than 50 % on average.

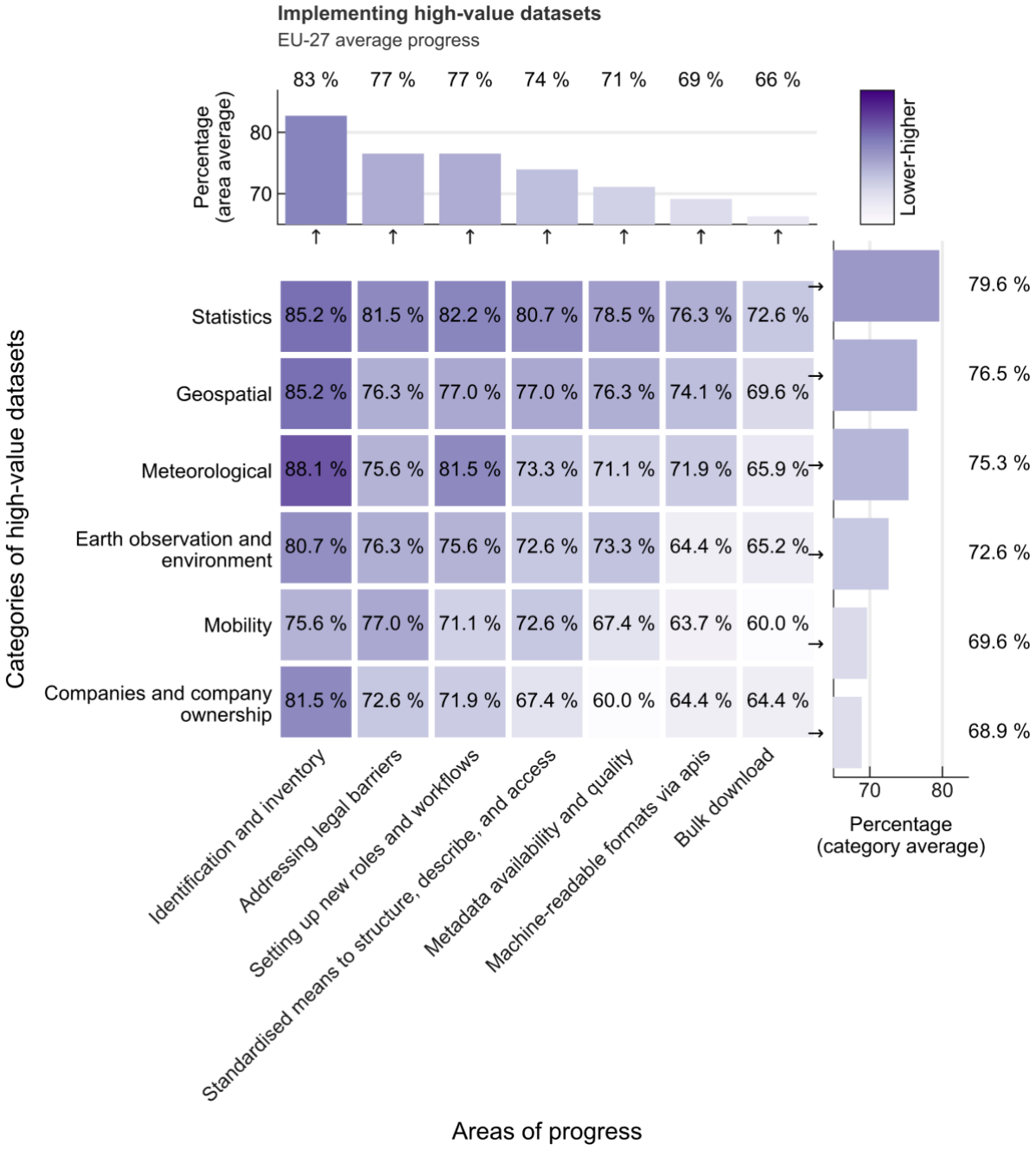

Figure 7: Average maturity scores of the six categories of HVDs and seven areas of activities

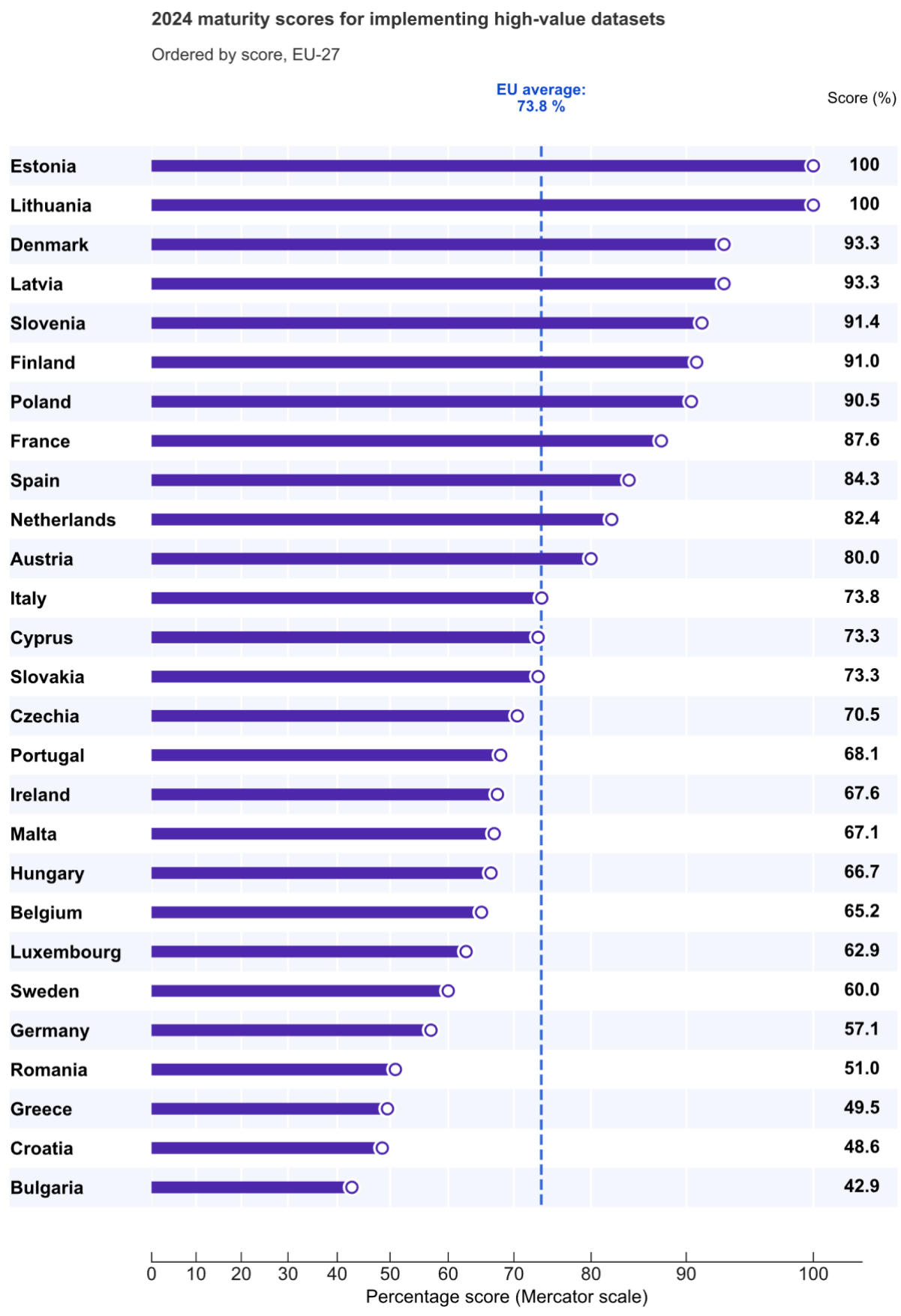

Figure 8: 12 Member States are at or above the EU average maturity for implementing the requirements on HVDs

4.3. Governance of open data

This indicator evaluates the governance structures and operating models in place at the national, regional and local levels to support open data initiatives. This includes the appointment of civil servants with a remit on open data and the exchange of knowledge and experiences within the public sector and with open data reusers.

Governance structures

A governance structure for open data refers to the formal system or framework that ensures various open data stakeholders' participation, collaboration and inclusion. This framework helps to ensure that open data initiatives are inclusive, transparent and aligned with the needs of all stakeholders. Governance structures can be top-down, with coordinating power exercised by an established body, or enacted using a hybrid model, allowing regional autonomy while maintaining central oversight. Either way, countries will often have mechanisms for engaging stakeholders within their governance systems. Table 9 presents an overview of how countries responded to the questions on this topic.

Table 9: Countries' responses to questions on governance structures

	Is there a governance structure in place that enables the participation and/or inclusion of various open data stakeholders?	*How would you classify the model used for governing open data in your country?*
EU-27	25 Member States (93 %), **all except Bulgaria** and **Croatia**, report that their governance structures enable the participation and inclusion of various stakeholders in open data policies.	20 Member States (74 %) report using a hybrid model, combining elements of a top-down and a bottom-up approach. Seven Member States (26 %) report that they implement a top-down approach.
EFTA	**Iceland**, **Norway** and **Switzerland** report that their governance structures enable the participation and inclusion of various stakeholders in open data policies, with **Iceland** as the most recent addition to this group.	All three participating EFTA countries report using a hybrid model, combining elements of a top-down and a bottom-up approach.
Candidate	**Albania** and **Ukraine**, along with **Serbia** as a new addition this year, report that their governance structures enable the participation and inclusion of various stakeholders in open data policies.	All four participating candidate countries report using a hybrid model, combining elements of a top-down and a bottom-up approach.

(Questions P13 and P14)

Most countries involve various stakeholders from different sectors, including government, civil society, academia and the private sector, in their open data governance structures. Typically, countries report that a centralised entity is established to govern open data activities. Indeed, all countries that report that their governance model uses a top-down approach (i.e. **Bulgaria**, **Czechia**, **Estonia**, **Ireland**,

Greece, **Cyprus** and **Slovenia**) also mention having such a central coordinating entity, but so do several countries that report a hybrid governance model. In hybrid models, this is often noted to be due to the institutional and political structure of the country. In this model, local and regional bodies maintain the autonomy to pursue their own open data initiatives. At the same time, the central government retains oversight to offer guidance, allocate funding and prevent redundancies.

Countries like **Austria**, **Bulgaria**, **Estonia**, **Greece**, **Iceland**, **Latvia**, **Lithuania**, the **Netherlands**, **Poland** and **Ukraine** have assigned oversight of open data affairs to specific national ministries. On the other hand, **Ireland** and **Cyprus** have established open data governance boards, comprising professionals from public services, academia and the private sector, to provide strategic direction to open data initiatives. Furthermore, countries such as **Denmark**, **Hungary** and **Romania** coordinate open data efforts through specialised agencies responsible for broader digital governance and data issues. Meanwhile, **France**, **Romania** and **Finland** utilise interministerial and interdepartmental structures for managing open data initiatives.

> ***We have a decentralised public sector, but the Ministry of Finance and the Ministry of Higher Education, Science, and Innovation are responsible for providing open data. Currently, the stewardship is at the ministerial level, but the execution is decentralised.***
>
> **Iceland's survey response**

Among most countries, there is an emphasis on participatory governance methods. There are certain ways in which most governments integrate different forms of collaboration, coordination and stakeholder engagement within their governance system.

One prominent method is the establishment of formal working groups and task forces as a means to govern open data activities. These groups provide a forum for ongoing discussions and can help enhance decision-making. Specifically, **Belgium**, **Czechia**, **Estonia**, **Romania**, **Serbia**, **Slovakia** and **Ukraine** note that their focus groups include diverse stakeholders, such as government officials, local authorities, civil society, the technology community, academia and the private sector. Whereas some groups, such as those from **Belgium**, **France** and **Poland**, are formalised around specific open data strategies or networks, others, such as in **Estonia** and **Slovakia**, are more informal, with members not necessarily formally appointed but rather included through informal mechanisms like mailing lists or voluntary participation. Various countries also note that they hold regular structured meetings as a mechanism for participatory governance, such as with a network of national ministries.

Furthermore, open feedback and consultation mechanisms are also used to engage various stakeholders in managing open data matters. For instance, **France** and **Lithuania** systematically collect feedback from stakeholders on open data that they access through their national open data platforms. **Denmark** has two forums managed by internal representatives who gather feedback from open data users.

Highlight from Czechia – adapting governance models over time
An interesting dynamic noted by **Czechia** is the transition of governance models. In Czechia, open data measures were initially driven by localities; however, since the introduction of national open data legislation, the national government has taken the steering role in open data initiatives.

Local and regional governance structures

To ensure the effective publication and reuse of open data across a country, governance must be established not only at the national level but also at the subnational level. This entails national governments creating an enabling environment for subnational entities to thrive in their open data endeavours. Although structural and legal limitations might exist, national governments often provide technical, monetary and advisory support to local administrations for their open data initiatives. Table 10 presents an overview of how countries responded to the questions on this topic.

Table 10: Countries' responses to questions on local and regional governance structures

	Does the governance structure ensure that the local and regional open data initiatives are facilitated and supported at the national level?	*To what degree do local/regional public bodies conduct open data initiatives?*
EU-27	24 Member States (89 %), **all except Germany** and **Finland**, report that the governance structure in their country ensures that local and regional open data initiatives are facilitated and supported nationally. **Malta, Austria and Portugal** are the newest countries to make this addition to their governance structure.	Nine Member States (33 %) report that all local/regional public bodies in their country conduct open data initiatives, and seven Member States (25 %) report that the majority of local/regional public bodies do. **Czechia** reports that there has been increased participation, from a few public bodies in 2023 to the majority being involved in these efforts in 2024. **Cyprus** and **Malta** indicate that this question is 'not applicable' due to their small size and the absence of regional governance structures.
EFTA	**Iceland** and **Norway** report that the governance structure in their country ensures that local and regional open data initiatives are facilitated and supported nationally. **Switzerland** reports that this question is 'not applicable', as the laws behind its national governance structure do not directly apply at the regional level but instead serve as guidelines for regional governance .	**Norway** and **Switzerland** report that the majority of the local/regional public bodies in their country conduct open data initiatives. **Switzerland** reports that there has been an increase in participation, from approximately half of local/regional public bodies in 2023 to a majority in 2024 being involved in these efforts. **Iceland** reports that only a few public bodies in the country conduct open data initiatives.
Candidate	**Serbia** and **Ukraine** report that the governance structure in their country ensures that local and regional open data initiatives are facilitated and supported nationally.	**Ukraine** reports that all local/regional public bodies conduct open data initiatives. **Serbia** reports that approximately half of the local/regional public bodies conduct open data initiatives, and **Albania** and **Bosnia and Herzegovina** report that only a few public bodies do.

(Questions P15 and P16)

A central national entity typically facilitates local and regional open data initiatives from the national level. Nonetheless, some countries, such as **Belgium**, **Germany** and **Switzerland**, cite structural or legal limitations (e.g. federalised structures) as reasons for not having robust national support for local and regional open data initiatives. That being said, many of these countries report that cooperation may exist between their national and regional bodies.

> ***Local data initiatives are very important in France and are often encouraged ... they often constitute interesting experiments that can be generalised.***
>
> **France's survey response**

When support for local and regional open data initiatives is provided, national entities do this in various ways.

- **Technical support. Estonia**, **Ireland**, **Greece**, **Spain** and **France** note that they provide technical and advisory support to regional and local governments from their national governments. For example, Greece's Ministry of Digital Governance offers technical support for publishing local datasets, and Spain's Aporta Initiative (managed by the Ministry for Digital Transformation and Public Service) offers specialised advice on open data technical and methodological aspects. **Croatia**, **Poland** and **Portugal** note that they use national data portals as a way to provide a platform for local authorities to share their data without them needing to develop their own systems.
- **Funding support.** Some countries also note that the national entity may provide monetary support to local and regional open data initiatives. For example, **France's** national government funds digital initiatives through the Public Action Transformation Fund.
- **Capacity-building support.** Some countries note that they provide structured programmes and events to facilitate local and regional open data initiatives. While these can come in the form of open data workshops or training on behalf of the national entity responsible for open data matters (as in the case of **Poland**), other countries, such as **Czechia**, **Cyprus** and **Slovakia**, specifically note that they sponsor, support or encourage local open data hackathons to facilitate engagement with open data.
- **Advisory support.** Some countries (e.g. **Bulgaria**, **Italy**, **Lithuania**, **Poland** and **Sweden**) note that their national governments undertake regular dialogue and knowledge sharing with their regional and local counterparts, which also helps to facilitate open data initiatives at the local and regional levels. In **Lithuania**, this is done through newsletters and public communications from the Ministry of Economy and Innovation. In **Italy** and **Sweden**, dedicated networks of national and municipal personnel exchange information regarding open data initiatives.

Highlight from Serbia – United Nations Development Programme collaboration for promoting local initiatives

In **Serbia**, the Office for Information Technology and e-Government, in collaboration with the United Nations Development Programme, actively supports local and regional open data initiatives. This multi-stakeholder cooperation aims to enhance the effectiveness and reach of open data efforts throughout the country.

Already, more than 50 % of user accounts on the national open data portal are owned by local self-governments. This can be attributed to the engagement that the initiative has fostered from local entities. In fact, over the past seven years, the initiative has supported numerous local events and activities, including the launch of an open data challenge focused on promoting local open data usage. In April 2024, the Office for Information Technology and e-Government provided expert support for the regional open data challenge, facilitated by the United Nations Development Programme and the Regional School of Public Administration.

Highlight from Italy – the Agency for Digital Italy

In **Italy**, the Agency for Digital Italy (AGID) facilitates the implementation of regional digital agendas in alignment with the country's three-year plan for information and communication technology in public administration. These efforts encompass specific actions aimed at enhancing open data initiatives.

A crucial component in each individual public administration is the Office of the Digital Transition Manager (RTD), established by Article 17 of the Digital Administration Code. The RTD oversees the transition to digital operations and reports directly to the political leadership or, in their absence, to the administrative management. This role serves as a vital link between top management, AGID and the Presidency of the Council of Ministers, addressing issues related to the digital transformation of public administrations.

AGID promotes regular dialogue with the appointed digital transition managers in each public administration through a dedicated platform that fosters communities focused on open data. This engagement ensures that the local and regional levels are actively involved and supported in their open data endeavours.

Outlining open data roles and responsibilities

A network of open data officers serves as a system of communication and collaboration between the national open data team and various open data officers across different regions or sectors within the country. Having civil servants across public sector bodies with an official remit on open data can facilitate the process of making data open. Table 11 presents an overview of how countries responded to the questions on this topic.

Table 11: Countries' responses to questions on open data roles and responsibilities

	Is a document describing the responsibilities and governance structure of the national (and/or regional/local) open data team publicly available?	*Does the governance model include the appointment of official roles in civil services that are dedicated to open data (e.g. open data officers)?*
EU-27	24 Member States (88 %), with **Malta** and **Portugal** as the most recent additions, report that they have a publicly available document describing the responsibilities and governance structure of the national (and/or regional/local) open data team. **Denmark**, **Croatia** and **Sweden** do not report having such a document available.	25 Member States (95 %), **all except Belgium** and **Denmark**, report that their governance model includes the appointment of dedicated open data roles in civil services.
EFTA	**Switzerland** reports that it has a publicly available document describing the responsibilities and governance structure of the national (and/or regional/local) open data team.	**Iceland** and **Switzerland** report that their governance models include the appointment of dedicated open data roles in civil services.
Candidate	All four participating candidate countries, including **Serbia** as the most recent addition, report that they have a publicly available document describing the responsibilities and governance structure of the national (and/or regional/local) open data team.	**Albania**, **Serbia** and **Ukraine** report that their governance models include the appointment of dedicated open data roles in civil services.

(Questions P17 and P19)

Several countries, such as **Germany**, **Spain**, **Croatia**, **Poland** and **Slovenia**, report that they have specific national laws that require the appointment of specific roles focused on open data. In particular, in **Spain** over the past year, some government bodies have started creating a unit responsible for information, as required by Law 37/2007. This unit will manage the reuse of public sector information (i.e. open data). Many countries appoint a designated coordinator, steward or officer for open data in their public bodies. These are specific individuals in government bodies who are tasked with managing open data affairs. However, in some countries, open data matters are designated as the responsibility of broader data officer roles, as these roles often existed prior to open data legislation. Individuals in these roles manage open data on top of other data-related matters (i.e. management, quality and data governance). For example, in 2022, **Estonia** created the Data Stewards Steering Group, which coordinates data stewards from various public authorities to ensure the sustainable and balanced development of the data field, including open data matters.

Highlight from Cyprus – governance structure outlined in the open data strategic plan for 2023–2027

Cyprus's *Open Data Strategic Plan 2023–2027* outlines its main goals and visions for open data, including action points and critical success factors. In addition, on page 9, the open data governance structure is outlined, displaying different stakeholders and their interactions (Figure 9).

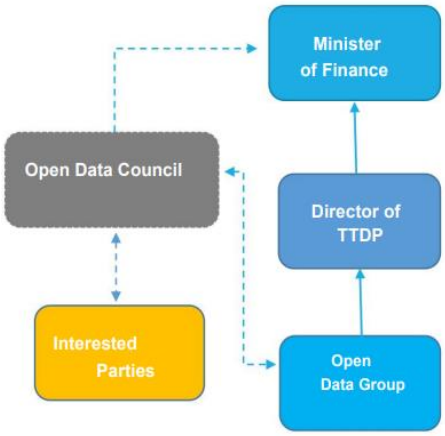

Figure 9: Diagram of Cyprus's governance structure (TTDP: Department of Public Administration and Personnel in Cyprus).

Network of open data team, officers and reusers

Communication and collaboration between various stakeholders are important for fostering a functional open data ecosystem. A regular exchange of knowledge and experiences between stakeholders, both within and across countries, can play a significant role in enhancing the quality and accessibility of open data and in creating feedback loops for improving open data policies. A prominent approach to facilitating these exchanges that is employed by countries is to create formal and informal groups that engage through various platforms and events. Table 12 presents an overview of how countries responded to the questions on this topic.

Table 12: Countries' responses to questions on communication and collaboration between stakeholders

	Is there a regular exchange of knowledge or experiences between the national open data team and the team maintaining the national portal?	*Is there a regular exchange of knowledge or experiences between the national open data team and the wider network of open data officers in your country?*	*Is there a regular exchange of knowledge or experiences between public sector bodies (i.e. the providers) and open data reusers (e.g. academia, citizens and businesses)?*
EU-27	26 Member States (96 %), **all except Finland**, report that the national open data team and the team maintaining the national portal in their countries have regular exchanges.	All Member States (100 %), with **Croatia** as the most recent addition, report that the national open data team and the wider network of open data officers in their countries have regular exchanges.	All Member States (100 %) report that public sector bodies and open data reusers in their countries regularly exchange knowledge and experiences.

	Is there a regular exchange of knowledge or experiences between the national open data team and the team maintaining the national portal?	*Is there a regular exchange of knowledge or experiences between the national open data team and the wider network of open data officers in your country?*	*Is there a regular exchange of knowledge or experiences between public sector bodies (i.e. the providers) and open data reusers (e.g. academia, citizens and businesses)?*
EFTA	All three participating EFTA countries report that the national open data team and the team maintaining the national portal in their countries have regular exchanges.	All three participating EFTA countries report that the national open data team and the wider network of open data officers in their countries have regular exchanges.	All three participating EFTA countries report that public sector bodies and open data reusers in their countries regularly exchange knowledge and experiences.
Candidate	**Albania**, **Serbia** and **Ukraine** report that the national open data team and the team maintaining the national portal in their countries have regular exchanges.	**Albania** and **Ukraine** report that the national open data team and the wider network of open data officers in their countries have regular exchanges.	**Serbia** and **Ukraine** report that public sector bodies and open data reusers in their countries regularly exchange knowledge and experiences.

(Questions P18, P20 and P21)

Exchanges between the national open data team and the team maintaining the national portal can be formalised around established groups, such as in **Denmark** (the forum for data distributors), **Germany** (the GovData working group) and **Austria** (Cooperation OGD Austria). Such exchanges can also be informal and occur on an ad hoc basis; this may be because the open data team and the team maintaining the portal work within the same institution (e.g. in **Hungary**, **Italy**, **Norway**, **Romania** and **Serbia**), such as an agency or ministry, or because they are part of the same team (e.g. in **Cyprus**, **France**, **Greece**, **Malta**, **Poland**, **Switzerland** and **Ukraine**). In contrast, some countries use external parties to maintain their open data portals (e.g. **Albania** and **Ireland**).

Similarly, exchanges between the national open data team and the wider network of open data officers are often arranged through working groups. Some exchanges can also be arranged around workshops and specialised forums or events, such as the open data liaison officer meeting in **Ireland**, the Interbestuurlijke Datastrategie Café in the **Netherlands** and the data stewards event in **Slovenia**. These meetings are sometimes specifically focused on training and development activities. For example, in **Ukraine**, the Open Data Academy was set up to boost skills through training programmes.

On the other hand, exchanges between national public sector bodies and open data reusers are often arranged through conferences and forums. Conferences such as the **Danish** Forum for the Use of Basic Data and Other Public Data, the **German** Berlin Open Data Day, the **Irish** National Open Data Conference and the **Swiss** Open Data Beer bring together public sector officials, academics, businesses and other stakeholders to discuss open data issues and innovations.

Furthermore, regular exchange of knowledge between the public sector and open data reusers is often fostered through collaborative working groups that include representatives of the public sector, the private sector, academia and civil society. Some examples include the **Bulgarian** working group on

transposing the open data directive, which includes representatives of public sector bodies, academia, businesses, non-governmental organisations and citizens, and the **Serbian** Open Data Working Group, which includes participants from the technology community, the media, academia and civil society.

Digital platforms are also used in this context to facilitate knowledge exchange. In addition to more general digital platforms (e.g. email and online meetings), some countries report that they have developed unique platforms dedicated to engaging various users in open data topics, such as the **Dutch** Geoform platform or the **Italian** Forum Italia platform.

Highlight from Norway – Datalandsbyen (Data Village)
Norway's Datalandsbyen, or 'Data Village', is an interactive online forum designed to facilitate engagement among users. It allows individuals to pose questions about data, engage in discussions, share their projects, connect with others and explore potential collaborations. In addition, it enables constant communication between the open data team, data professionals, the team maintaining the Norwegian national portal, open data reusers and the public.

4.4. Open data implementation

This indicator evaluates the processes and activities in place to implement the open data policies and strategies outlined. Specifically, this indicator examines the initiatives that assist data providers, including holders of real-time, geospatial and citizen-generated data, with their open data publication process and that promote open data literacy among civil servants and the broader public.

Data publication plans

Data publication plans are specific workflows or internal data management processes for the publication of datasets. Data publication plans and related monitoring mechanisms are needed to enable those responsible to oversee the progress being made towards opening up datasets and to intervene in the event of barriers. Table 13 presents an overview of how countries responded to the question on this topic.

Table 13: Countries' responses to the question on data publication plans

	Do data publication plans exist at the public body level?
EU-27	All Member States (100 %), with **Lithuania** and **Portugal** as the most recent additions, report that they have publication plans for open data at the public body level.
EFTA	**Norway** and **Switzerland** report that they have publication plans for open data at the public body level.
Candidate	**Albania** and **Ukraine** report that they have publication plans for open data at the public body level.

(Question P22)

The majority of countries have implemented legal frameworks or regulations that require public sector bodies to develop and implement data publication plans. In particular, countries tend to use centralised national platforms or geoportals with specific workflows and procedures to help them publish open data.

Highlight from Denmark – structured data publication planning
In **Denmark**, data publication plans exist at various levels within public bodies. • **Statistics Denmark.** Statistical datasets follow a detailed release calendar, with publication dates announced at least a year in advance. The processes and workflows are documented in the statistical documentation available for each dataset. • **Basic data.** The Datafordeleren platform connects to more than 20 public data registries, making it a central hub for accessing various types of public data. This integration simplifies the data discovery process for users by providing a one-stop shop for diverse datasets ranging from demographic information to economic indicators. Information about new releases, planned service changes and documentation is easily accessible through the website. Additionally, Datafordeleren supports various formats for data retrieval, enhancing its usability for developers and analysts. • **General guidelines.** The Danish Agency for Digital Government provides a reference architecture for data sharing and technical guidance that data publishers can use when developing their publication plans. By adhering to these documents, agencies can enhance collaboration and streamline processes. This framework promotes best practices in data management and encourages innovation by enabling seamless data integration across various platforms and services.

Implementation plans and monitoring processes

It is important that governments establish processes to ensure the effective implementation of their policies and strategies and to ensure continuous updates to maintain their relevance. Table 14 presents an overview of how countries responded to the questions on this topic.

Table 14: Countries' responses to questions on implementing plans and monitoring processes

	Are there processes to ensure that the open data policies/strategy previously mentioned are implemented?	*Do you update your policy/strategy as appropriate to ensure its success, such as based on data collected for monitoring?*
EU-27	All Member States (100 %), with **Belgium** and **Portugal** as the most recent additions, report that they have processes to ensure that their open data policies and strategies are implemented.	19 Member States (70 %) report that they have procedures in place to update their policy/strategy as appropriate.
EFTA	All three participating EFTA countries report that they have processes to ensure that their open data policies and strategies are implemented.	**Norway** and **Switzerland** report that they have procedures in place to update their policy/strategy as appropriate.
Candidate	**Albania**, **Serbia** and **Ukraine** report that they have processes to ensure that their open data policies and strategies are implemented.	**Albania**, **Serbia** and **Ukraine** report that they have procedures in place to update their policy/strategy as appropriate.

(Questions P23 and P24)

The most frequently mentioned mechanism for ensuring the implementation of open data strategies and policies is regular progress monitoring. In many cases, the monitoring of progress is mandated by the open data strategies and policies themselves. Additionally, many countries have designated

agencies or councils that are responsible for overseeing the implementation of open data policies and for providing support to ensure the process runs smoothly. For example, **Hungary** mandated the creation of the National Data Asset Council to support the implementation of its open data policy, while **Estonia** created the National Open Data Team in collaboration with multiple agencies to monitor open data plans and provide technical support.

Highlight from Ireland – iterative development and continuous improvement

Ireland employs an iterative process to developing and updating its national open data strategy, emphasising continuous improvement. The Open Data Unit collaborates with a stakeholder working group to draft the strategy, which outlines specific goals, objectives and action plans. After incorporating public feedback on the draft, the strategy is finalised and submitted for review and approval by the governance board and other stakeholders before being presented to the cabinet for government endorsement.

Once approved, the Open Data Unit oversees the implementation of the strategy's initiatives, collaborating with various government agencies and stakeholders. The unit actively monitors user needs and collects feedback from data publishers and users to ensure that the strategy remains effective. This ongoing communication facilitates the identification of necessary revisions to adapt to evolving needs and challenges, initiating a new development cycle.

The most recent updates to the strategy, covering 2023 to 2027, focus on three key pillars: supporting data publishers, maintaining the open data platform and engaging users. This shift towards a more user-centric approach includes strengthening communication channels between data publishers and users to better tailor data offerings to their needs.

In some cases, countries emphasise specific aspects of the policies and strategies for monitoring. For example, open data availability and quality are prominent focuses of countries' monitoring efforts (e.g. as mentioned by **Czechia**, **Italy**, **Luxembourg**, **Poland, Sweden** and **Ukraine**). This includes tracking metadata quality, ensuring compliance with legislation, and assessing data availability and publication timelines.

Publishing annual reports is a frequent way in which countries monitor their progress. These are either made publicly available (e.g. in **Albania**, **Bulgaria**, **Czechia**, **Lithuania**, **Poland**, **Portugal** and **Serbia**) or submitted to federal parliament or institutions overseeing the governance of open data in the country (e.g. in **Croatia**, **Germany**, **Ireland**, **Slovenia** and **Ukraine**). In addition, **France**, **Italy** and **Portugal** provide online tools, such as public dashboards, to monitor the implementation of open data policies in a transparent manner.

In terms of updating policies/strategies, many countries have scheduled policy updates whereby policies are reviewed and amended based on a predetermined time frame. Others employ more adaptive approaches, updating policies when needed. Countries have various means of informing the content and timing of their policy updates. For example, **Latvia**, **Norway** and **Spain** highlight the need to align with international standards (e.g. EU legislation and the UN's sustainable development goals) and maintain consistency with broader frameworks, which serves as a key driver for updating their open data policies and strategies. Similarly, **Estonia** and **Portugal** note that they update their policies and strategies based on the emergence of new technologies.

Monitoring charging practices relating to open data

Legal frameworks often mandate different processes to ensure that public bodies understand when they can charge above the marginal costs and which bodies are permitted to do so. Table 15 presents an overview of how countries responded to the question on this topic.

Table 15: Countries' responses to the question on monitoring charging practices

	Are there any processes in place to assess if public sector bodies are charging for data above the marginal costs?
EU-27	25 Member States (92 %), **all except Hungary** and **Sweden**, report that they implement processes to assess if public bodies charge above the marginal costs for the data they provide. **Romania** is the most recent addition to this group.
EFTA	**Iceland** and **Norway** report that they implement processes to assess if public bodies charge above the marginal costs for the data they provide.
Candidate	**Serbia**, **Ukraine** and, the most recent addition, **Albania**, report that they implement processes to assess if public bodies charge above the marginal costs for the data they provide.

(Question P25)

The majority of countries have put in place clear legal frameworks that stipulate in what cases public sector bodies can charge fees for data and how high these fees can be. **Croatia** notes that its decree also includes an audit of its methodology to determine prices. Often, an open data team or legal body (e.g. executive branches or courts) applies the rules set out in these decrees and laws and coordinates assessments of cases in which fees apply, ensuring they comply with cost regulations.

Often, countries will have publicly available lists of which public bodies are allowed to charge above the marginal costs, how much they are allowed to charge and sometimes (as in the case of **France** and **Latvia**) the methodology for determining the pricing of paid services, and the procedure for approving the pricing. **France** notes that its price list will be reviewed at least every five years and that the details of calculations are published jointly in electronic form on the website of the administration concerned. In the cases of **Ireland** and **Austria**, public bodies are responsible for notifying the national government regarding their choice to charge fees.

On the other hand, **Bulgaria**, **Iceland** and **Spain** note that the onus is on the data requesters interested in accessing data to report if they are being overcharged. This typically involves reporting to a committee, a court or the department overseeing open data matters, which then decides whether the data provider will need to change its fees. **Spain** provides an option in its national catalogue for users to report whether public sector agencies are charging above the marginal costs for data, and the platform administrator team will evaluate it.

Data literacy training and open data publication activities

Activities to support open data publication are initiatives designed to assist data holders in making their data publicly available in an open and accessible format. These activities, which can come in the form of training programmes, often coincide with efforts to develop civil servants' competencies with data. Countries can help to ensure that public sector staff are well equipped to handle data-related responsibilities by aligning open data support with professional development efforts. Table 16 presents an overview of how countries responded to the questions on this topic.

Table 16: Countries' responses to questions on open data publication and data literacy training

	Are there any activities in place to assist data holders with publishing their data as open data?	*Is there a professional development or training plan for civil servants working with data in your country?*
EU-27	26 Member States (96 %), **all except Bulgaria**, have activities in place to assist data providers with their open data publication.	26 Member States (96 %), **all except Malta**, report that they offer professional training to civil servants working with open data. **Latvia** is the latest addition to this group.
EFTA	All three participating EFTA countries report having activities in place to assist data providers with their open data publication.	All three participating EFTA countries report offering professional training to civil servants working with open data.
Candidate	**Albania**, **Serbia** and **Ukraine** report having activities in place to assist data providers with their open data publication.	**Albania**, **Serbia** and **Ukraine** report that they offer professional training to civil servants working with open data.

(Questions P27 and P28)

Structured training programmes on open data and data governance are common in most countries to equip civil servants with the necessary skills for working with open data. These courses are often provided by government and public institutions and are usually accessible asynchronously for civil servants via digital learning platforms (e.g. in **Italy** (Syllabus), the **Netherlands** (RADIO) and **Finland** (eOppiva)). Several countries also collaborate with external organisations to offer specialised data training, such as universities, academic institutions and private companies (e.g. **Greece** collaborates with Microsoft and Oracle to provide official certification in digital competencies for civil servants). Many countries note that they provide on-demand support services to data holders based on specific needs.

Cyprus and **Sweden** note that public sector bodies that wish to publish their data must appoint designated open data personnel, who undergo a training programme and are responsible for ensuring the publication of open data on behalf of that organisation.

Providing technical support for publishing open data is commonplace in all countries. This can come in various forms, such as creating automated data publication scripts (**Luxembourg**), providing assistance on publication aspects such as API standards (**Austria**), developing custom harvesters for large data publishers (**Serbia**) or providing resources to smaller public bodies such as a shared metadata catalogue (**Sweden**). Additionally, **Denmark** and **Estonia** note that they provide financial assistance to data holders to encourage them to publish their data.

Highlight from Luxembourg – activities to support data owners

In **Luxembourg**, various activities are implemented to assist data owners in opening their datasets. These initiatives include the following.

- **Advisory meetings.** During these meetings, data owners discuss their datasets and inventory documents, allowing obstacles to be identified that may have hindered data openness. The team provides legal guidance and technical support as needed.
- **Harvester scripts development.** The team regularly develops custom harvester scripts after collaborating with data owners to obtain their feedback and consent regarding licensing, description and data validity.
- **Publication script guidance.** Assistance is offered to data owners who are writing their own automatic publication scripts, ensuring that they have the necessary support for successful data sharing.
- **Central infrastructure maintenance.** The creation and maintenance of centralised infrastructures, such as the national Inspire platform, the geoportal and the HVD4Gov platform (currently under construction), facilitate the preparation, description, modification and publication of data. These infrastructures establish a clear workflow that ensures that data becomes accessible as open data, searchable, downloadable or usable via APIs and web services on the national open data portal.

Chapter 5: Open data portals

Public sector organisations at the European, national and local levels create open data portals to publish open data and make it easily accessible to anyone who wishes to use it. These websites function as directories to help users find public data resources. Rather than serving only as storage sites, these portals often act as metacatalogues, focusing on making data stored elsewhere easily discoverable in a central location. Governments that operate these portals usually engage in a range of activities to promote the availability and reuse of public sector information. In this broader context, portals also play a key role in raising awareness about open data and encouraging its reuse among users.

The **portal** dimension of the open data maturity (ODM) assessment is designed to encourage national portals to offer features and functionalities that meet user needs and deliver a positive user experience. A well-designed, user-friendly portal can boost the adoption of open data and help transform casual users into active reusers.

In brief, the **portal** dimension investigates the functionality of national open data portals, how user needs and behaviours are incorporated into portal improvements, the availability of open data across various sectors and strategies to ensure the portal's long-term sustainability. Table 17 provides an overview of the indicators used to assess the portal dimension.

Table 17: Indicators of the portal dimension

Indicator	Key elements
Portal features	Portal features ensure access to datasets and relevant content, and include more advanced features such as SPARQL Protocol and RDF Query Language (SPARQL) search, discussion forums, rating of datasets, means of requesting datasets and transparency on the status of requested datasets. Activities are conducted to promote the visibility and reuse of high-value datasets (HVDs) through the portal.
Portal usage	Traffic to the portal is monitored, and analytics tools are used to gain insights into users' behaviour and the most and least consulted data categories. In addition, the portal offers application programming interfaces (APIs) or SPARQL end points through which advanced users can access the metadata programmatically.
Data provision	Most data providers contribute data to the national portal, and actions are taken to support data publication. In addition, access to real-time data is provided through the portal, and data that does not stem from official sources (e.g. citizen-generated data) can be uploaded. Furthermore, data from regional or local sources is discoverable on the national portal.
Portal sustainability	A strategy to ensure the sustainability of the portal has been determined, and activities are conducted to ensure the portal's visibility, including through a social media presence. In addition, user surveys are conducted regularly and feed into a review process to improve the portal.

This chapter will first present overall performance on the portal dimension and then provide a summary of the results and best practices for each indicator.

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5.1. Overall performance on the portal dimension

In 2024, the portal dimension is the second-best performing dimension among the EU-27, achieving a maturity score of 82 % (Figure 10). This is despite its being the only dimension to have experienced a decreased score compared with 2023, with a drop of 3 percentage points (pp). The reduced score on the portal dimension in 2024 can be attributed to a decrease in all four of the underlying indicators in this dimension, with the portal features indicator showing the largest decline (– 6 pp). This decline may be partially influenced by changes in the methodology, including introducing new questions that set higher requirements.

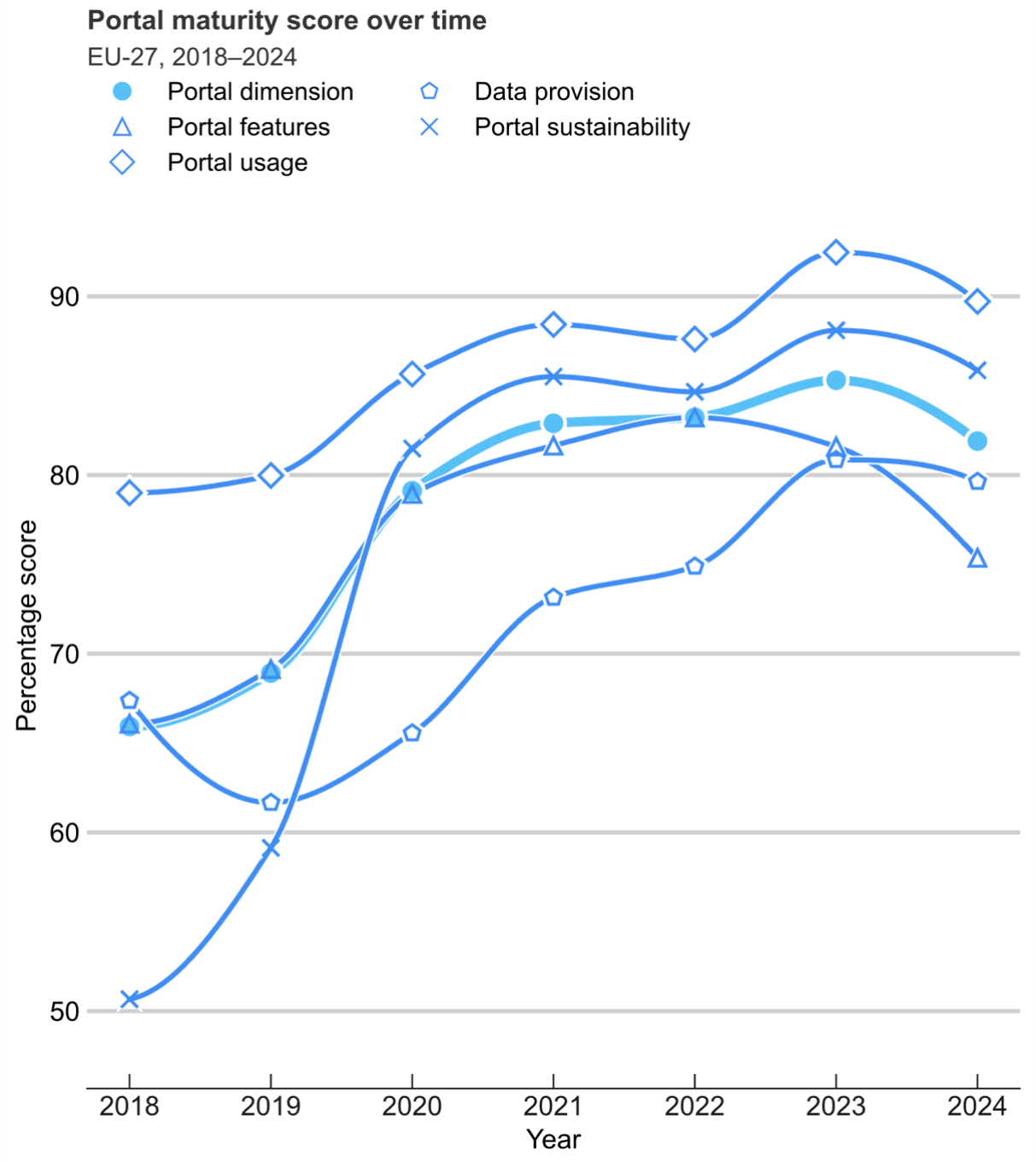

Figure 10: The EU-27 average score on the portal dimension decreased year-on-year

Regarding individual country performance, **Poland** stands out as the only participating country to report having conducted all of the activities assessed in the questionnaire, earning a 100 % score on this dimension, a 2 pp increase from 2023 (Figure 11). **France** follows closely in second place, with a maturity score of 98.5 % (a 2 pp increase from 2023). In total, 20 countries surpass the EU average of 82 %, with 11 countries achieving scores above 90 %. Notably, among these are **Ukraine**, a candidate country with a score of 94 %, and **Norway**, a European Free Trade Association (EFTA) country with a score of 91 %.

Czechia (+ 20 pp) and **Croatia** (+ 14 pp) achieved double-digit improvements in their maturity scores compared with 2023. **Albania** (+ 9 pp) and **Slovakia** (+ 9 pp) are also among the most improved countries in this dimension. **Czechia's** improved maturity can be attributed to progress across all four indicators of the portal dimension. The country achieved a notable increase in the portal usage indicator (+ 48 pp), reflecting a focus on enhancing user engagement, including monitoring trends and user preferences and enabling regular updates to better align the portal's offerings with user demand. Many countries, including **Czechia**, have integrated capabilities for programmatic metadata queries via APIs and SPARQL access points, demonstrating a well-defined technology stack. The Comprehensive Knowledge Archive Network (CKAN) remains the most widely adopted platform, followed by Udata and LinkedPipes. The LinkedPipes extract, transform and load (ETL) tool, the LinkedPipes Data Catalog Vocabulary – Application Profile (DCAT-AP) viewer and Openlink Virtuoso are used by **Czechia**, which bases its implementation on open-source DCAT-AP-compliant tools.

Highlight from Czechia – analysing users' experiences through a questionnaire

One of the key practices highlighted in this year's report is basing portal improvements on user feedback.

Czechia, for example, initiated research at the beginning of 2024 focused on users' experiences of its national portal and data catalogue. The research involved a questionnaire, distributed via a newsletter and published on the portal, and direct interviews and focus group sessions with users. The findings from this research are currently being analysed and will inform the strategy for developing the portal in 2025.

Read more about this trend in Section 5.3.

Croatia saw a large improvement in the data provision indicator (+ 21 pp). Croatia allows both official and non-official providers to publish open datasets, and the national portal aggregates data from various local and regional portals across the country. However, a common challenge, also reported by other countries, has been the incomplete harvesting of metadata from all local and regional portals. While some countries automatically harvest the data from other sources, other countries strike ad hoc agreements with regional and local bodies to extract their data. Croatia has set up an automated synchronisation system with three of the seven regional and local portals identified, specifically those of Rijeka, Zagreb and Varaždin. This advancement ensures that the national portal is updated more frequently, moving Croatia closer to establishing a comprehensive one-stop shop for data across the country.

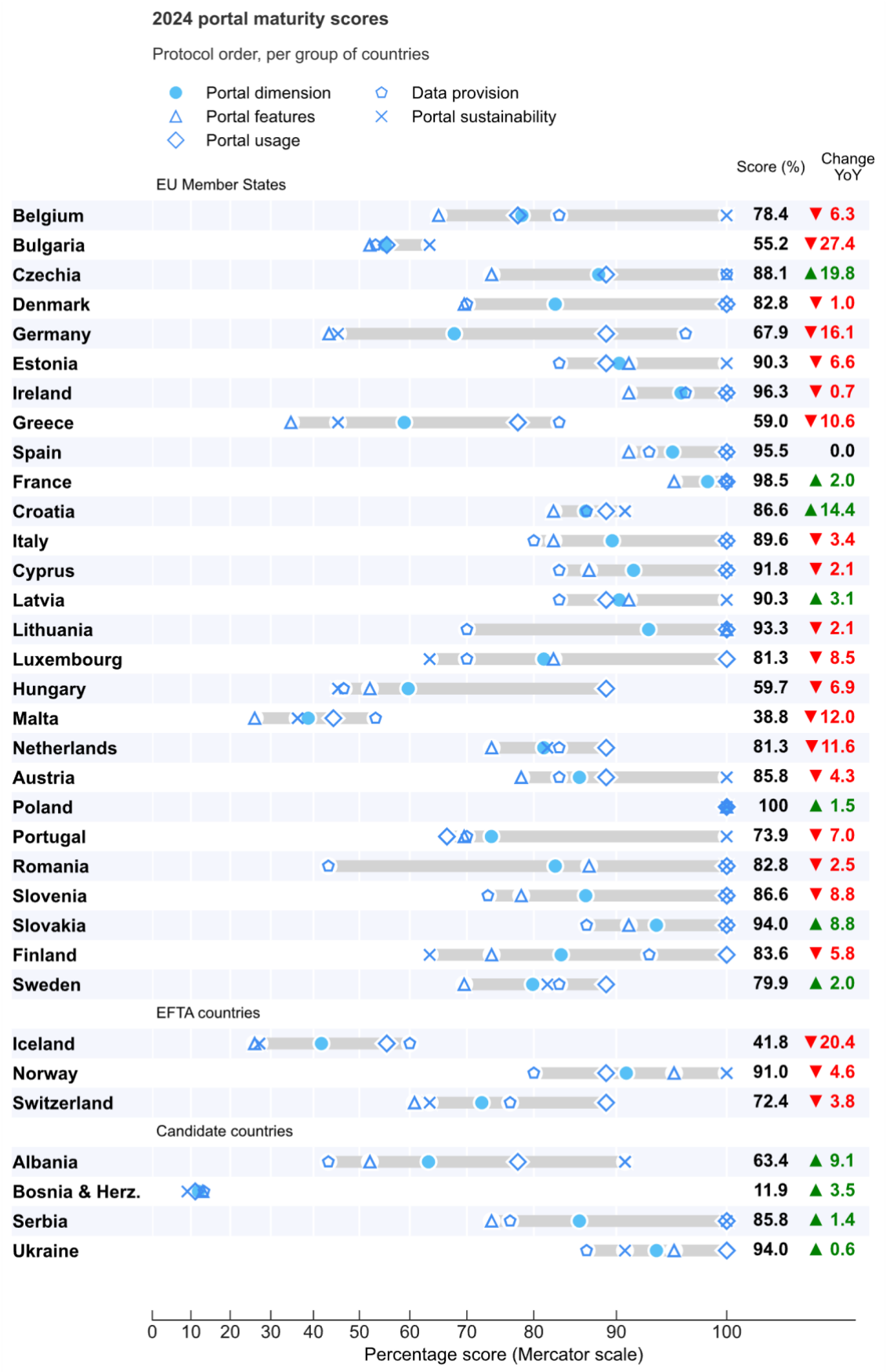

Figure 11: The majority of countries had a decreased score on the portal dimension in 2024. (YoY: year-on-year).

Highlight from Croatia – supporting local and regional portals in publishing metadata

One of the key practices highlighted in this year's report is countries providing support to data providers at the local and regional levels to increase the quality and quantity of data on the national portal.

The Central State Office for the Development of Digital Society and the Information Commissioner in Croatia play key roles in supporting public authorities and users in the process of publishing open data. As government bodies responsible for promoting and facilitating the publication of open data at both the national and the local levels, they provide comprehensive assistance through the following activities.

- **Online education (webinars).** They organise webinars focused on open data, where public authorities and other interested parties receive training on the importance of open data, the processes involved in publishing metadata and how to effectively manage and use open data. These webinars serve as a key resource for building capacity and awareness among data publishers.
- **Guidelines on reuse of open data.** They provide detailed guidelines aimed at helping public authorities understand how to reuse open data. These guidelines outline the best practices for publishing metadata, ensuring the data's quality and encouraging its use in innovation and decision-making processes by various stakeholders.
- **Direct communication and assistance.** They maintain open channels of communication via email and over the telephone, through which public authorities can seek advice on their legal obligations to publish open data on the national open data portal. They also offer technical and legal assistance in ensuring the smooth publication and management of this data, helping authorities to comply with relevant laws and standards.

Read more about this trend in Section 5.4.

Slovakia achieved full maturity scores on the portal usage and portal sustainability indicators. Countries with high maturity in portal sustainability, like Slovakia, have long-term strategies for maintaining the national portal. This includes making the portal's source code, documentation and other relevant artefacts publicly accessible, often hosted on platforms like GitHub or GitLab. Such transparency and open access to resources foster community trust and allow developers to contribute to ongoing improvements, reinforcing the portal's sustainability and adaptability over time.

Highlight from Slovakia – the SPARQL end point

One of the key practices highlighted in this year's report is the offering of tools to data providers to assist them with publishing data.

Slovakia has implemented a SPARQL end point with predefined queries to assist data providers in monitoring and improving the quality of their metadata. This tool allows providers to track key metrics, such as metadata quality, and to benchmark their performance against other providers. With these insights, providers can more effectively ensure that their data aligns with national standards and user expectations.

Additionally, a dedicated web page offers an overview of basic statistics. This web page provides an overview of metadata quality indicators, enabling providers and stakeholders to easily assess the consistency and completeness of the metadata available on the national platform. The goal is to promote high standards in metadata management and to facilitate continuous improvement through accessible, data-driven insights, thereby leading to increases in the usability of the datasets and supporting a more transparent and reliable open data ecosystem.

Read more about this trend in Section 5.4.

Albania achieved the most significant progress on the portal sustainability indicator (+ 48 pp), with progress also made on the portal features indicator (+ 7 pp). Key improvements included implementing a long-term strategy to ensure the portal's sustainability and initiating regular monitoring of published data characteristics, such as category distribution, the ratio of static to real-time data and how these metrics evolve over time. This monitoring process allows the portal team and data providers to make informed improvements, ensuring higher performance and more relevant data offerings on the national portal.

Highlight from Albania – action plan for portal sustainability

One of the key practices highlighted in this year's report is the setting up of long-term strategy plans for better maintenance of the portal.

For example, in **Albania**, the National Agency of Information Society, which oversees the opendata.gov.al portal, has appointed dedicated contacts who coordinate regularly with representatives from other institutions to boost the number of available datasets. Additionally, the agency collaborates closely with the Prime Minister's Office, which plays a key role in leading high-level initiatives, including the preparation of annual reports and documentation for the Open Government Partnership. These reports are made publicly accessible on opendata.gov.al. As part of the World-Bank-supported programme 'Improving equitable access to high-standard, sustainable public services at central and sub-national levels', an action plan and strategy are being developed to enhance the open data portal's functionality and ensure its long-term sustainability.

Read more about this trend in Section 5.5.

5.2. Portal features

This indicator assesses both basic and advanced features of national open data portals. Basic functionalities include advanced search options (e.g. multifield searches and filtering), dataset downloads and the ability to search by file format or data domain. More advanced portals allow users to access data programmatically through APIs or SPARQL queries. This indicator also looks at whether users can request and rate datasets and if the portals showcase reuse cases. Additionally, it evaluates features that promote online interaction between data providers and users, including discussion forums, feedback channels and notifications for new datasets.

Overview of the national portals

All participating countries, **except Bosnia and Herzegovina**, have a national open data portal. However, there are some local open data portals in **Bosnia and Herzegovina**. To ensure more advanced and flexible search capabilities, many national open data portals provide APIs (26 EU Member States; 96 %) or SPARQL end points (12 Member States; 44 %), along with documentation, to enable programmatic querying of metadata. These tools allow users and developers to interact directly with the portal's underlying data structures, facilitating sophisticated searches beyond what is possible through a standard web interface. Table 18 provides an overview of the key features of national open data portals.

Table 18: Overview of national open data portals for all of the 2024 ODM participants

Country	National portal website	Technology stack	API present?	SPARQL access point present?
Member States				
Belgium	https://data.gov.be/en	Custom back end with Drupal front end (see GitHub)	Yes (see API)	
Bulgaria	https://data.egov.bg	Custom, including Fluentd, Elasticsearch node, MariaDB and Graylog	Yes (see API)	
Czechia	https://data.gov.cz/english	Custom, including LinkedPipes	Yes (see API)	Yes (see end point)
Denmark	www.datavejviser.dk	CKAN back end with a DCAT plug-in and a front end designed with React	Yes (see API)	
Germany	https://www.govdata.de	Custom, including the CMS Typo3 for editorial content and Piveau for data storage	Yes (migrating from CKAN API to Piveau API)	Yes (see end point)
Estonia	https://avaandmed.eesti.ee	Custom, including Typescript, PostgreSQL and Solr	Yes (see API)	Yes (see end point)
Ireland	https://data.gov.ie	CKAN	Yes (see API)	
Greece	https://data.gov.gr http://repository.data.gov.gr	Custom based on CKAN	Yes (see API)	
Spain	https://datos.gob.es/en	CKAN and Drupal	Yes (see API)	Yes (see end point)
France	https://www.data.gouv.fr	Udata	Yes (see API)	Yes (see end point)
Croatia	https://data.codeforcroatia.org/	CKAN	Yes (see API)	Yes (see end point)
Italy	https://dati.gov.it	CKAN and Drupal	Yes (see API)	Yes (see end point)
Cyprus	https://www.data.gov.cy/	EKAN	Yes (see API)	
Latvia	https://data.gov.lv/eng	CKAN	Yes (see API)	Yes (see end point)
Lithuania	https://data.gov.lt/?lang=en	Self-developed solution in Python	Yes (see API)	Yes (see end point)
Luxembourg	https://data.public.lu/en	Udata	Yes (see API)	
Hungary	https://kozadatportal.hu	CKAN	Yes (see API)	

Country	National portal website	Technology stack	API present?	SPARQL access point present?
Malta	https://open.data.gov.mt	Custom		
Netherlands	https://data.overheid.nl/en	CKAN	Yes (see API)	
Austria	https://www.data.gv.at/en	CKAN and Wordpress	Yes (see API)	
Poland	https://dane.gov.pl/	Custom, including Falcon, Django, RDFLib, Wagtail CMS, Typescript (microservice architecture)	Yes (see API)	Yes (see end point)
Portugal	https://dados.gov.pt/en/	Udata	Yes (see API)	
Romania	https://data.gov.ro/en	CKAN	Yes (see API)	
Slovenia	https://podatki.gov.si	CKAN	Yes (see API)	
Slovakia	https://data.gov.sk/en	Custom, including LinkedPipes		Yes (see end point)
Finland	https://www.avoindata.fi/en	CKAN	Yes (see API)	Yes (see end point)
Sweden	https://www.dataportal.se/en	Custom, including EntryScape, the Strapi CMS and NodeBB	Yes (see API)	
EFTA countries				
Iceland	https://opingogn.is	CKAN		
Norway	https://data.norge.no	Custom, including React, Java/Kotlin, Python, Jena, Fuseki, Elasticsearch, PostgreSQL, MongoDB and Kafka	Yes (see API)	Yes (see end point)
Switzerland	https://opendata.swiss/en/	CKAN	Yes (see API)	
Candidate countries				
Bosnia and Herzegovina	None			
Albania	https://opendata.gov.al/en		Yes	
Serbia	https://data.gov.rs	Udata	Yes (see API)	
Ukraine	https://data.gov.ua/en	CKAN	Yes (see API)	Yes (see end point)

(Questions PT1, PT2, PT3 and PT4)

(CMS: content management system).

Preview functions

Making data more accessible without requiring downloads can enhance usability, encouraging individuals to engage with and analyse the data directly. This approach applies to both tabular and geospatial data, fostering a more interactive and user-friendly experience. Table 19 presents an overview of how countries responded to the questions on this topic.

Table 19: Countries' responses to questions on preview functions

	Does the national portal offer a preview function for tabular data?	*Does the national portal offer a preview function for geospatial data?*
EU-27	18 Member States (67 %) report that they offer a preview function for tabular data.	15 Member States (56 %) report having a preview function for geospatial data. This is an increase from 2023, with **Croatia**, **France** and **Sweden** the latest additions to this group.
EFTA	**Norway** and **Switzerland** report having preview functions for tabular data.	**Norway** and **Switzerland** report having preview functions for geospatial data. This remained stable from 2023.
Candidate	**Albania**, **Serbia** and **Ukraine** report having preview functions for tabular data.	**Albania** and **Ukraine** report having a preview function for geospatial data.

(Questions PT20 and PT21)

In most portals, users can activate a 'preview' feature to quickly explore data without needing to download it. This is true of a diverse range of datasets. For example, in **Albania**, users can preview datasets on healthcare centres and fuel imports. In **Sweden**, geospatial data such as air humidity can be viewed, while, in **Estonia**, users can explore data on ports.

Providing feedback on the portal

To encourage continued improvement and usability of the national portal, countries can offer a mechanism for users to provide general feedback, such as a 'Contact us' or 'Feedback' button placed in a visible spot that allows users to send a general comment concerning the portal. Feedback can also be specific to certain datasets. Table 20 presents an overview of how countries responded to the questions on this topic.

Table 20: Countries' responses to questions on portal feedback mechanisms

	Does the national portal offer a mechanism for users to provide general feedback?	*Does the national portal offer a mechanism for users to provide feedback on specific datasets?*	*Does the national portal provide a mechanism for users to rate datasets?*
EU-27	25 Member States (93 %) enable users to provide general feedback on the portal. **Czechia** and **Luxembourg** newly report offering this feature.	22 Member States (81 %) enable users to provide feedback on a specific dataset.	14 Member States (52 %) enable users to rate datasets. **Latvia** and **Poland** newly report offering this feature.
EFTA	All three participating EFTA countries enable users to provide feedback on the portal, with **Switzerland** newly reporting this.	**Iceland** and **Norway** enable users to provide feedback on specific datasets.	None of the participating EFTA countries enables users to rate specific datasets.
Candidate	**Albania** and **Ukraine** enable users to provide general feedback on the portal.	**Albania**, **Serbia** and **Ukraine** enable users to comment on specific datasets. **Albania** is the latest country to report this.	**Ukraine** enables users to rate datasets.

(Questions PT8, PT9 and PT10)

Most countries offer a public contact point on their open data websites, enabling users to directly reach out to the open data team with specific questions, ensuring user privacy in their inquiries. In addition, some countries support public discussion boards, on which users can post comments and view issues or insights shared by others, fostering a spillover effect that enhances community knowledge. These boards allow users to ask questions or provide feedback on the portal as a whole or on individual datasets. Some systems also incorporate a rating feature, whereby users can evaluate datasets using a star or voting system, helping improve data quality and relevance. In **Norway**, users can publicly comment on all the resources available on the portal. If they do not want their feedback published online, users can also directly email the open data team.

Highlight from Sweden – enabling users to directly contact data providers

In **Sweden**, each dataset on the national portal includes a dedicated section where users can discuss the data and ask questions. Additionally, every dataset features a feedback button that allows users to contact the publishing organisation for inquiries, feedback and requests regarding the information on this page. Users can also directly contact the dataset owner through the contact information provided on each data page.

High-value datasets

The reuse of HVDs offers significant benefits to society, the environment and the economy. Promoting these datasets on the portal can help boost the visibility and reuse of these datasets. Table 21 presents an overview of how countries responded to the question on this topic.

Table 21: Countries' responses to the question on HVDs

	Do you promote HVDs on your national portal?
EU-27	20 Member States (70 %) report actively promoting HVDs on their national portals.

(Question PT22)

Non-EU countries were not surveyed on this question, since Commission Implementing Regulation (EU) 2023/138 on HVDs applies only to EU Member States.

Common approaches to promoting HVDs on the national portal include incorporating filtering options to help users easily locate these datasets or using editorial tools such as labels or tags to promote their visibility and encourage reuse. Several countries have also created dedicated sections within their portals to inform users about HVDs and their significance.

For example, **Poland**'s open data portal promotes various types of HVDs, which are graphically marked so that users can filter them. The portal also features a special section focused on HVDs, offering an overview of their characteristics and updates on relevant policy developments. Similarly, **France** employs multiple strategies to highlight high-value data. A dedicated thematic page provides context, linking datasets to their practical applications, and a tagging system facilitates easy filtering. The French portal also includes a progress tracking dashboard, allowing users to monitor the release of public data, including ministerial commitments and HVDs.

Requesting datasets and providing transparency

Users may seek datasets that are not available on the national portal. In this case, it is valuable if they can request specific datasets, such as through a 'request data' button. These requests and their progress status should be presented transparently. Table 22 presents an overview of how countries responded to the questions on this topic.

Table 22: Countries' responses to questions on requesting datasets and providing transparency

	Does the national portal enable users to request datasets?	*Are requests for datasets and their progress status presented in a transparent manner on the national portal?*	*Does the team monitor the extent to which requests result in the publication of the requested data?*
EU-27	22 Member States (81 %) provide the possibility for users to request datasets. This number has decreased by one country, **Serbia,** since 2023.	Like in 2023, 18 Member States (67 %) report that they display the progress of requests on their national portals.	23 Member States (85 %) report that they monitor the results of requests. This number has decreased by one country, **Germany**, since 2023.

	Does the national portal enable users to request datasets?	*Are requests for datasets and their progress status presented in a transparent manner on the national portal?*	*Does the team monitor the extent to which requests result in the publication of the requested data?*
EFTA	Like in 2023, **Norway** reports that it provides the possibility for users to request datasets.	Like in 2023, **Norway** reports that it displays requests on its national portal.	Like in 2023, **Norway** reports that it monitors the status of requests.
Candidate	**Albania**, **Serbia** and **Ukraine** provide the possibility for users to request datasets. **Albania** newly reported enabling this.	**Ukraine** reports that it displays requests on its national portal.	**Serbia** and **Ukraine** report that they monitor the status of requests.

(Questions PT13, PT14 and PT15)

The open data team is often in charge of periodically assessing requests for datasets, tracking them and replying to them. In some countries, this is an automated process whereby requests are sent through standardised forms and dashboards. In other countries, users request datasets via email and the open data team needs to assess the questions manually.

Highlight from Spain – interacting with users

In **Spain**, users can submit requests for data that is not currently available in the catalogue through a user-friendly, dedicated form. These requests are automatically routed to the appropriate public bodies, which evaluate whether the requested data can be published or incorporated into their open data initiatives and future roadmaps.

Users also have the option to support existing requests by clicking the 'join the request' button displayed alongside each dataset request. This collaborative feature encourages a sense of community among users with similar data needs, potentially increasing the priority of popular requests. All requests are managed transparently in the data availability section, where users can follow each request's journey through various status stages: received, assigned, under study, programmed, published and the final outcome, which indicates if the data was released or provides an explanation if it was declined. This section also provides historical tracking.

Over the past year, Spain has actively responded to user data demands, fulfilling 31 new data requests. This approach not only enhances the responsiveness of public data services but also fosters a more engaged and data-driven citizenry.

Actively involving users

Users can be a source of citizen-generated data, including open data that they have processed into new forms. This can help national portals increase the variety of available data and enhance the community's engagement. When new datasets, whether from official or non-official sources, are published, national portals could notify users to enhance the reach of open data. Table 23 presents an overview of how countries responded to the questions on this topic.

Table 23: Countries' responses to questions on actively involving users

	Does the national portal provide the functionality for users to contribute datasets that they have produced or enriched?	*Does the national portal offer the possibility for users to receive notifications when new datasets are available on the national portal?*
EU-27	18 Member States (67 %) report that they enable users to actively publish datasets on the national portal. There has been a sharp decrease in the number of countries that allow users to publish datasets. Unlike in 2023, **Czechia**, **Greece**, **Croatia**, **Italy**, **Malta**, **Romania** and **Slovenia** no longer report offering this feature.	20 Member States (74 %) report that they notify users when new datasets are available.
EFTA	**Norway** reports that it enables users to publish datasets on the national portal. Unlike in 2023, **Iceland** and **Switzerland** no longer report implementing this feature.	**Norway** and **Switzerland** report that they notify users when new datasets are available.
Candidate	**Albania**, **Serbia** and **Ukraine** report that they enable users to publish datasets.	**Serbia** and **Ukraine** report offering notifications on new content being published, with **Serbia** the newest addition to this group.

(Questions PT7 and PT12)

This year, there has been a noticeable decline in the number of users permitted to publish data on national open data portals. Many portals now restrict data publishing rights exclusively to official data providers, limiting contributions from citizens and other independent actors. Conversely, countries are enhancing user engagement by introducing more proactive notification systems, allowing users to be promptly informed whenever a new dataset is published.

In **Sweden**, any user who has created a dataset can publish it on the national portal, along with supporting materials such as documentation or test cases. This is done through the 'admin' tool, which is accessible after logging in. In **Latvia**, users can subscribe to a newsletter to receive notifications when new datasets are uploaded. Meanwhile, in **Portugal**, users can opt to be notified about specific dataset activities by clicking the star button. Notifications are then sent via email and directly to the user's administration area on the portal.

Enhancing the open data culture

To further engage users, national data portals often provide functionality that enables reusers and data providers to interact. At the same time, many national portals provide a space to find information, events and news on relevant open data topics in the country. These features enhance the open data culture by allowing interaction between users and updating them on the ongoing trends in the field. Table 24 presents an overview of how countries responded to the questions on this topic.

Table 24: Countries' responses to questions on enhancing the open data culture

	Does the national portal enable users to find information and news on relevant open data topics in the country?	*Does the national portal offer a mechanism through which users can undertake exchanges with others?*
EU-27	22 Member States (81 %) report publishing information on open data topics in the country.	19 Member States (70 %) report providing a space for dialogue on their national portal, such as a discussion forum. This number has decreased by one country since 2023.
EFTA	**Norway** and **Switzerland** report publishing information on open data topics in the country.	**Norway** reports offering a mechanism for users to exchange information with other users.
Candidate	**Serbia** and **Ukraine** report updating users on open data topics.	**Serbia** and **Ukraine** report enabling users to interact with each other on the national portal.

(Questions PT11 and PT16)

Most countries publish information and updates on open data topics through their national portals. **Lithuania**, for instance, has a dedicated blog page for the latest news. **Ireland** has a news section on its portal and distributes a newsletter.

In terms of dialogue functionality, **Austria**, for example, uses the GitHub platform to facilitate public discussions. Questions are directed to the national open data team, who respond accordingly. By categorising issues based on specific portal components, it becomes easier for other users to search for and participate in relevant discussions. This public format also allows data publishers directly affected by the query to respond to the user. In some cases, countries have decided not to provide this feature. For example, **Finland** has removed the discussion board from its national open data portal due to low usage and significant security concerns. The forum was frequently flooded with fake accounts posting spam and advertisements, requiring extensive manual moderation. Previously, moderation support was provided by Disqus, which could automatically block spam and bots; however, due to EU data protection regulations, Disqus is no longer a viable option, since it is headquartered in the United States and does not comply with EU privacy standards. A thorough evaluation of other open-source solutions revealed similar vulnerabilities that did not meet the Finnish Digital Agency's security policies. As a result, Finland does not plan to reintroduce the discussion board feature in the near future.

Providing examples of open data reuse

Making open data available for reuse is one of the primary purposes of open data portals. Showcasing reuse examples is one way to inspire reusers and stimulate the uptake of open data. Countries may provide the possibility for users to submit their own reuse examples as a way to enrich the showcase on the national portal and give the open data team a better overview of what their datasets are being reused for and how. Table 25 presents an overview of how countries responded to the questions on this topic.

Table 25: Countries' responses to questions on showcasing open data reuse examples

	Does the national portal showcase reuse examples, such as in a designated section of the portal?	*Does the national portal reference the datasets that the showcased reuse examples are based on?*	*Does the national portal provide the possibility for users to submit their own reuse cases?*
EU-27	25 Member States (93 %) report highlighting reuse cases in a designated section of their portals. **Sweden** newly reported doing this.	21 Member States (78 %) report linking reuse cases to the underlying datasets.	21 Member States (78 %) report enabling users to submit their own reuse cases.
EFTA	**Norway** and **Switzerland** report highlighting reuse cases in a designated section of their portals.	**Norway** and **Switzerland** report linking reuse cases to the underlying datasets.	**Norway** and **Switzerland** report enabling users to submit their own reuse cases.
Candidate	**Serbia** and **Ukraine** report highlighting reuse cases in a designated section of their portals.	**Serbia** and **Ukraine** report linking reuse cases to the underlying datasets.	**Serbia** and **Ukraine** report enabling users to submit their own reuse cases.

(Questions PT17, PT18 and PT19)

Most countries showcase reuse examples on their portal (this topic is investigated in more detail in Chapter 4 of this report). For instance, the **Italian** national open data portal tags use cases, enabling users to search for them easily. Additional tags may be applied if the use case is linked to specific events, news articles, data stories or webinars. In **Switzerland**, each reuse case includes a dedicated 'datasets in showcase' section, allowing users to find the referenced datasets used by the reuse case.

5.3. Portal usage

This indicator evaluates whether portal administrators frequently assess the alignment of the portal's design, features and available data with user needs. Although direct feedback from users is useful, it can often be anecdotal. Therefore, this indicator also explores whether systematic monitoring of portal usage is employed to gain a broader insight into user behaviour. Specifically, it looks into whether data on the number of unique visitors, common user profiles, the most accessed datasets, preferred data categories and traffic generated through the portal's APIs is collected and analysed.

User analytics

It is important that countries are aware of the usage of portals to better direct their efforts to increase the supply and reuse of open data. These questions aim to understand whether countries monitor the portal's traffic. Moreover, countries can also perform other activities to better understand the behaviour and needs of users of their portals, such as web analytics, surveys and analysis of social media feeds. Table 26 presents an overview of how countries responded to the questions on this topic.

Table 26: Countries' responses to questions on user analytics

	Do you monitor the portal's traffic?	*Besides monitoring portal traffic, do you perform any further activities to better understand the behaviour and needs of users of your portal?*
EU-27	All 27 Member States report that they monitor the portal's traffic. This number has decreased by one country, **Czechia**, since 2023.	23 Member States (85 %) report that they conduct other activities to understand users' needs.
EFTA	All participating EFTA countries report that they monitor the portal's traffic.	All participating EFTA countries report that they conduct other activities to understand users' needs.
Candidate	All participating candidate countries report that they monitor the portal's traffic.	**Serbia** and **Ukraine** report that they conduct other activities to understand users' needs.

(Questions PT23 and PT25)

Countries use various analytics tools to monitor the popularity of datasets and gain insights into how to improve the quality of the datasets. The most popular tools include Matomo Web Analytics, Google Analytics and Piwik PRO.

Furthermore, social media platforms are widely used to monitor user behaviour, and many countries use surveys and interviews to gather direct feedback from users. **Norway**, for instance, uses a dual approach: first, it uses Monsido for analytics to track portal usage; it then conducts surveys to validate its hypotheses and identify ways to enhance the website based on user needs. **Iceland**, on the other hand, analyses communications from users who contact the open data team. By examining the reasons for contact and compiling statistics on common issues, they can assess whether improvements are necessary.

Enhancing the performance of national portals

Assessing user analytics for insights and following these up with concrete improvements can allow national portals to serve their users better. Similarly, national portals undertake activities to promote the portal and attract new users or new audiences to enhance the impact of open data. Table 27 presents an overview of how countries responded to the questions on this topic.

Table 27: Countries' responses to questions on enhancing the performance of national portals

	Do you use the insights about portal usage and about the behaviour and needs of portal users to improve the portal accordingly?	*Do you undertake any activities to promote the portal and attract new users or new audiences?*
EU-27	24 Member States (89 %) report using insights from users to keep improving the portal.	25 Member States (93 %) report conducting activities to promote and attract new users.
EFTA	**Norway** and **Switzerland** report using user insights to keep improving the portal.	**Norway** and **Switzerland** report conducting activities to promote and attract new users.
Candidate	All candidate countries, **except Bosnia and Herzegovina**, report using user insights to keep improving the portal.	All candidate countries, **except Bosnia and Herzegovina**, report conducting activities to promote and attract new users.

(Questions PT26 and PT27)

User input is essential for identifying current needs and prioritising improvements to enhance national portal performance. In **Denmark**, for example, feedback from users is used to guide developers on which features to implement. Most improvements focus on enhancing metadata and onboarding new authorities based on the demand for specific data. Recently, they introduced the display of data services, a highly requested feature by advanced users. They also added roles like 'Originator' (Ophavsmand) to provide clearer attribution for datasets. In **Luxembourg**, user feedback revealed that outdated datasets were receiving more views than newer, up-to-date ones on the same topics. To address this, documentation for older datasets was updated to redirect users to the latest versions.

Countries take diverse approaches to promoting open data. **Serbia**, for instance, launched a regional open data challenge, requiring participants to use at least one public open dataset to participate. **Slovakia** offers open and free training sessions to attract new users. **Slovenia** organises hackathons, university lectures and events for businesses and the public sector. Similarly, **Romania** promotes its open data portal through webinars, public meetings with academia and the private sector, student-focused information sessions and presentations at relevant events such as the National Committee on e-Government and Red-tape Reduction.

Highlight from Sweden – improving the data portal through user experience

Sweden adopted an innovative, user-centred approach to redesigning its national data portal, collaborating with web consultants who specialise in user experience to ensure that the platform meets the needs of diverse users. This conceptual redesign focused on user-driven design principles, incorporating iterative testing and continuous feedback to enhance both functionality and user satisfaction. In March 2024, Sweden launched the new data portal, featuring a range of significant improvements designed to streamline access and boost usability. Key enhancements include the following.

- **User-friendly design and structure.** A cohesive and consistent design refresh was implemented, making navigation intuitive and visually clear, thereby enhancing the overall user experience.

Highlight from Sweden – improving the data portal through user experience
• **Support and tools section.** This section offers users advanced filtering options, helping them to locate data more efficiently and customise search criteria according to their specific needs. • **Good examples showcase.** Users can now apply to share their successful data reuse cases, highlighting practical examples of data-driven solutions and fostering a sense of community and knowledge exchange. • **Data collaboration hub.** This dedicated area showcases national initiatives and collaborations aimed at positioning data as a strategic resource, encouraging collective efforts and highlighting innovative data reuse. • **Educational resources page.** An easily accessible resource section provides users with educational materials and guides related to data, promoting data literacy and supporting users in developing their data-related skills. • **'Why share data?' section.** This page outlines the benefits of data sharing, relevant regulations and best practices, providing a comprehensive view of how sharing data can drive innovation and transparency. • **Results and follow-ups section.** This page displays key metrics, including metadata quality assessments across various data catalogues, reinforcing the platform's commitment to data quality and continuous improvement. Through this user-focused redevelopment, Sweden's data portal not only enhances accessibility but also supports users in exploring, using and contributing to the nation's data resources, ultimately advancing the strategic use of data as a public asset.

Most popular data domains

Analytics on what users prefer can improve the usability and utility of the portal. This involves monitoring what keywords are used to search for data and content on the portal, as well as monitoring the most and least consulted pages. Similarly, national portals take measures to optimise the search and discoverability of content. Table 28 presents an overview of how countries responded to the questions on this topic.

Table 28: Countries' responses to questions on the most popular data domains

	Do you monitor what keywords are used to search for data and content on the portal?	*Do you take measures to optimise the search and discoverability of content?*
EU-27	24 Member States (88 %) report that they monitor the keywords used in the portal and the most and least consulted pages.	All Member States (100 %) report optimising the discoverability of datasets. This number has decreased by one country, **Croatia**, since 2023.
EFTA	All participating EFTA countries, **except Iceland**, report that they monitor the keywords used in the portal and the most and least consulted pages.	All participating EFTA countries report that they implement measures to improve the discoverability of content.
Candidate	**Serbia** and **Ukraine** report that they monitor the keywords used in the portal and the most and least consulted pages.	**Albania**, **Serbia** and **Ukraine** report that they implement measures to improve the discoverability of content.

	Do you monitor what keywords are used to search for data and content on the portal?	*Do you take measures to optimise the search and discoverability of content?*
	This number has decreased by one country, **Albania**, since 2023.	

(Questions PT28 and PT30)

Monitoring the keywords used in data portal searches can offer insights into user interests and navigation patterns. In **Austria**, this monitoring is enhanced by artificial intelligence models, which provide data for a comprehensive dashboard. **France** takes a similar approach, tracking the most viewed pages and popular new content. A daily top 10 list is shared within the team to identify trending topics that may warrant further development, such as writing dedicated articles or highlighting specific datasets. This also helps to determine when data exploration is needed. For example, certain datasets are popular because users seek information rather than raw data, guiding decisions on whether to redirect users to different datasets or create tailored data exploration tools.

To improve searches and content discoverability, **Finland** has upgraded its portal's search engine, with better support for both Finnish and Swedish users. Additionally, the national DCAT-AP extension requires a set of mandatory, optional and recommended attributes, further enhancing data findability.

Application programming interfaces

APIs allow reusers to programmatically access metadata and thereby to automatically execute searches and process data. National portals can run analytics on this API usage in the same way as they do for regular portal traffic. Moreover, metadata on the portal can be made available in clear, plain language to enable both humans and machines to read and understand it. Table 29 presents an overview of how countries responded to the questions on this topic.

Table 29: Countries' responses to questions on APIs

	Do you run analytics on API usage?	*Is the metadata on your portal available in clear, plain language to enable both humans and machines to read and understand it?*
EU-27	17 Member States (63 %) report analysing API usage.	All Member States (100 %) have metadata that is written in language that is understandable to humans and machines, like in 2023.
EFTA	**Iceland** reports analysing API usage.	All participating EFTA countries report providing human-readable metadata.
Candidate	**Albania**, **Serbia** and **Ukraine** report analysing API usage.	**Albania**, **Serbia** and **Ukraine** report providing human-readable metadata.

(Questions PT24 and PT31)

APIs allow different software systems to communicate and exchange data. For instance, a government portal might have APIs that let external developers access public data or integrate services. Analytics on API usage involve collecting data on various aspects of API usage, such as how often the API is being accessed, which services or systems are using the API, the performance of the API (response time and error rates) and patterns in API calls over time (e.g. peak usage hours). In **Cyprus**, Matomo is employed to analyse API usage, providing insights into the popularity of specific APIs, such as the page titles and uniform resource locators (URLs) being accessed. Additionally, it gathers detailed information about reusers, including their internet protocol (IP) address; the request date, time and location; and device specifics like operating system, model, browser and screen resolution. The report also captures the unique visitor identification, along with the timing and frequency of all visits made by each user.

The majority of countries provide metadata in forms for both humans and machines to read and understand, like in **Germany**, where the metadata is human-readable and is accompanied by a link to a machine-readable resource description framework (RDF) file.

5.4. Data provision

This indicator measures the level of contributions from data providers to national portals and the initiatives implemented to encourage their participation, including the connections between national and regional/local portals. It also explores how open data portals help users find citizen-generated data and data that cannot be publicly shared. Finally, it evaluates how effectively the national portal's infrastructure allows access to real-time and dynamic data.

Official data providers

Public sector bodies are the primary suppliers of open data. Therefore, it is interesting to assess to what degree public sector data providers contribute data to the national portal. In addition to open data, national portals can also show users if data exists that cannot be made available as open data. A feature like this can help reduce freedom-of-information requests for data that cannot be opened. Table 30 presents an overview of how countries responded to the questions on this topic.

Table 30: Countries' responses to questions on official data providers

	To what degree do public sector data providers contribute data to the portal?	*Does the national portal allow users to see if data exists that cannot be made available as open data?*
EU-27	22 Member States (81 %) report that all or the majority of public sector providers supply data to the national portal.	19 Member States (70 %) report that they show users if data exists that cannot be made available as open data. **Germany**, **Croatia** and **Latvia** newly report this.
EFTA	**Norway** and **Switzerland** assess that approximately half of data providers supply data to the portal. **Iceland** reports that only public sector bodies supply data to the national portal.	All the participating EFTA countries report that they show users if data exists that cannot be made available as open data.
Candidate	**Ukraine** reports that all public sector providers supply data to the national portal. **Albania** and **Serbia** assess that	None of the participating candidate countries report showing users if data exists that cannot be made available as open data.

	To what degree do public sector data providers contribute data to the portal?	*Does the national portal allow users to see if data exists that cannot be made available as open data?*
	approximately half of data providers supply data to the portal.	

(Questions PT32 and PT40)

In general, official data providers make data available on the central portal. This is achieved through ongoing efforts by national portal teams. For example, in the **Netherlands**, public sector data providers are generally proactive in publishing their datasets on the national data portal. Most organisations automatically synchronise their internal catalogues with the portal. However, ongoing relationship management is essential to ensure data owners consistently upload their datasets. In **Czechia**, the legislation mandates that all open data must be registered in the national open data portal. As a result, the portal includes datasets from central, regional and local providers, who directly register their data. After initial registration, the portal can automatically harvest updates and new information.

Some countries also publish lists of data that exist but are not available as open data. In **Italy**, for example, the national data portal features a specific section for public administration databases that are not available as open data. Additionally, the portal is linked to the catalogue for spatial data, which contains both open and restricted datasets. For open data, the corresponding metadata is also made accessible via the dati.gov.it portal, using the DCAT-AP standard for geographical metadata.

Non-official data providers

Some countries also allow non-official providers to contribute data to the portal, such as community-sourced / citizen-generated data. Table 31 presents an overview of how countries responded to the question on this topic.

Table 31: Countries' responses to the question on non-official data providers

	Does the national portal provide a way for non-official data to be published?
EU-27	17 Member States (62 %) report allowing the publication of non-official data on their portal. **Czechia**, **Germany**, **Ireland**, **Croatia**, **Slovakia** and **Sweden** newly report this.
EFTA	None of the EFTA countries report allowing the publication of data from non-official providers on the national portal.
Candidate	**Serbia** and **Ukraine** report allowing the publication of non-official data on their portal. This number has increased by one country, **Ukraine**, since 2023.

(Question PT39)

Often, national portals publish non-official datasets in the same catalogue as official datasets and use tags to indicate when datasets stem from non-official sources. For example, in **Croatia**, any user can apply to publish data through the national portal by submitting a designated form. Similarly, **Estonia** has no distinction between official and non-official data; instead, the focus is on the organisation or

individual publishing the data. In **France**, publishers are identified with a specific label to distinguish official from non-official sources.

Assistance for data providers

By identifying data providers who have not yet published data on the national portal and taking concrete actions to assist them, national portals can increase the supply of open data. Table 32 presents an overview of how countries responded to the questions on this topic.

Table 32: Countries' responses to questions on assistance for data providers

	Do you identify the data providers that are not yet publishing data on the national portal?	*Were there concrete actions taken to assist these data providers with their publication process?*
EU-27	All Member States (100 %) report that they identify the data providers not yet publishing data on the national portal.	26 Member States (96 %), **all except Lithuania**, report that they take concrete actions to assist these data providers with their publication process.
EFTA	All participating EFTA countries report that they identify the data providers not yet publishing data on the national portal.	All participating EFTA countries report that they take concrete actions to assist these data providers with their publication process.
Candidate	All candidate countries, **except Bosnia and Herzegovina**, report that they identify the data providers not yet publishing data on the national portal.	All participating candidate countries, **except Bosnia and Herzegovina**, report that they take concrete actions to assist these data providers with their publication process.

(Questions PT33 and PT34)

Countries support data providers in publishing datasets on national portals through various methods, including by providing general guidelines, online tutorials and frequently-asked-questions pages or organising ad hoc meetings. In **Portugal**, for example, tutorials on registration, publication and reuse are available, and organisations receive direct assistance for more complex inquiries. In **Albania**, new publishers can email their data for manual insertion by the open data team, which handles publication on the portal. Technical support is provided for automatic publication through electronic systems.

Regional and local data sources

National portals primarily focus on data provided by national-level sources. However, regional and local datasets can offer detailed, context-specific insights on a range of subjects. Making these regional and local datasets accessible through national portals can promote their discovery and broader reuse. Table 33 presents an overview of how countries responded to the questions on this topic.

Table 33: Countries' responses to questions on regional and local datasets

	Besides the national open data portal, are there other regional and local portals?	*Are regional and local portals and their data sources discoverable via the national portal?*	*To what degree are regional and local sources harvested automatically?*
EU-27	24 Member States (88 %) report that there are other regional and local portals besides the national open data portal.	22 countries (81 %) report that regional and local sources are discoverable via the national portal.	17 Member States (63 %) report that all or the majority of regional and local datasets are harvested automatically. 5 Member States (19 %) indicated that this question was not applicable, mainly because there are no regional bodies given the size of their countries.
EFTA	All participating EFTA countries report that regional and local portals exist in their country. **Iceland** newly reports this.	All participating EFTA countries report that regional and local sources are discoverable via the national portal. **Iceland** newly reports this.	**Norway** reports that all regional and local datasets are harvested automatically. For **Switzerland**, this is true of the majority of datasets. **Iceland** reports that none of the regional and local datasets are automatically harvested.
Candidate	All participating candidate countries report that regional and local portals exist in their country.	**Serbia** and **Ukraine** report that regional and local sources are discoverable via the national portal.	**Ukraine** reports that all regional and local datasets are harvested automatically. For **Sebia**, this is true of the majority of datasets.

(Questions PT35, PT36 and PT37)

A national open data portal can play a crucial role in promoting open data across the country. These portals often serve as a comprehensive one-stop shop, and most countries make regional and local data discoverable through their national portals. For example, in **Germany**, datasets from various regions are accessible through the main portal and can be easily filtered for specific locations. Some countries, such as **Luxembourg** and **Malta**, do not have regional data portals, mainly due to the smaller size of the country and the fact that there are no regions.

In many cases, datasets from smaller regional and local portals are automatically harvested after agreements are made with local authorities. For example, in **Spain** in 2024:

- 20 regional initiatives contributed 42 % of the total data in the national catalogue, with 99 % of these datasets being automatically harvested;
- 102 local initiatives contributed 17 % of the total data, also with 99 % of the datasets harvested automatically.

However, in some cases, like in **Denmark**, automatic harvesting is not implemented due to time and resource constraints on both sides, making it difficult to align data models and agree on certain technical specifications.

Access to real-time and dynamic data

Dynamic data is information that evolves over time and is updated periodically as fresh data points are collected, like weekly reports on unemployment figures. In contrast, real-time data involves continuous updates at short intervals, with examples including air quality readings, live weather reports and transportation or traffic details. This type of data plays a crucial role in various applications, such as traffic-optimised navigation systems or economic forecasting models. Table 34 presents an overview of how countries responded to the question on this topic.

Table 34: Countries' responses to the question on real-time and dynamic data

	Does the national portal include datasets of real-time or dynamic data?
EU-27	24 Member States (89 %) report that they offer real-time or dynamic data on their portal. **Malta** newly reports this.
EFTA	All participating EFTA countries offer real-time or dynamic data on their portal.
Candidate	All participating candidate countries, **except Bosnia and Herzegovina**, report offering real-time or dynamic data on their portal.

(Question PT38)

Most countries have real-time or dynamic data on their national portals. In **France**, for example, one of the most successful applications of real-time data has been in the transportation sector. The portal transport.data.gouv.fr showcases reuse examples based on real-time transport data. The task force behind the portal has undertaken substantial efforts to promote real-time data use, offering documentation on standardisation, maintaining an inventory of real-time data that still needs to be standardised and fostering dialogue with stakeholders to advance adoption.

Similarly, in **Lithuania**, real-time road traffic and weather conditions data is accessible through the local infrastructure portal eismoinfo.lt. This data is searchable and downloadable from the national data portal's metadata catalogue at data.gov.lt, which provides a source URL for traffic intensity information. The data is dynamically updated as it is registered in the primary database and is presented to citizens through a user-friendly application, enhancing accessibility and engagement.

5.5. Portal sustainability

This indicator investigates the strategies and procedures established to maintain the long-term sustainability of national portals. It encompasses initiatives aimed at increasing the visibility of these portals, efforts to gauge user satisfaction and incorporate their feedback, and mechanisms for monitoring and enhancing the performance of the national portal.

Strategy and visibility

A key step in ensuring the long-term sustainability of national portals is developing a strategy or action plan that outlines the activities and mechanisms needed for continued operation. These plans often focus on securing funding, maintaining key personnel, fostering public engagement and ensuring that the portal meets the needs of its core audience. Table 35 presents an overview of how countries responded to the questions on this topic.

Table 35: Countries' responses to questions on strategy and visibility

	Does the national portal have a strategy to ensure its sustainability?	*Is your national portal active on social media?*
EU-27	22 Member States (81 %) report that the national portal has a strategy to ensure its sustainability.	21 Member States (78 %) are active on social media to increase the visibility of the portal. **Germany** and the **Netherlands** did not report doing this, a change from the previous year.
EFTA	**Norway** and **Switzerland** report that the national portal has a strategy to ensure its sustainability.	All participating EFTA countries are active on social media.
Candidate	All participating candidate countries, **except Bosnia and Herzegovina**, report having a strategy to ensure the portal's sustainability. **Albania** newly reports this.	All participating candidate countries, **except Bosnia and Herzegovina**, report being active on social media.

(Questions PT41 and PT42)

In many countries, the national portal serves as a cornerstone of the national open data policy or strategy. In **Ukraine**, for example, the Ministry of Digital Transformation has taken steps to ensure the portal's sustainability by preparing a technical task and a technical and economic justification for its modernisation. Key documents include the results of the portal audit, technical task and technical and economic justification. Additionally, Ukraine's draft *Strategy for the development of the open data sphere for 2025–2027* sets out an operational action plan for each strategic goal. It outlines specific measures, expected results, deadlines and responsible actors. One of the key strategic goals is the enhancement of the accessibility and capabilities of the unified state web portal of open data.

Furthermore, the majority of countries are available on social media. X, Facebook and LinkedIn are the most used social media platforms. These channels are used to boost the public's awareness of open data and directly interact with users and data enthusiasts.

Availability of documents to the public

National portals can make their portal's source code and relevant documentation and artefacts available to the public (e.g. on platforms such as GitHub or GitLab) to foster transparency and promote open-source initiatives. Table 36 presents an overview of how countries responded to the question on this topic.

Table 36: Countries' responses to the question on the public availability of documents

	Are the portal's source code and relevant documentation and artefacts made available to the public?
EU-27	Like in 2023, 25 Member States (93 %) report publicly sharing the portal's source code and relevant documentation.
EFTA	All participating EFTA countries report publicly sharing the portal's source code and relevant documentation.
Candidate	**Bosnia and Herzegovina** and **Serbia** report publicly sharing the portal's source code and relevant documentation.

(Questions PT43)

The great majority of the countries interviewed report that they provide such documents on GitHub. For instance, **Belgium** makes them available for back-end tools on GitHub, while the web content management system front end relies on the Drupal distribution OpenFed.

Monitoring performance

To track progress and plan improvements, national portals can assess various characteristics of the data published on their portals, such as the number of datasets available, their distribution across categories, the presence of real-time data and how these aspects have evolved over time. Additionally, performance and usage reports can provide valuable evidence to support continued initiatives and justify investments. Table 37 presents an overview of how countries responded to the questions on this topic.

Table 37: Countries' responses to questions on monitoring performance

	Do you monitor the characteristics of the data published on the portal, such as the distribution across categories, static versus real-time data, and how these change over time?	*Does this monitoring enable the portal team and/or data providers to take action to improve their performance on the national portal?*
EU-27	25 Member States (93 %) report that they monitor the characteristics of the data published on the portal. **Denmark**, **Latvia** and **Slovakia** newly report this, and **Germany** no longer reports doing this in 2024, a change from the previous year.	25 Member States (93 %) report that this monitoring enables the portal team and/or data providers to take action to improve their performance on the national portal.

	Do you monitor the characteristics of the data published on the portal, such as the distribution across categories, static versus real-time data, and how these change over time?	*Does this monitoring enable the portal team and/or data providers to take action to improve their performance on the national portal?*
EFTA	**Norway** reports that it monitors the characteristics of the data published on the portal.	**Norway** responded this monitoring enables the portal team to take action to improve their performance on the national portal.
Candidate	All participating candidate countries, **except Bosnia and Herzegovina**, report that they monitor the characteristics of the data published on the portal. **Albania** newly reports this.	All candidate countries, **except Bosnia and Herzegovina**, report that this monitoring enables the portal team and/or data providers to take action to improve their performance on the national portal.

(Questions PT44 and PT45)

The majority of countries have implemented a monitoring framework to continuously improve the portal. This particularly involves monitoring metadata, such as analysing both summary and specific statistics on metadata to track any missing DCAT-AP attributes across datasets. In **Sweden**, for example, the statistics at a glance section includes information on the number of organisations publishing data, those with the most published datasets and the five most common data categories.

Many countries also analyse performance metrics to further enhance portal usability. In **Serbia**, for example, monitoring covers aspects such as data formats, quality, description and update frequency. This information is shared with data providers, along with recommendations for improvement. In **Czechia**, dashboards tracking the quality of data and metadata are accessible to the national team and data providers. The team monitors these dashboards regularly, addresses irregularities with providers – especially members of the Open Data Working Group – and encourages improvements. Performance results from major providers are also published annually in the *Annual Report of the State of Open Data* in an easy-to-understand format.

Highlight from Lithuania – monitoring dashboard

Lithuania provides an example of how the characteristics of the data published on the portal, such as the distribution across categories and static versus real-time data, can be monitored over time (Figure 12).

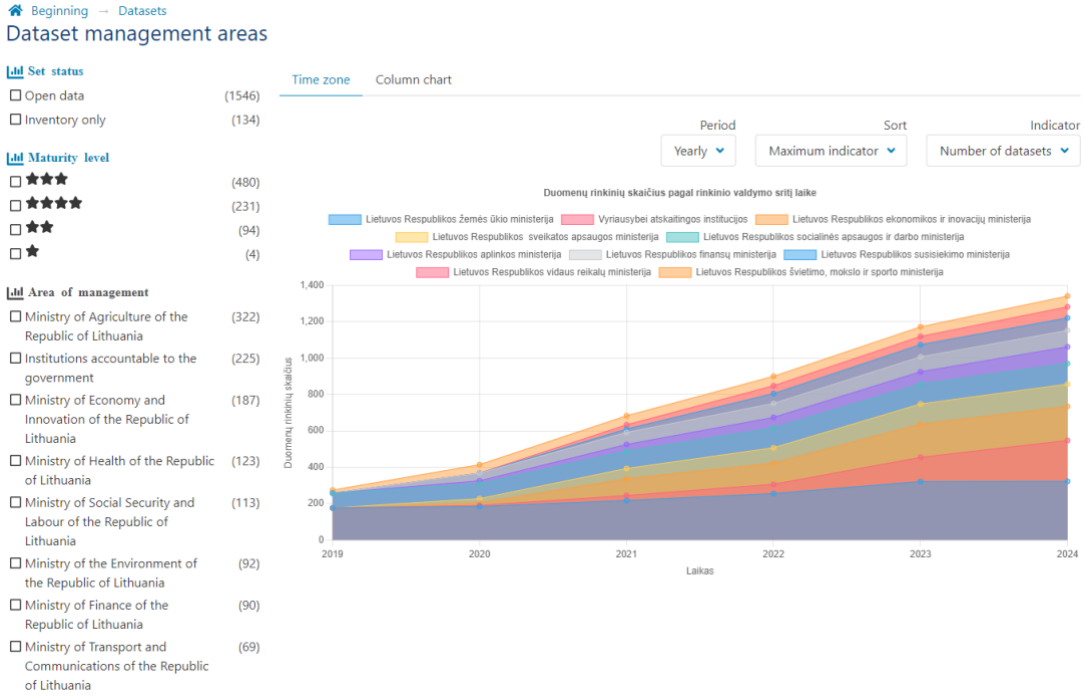

Figure 12: Lithuania's open data monitoring dashboard

5.6. Pilot indicator: automated tests of portal performance

Pilot indicator – automated tests

In addition to gathering qualitative information on portals, there are technical and quantitative methods to evaluate portals on objective metrics. Such tests can complement the insights derived from the questionnaire and extend the scope of the ODM report. As a pilot, four indicators (mobile friendliness, page speed, security and web accessibility) were measured for this year's report but did not contribute to countries' maturity score. These tests were conducted on the portal URLs listed in Table 18.

Mobile friendliness assesses how well a website adapts to mobile devices, ensuring a seamless user experience for visitors on smartphones and tablets. This indicator is operationalised through the Bing mobile friendliness tool. In summary:

- **94 %** of all portals are mobile friendly;
- **100 %** of all EU portals are mobile friendly;
- portals from **Albania** and **Iceland** were not evaluated as mobile friendly by this automated tool.

Page speed assesses a selection of speed and performance standards from Google's PageSpeed Insights. The results can be summarised as follows.

- Of all portals, **85 %** pass the **time to interactive** test. This test measures how long it takes a page to become fully interactive. Sites are considered fully interactive when (a) the page displays useful content, (b) event handlers are registered for the most visible page elements and (c) the page responds to user interactions within 50 milliseconds.
- Of all portals, **82 %** pass the **first contentful paint** test. This test measures the time from when the user first navigated to the page to when any part of the page's content is rendered on the screen. Sites should strive to have a first contentful paint of 1.8 seconds or less.
- Of all portals, **52 %** pass the **largest contentful paint** test. This test reports the render time of the largest image, text block, or video visible in the viewport, relative to when the user first navigated to the page. To provide a good user experience, sites should strive to have a largest contentful paint of 2.5 seconds or less.
- Of all portals, **33 %** pass the **cumulative layout shift** test. This test measures the biggest group of unexpected layout changes that happen on a web page while it is loading. To provide a good user experience, sites should strive to have a cumulative layout shift score of 0.1 or less.

Security assesses several complementary metrics related to basic cybersecurity hygiene using the publicly available security testing tool by the Dutch national government called internet.nl. The results can be summarised as follows.

- Of all portals, **15 %** pass the **modern address (IPv6)** test. This test evaluates if the website is reachable for visitors using a modern internet address (IPv6), making it fully part of the modern internet.
- Of all portals, **27 %** pass the **domain name system security extensions** test. This test evaluates if the website's domain is signed with a valid signature, which protects against manipulated translation from the domain into rogue internet addresses.
- Of all portals, **12 %** pass the **secure connection** test. This test evaluates if information in transit between the website and its visitors is protected against eavesdropping and tampering.
- Of all portals, **3 %** pass all three tests.

Web accessibility assesses the accessibility status of websites (including for individuals with disabilities) using the open-source Axe-core tool. The accessibility criteria are based on the web content accessibility guidelines (WCAGs). The results can be summarised as follows.

- Of all portals, **53 %** pass the **alternative text (WCAG 1.1.1)** test. This test evaluates whether the website offers text alternatives for non-text content, enabling it to be transformed into formats like large print, braille, speech, symbols or simplified language to meet diverse user needs.
- Of all portals, **47 %** pass the **colour contrast (WCAG 1.4.3)** test. This test evaluates if the visual presentation of text and images on the website has a contrast ratio of at least 4.5:1. Exceptions include cases of large text, text or images part of an inactive user interface component, and text that is part of a logo or brand name.
- Of all portals, **75 %** pass the **page/document title (WCAG 2.4.2)** test. This test evaluates if the website has titles that describe the topic or purpose.
- Of all portals, **50 %** pass the **link name (WCAG 2.4.4)** test. This test evaluates the clarity and accessibility of links on a website.
- Of all portals, **69 %** pass the **language attribute (WCAG 3.1.1)** test. This test evaluates if the primary language of each web page is specified in a way that can be identified by software, such as screen readers and search engines.
- Of all portals, **69 %** pass the **valid language code (WCAG 3.1.2)** test. This test evaluates if the language of each passage or phrase in the website's content can be identified and defined by software, allowing assistive technologies (e.g. screen readers) to accurately convey content in the appropriate language.
- Of all portals, **50 %** pass the **name, role, value (WCAG 4.1.2)** test. This test evaluates the accessibility and compatibility of user interface components of the website with assistive technologies.
- Of all portals, **22 %** pass all seven of the above tests.
- Of all EU portals, **27 %** pass all seven of the above tests.

Chapter 6: Open data quality

The quality of the data refers to the overall state of the dataset. Preparing high-quality data includes dealing with missing values and other inaccurate elements, harmonising data structures and making the data available in accessible formats. Data quality also depends on the quality of its deployment on national portals, which can be assessed by looking at the use of aspects such as open data licences, machine-readable data formats, unique resource identifiers (a character sequence that identifies a dataset) and a linked data approach (a set of design principles for relating datasets to one another).

In addition to the data itself, high-quality data is accompanied by good descriptions. Such descriptive data is called metadata and gives information about other data, such as author, date and keywords. Specifications such as the Data Catalog Vocabulary – Application Profile (DCAT-AP) – which was designed to describe public sector datasets in Europe and is, therefore, the reference specification in the open data maturity (ODM) assessment methodology – define the structure and content of metadata descriptions and aim to make public sector data more easily searchable across borders and sectors.

Data that is high quality has greater value. This value derives from characteristics such as being easier for reusers to analyse and visualise. High-quality metadata similarly aids reuse by making datasets more discoverable, since search engines can better match the data's description with a user's search terms.

The **quality** dimension of the ODM assessment encourages national portals to publish datasets with high-quality data and metadata. The ODM methodology emphasises metadata quality, since national portals aim to make datasets discoverable and harvest metadata. The methodology also investigates whether portal managers have materials and processes to assist and incentivise data publishers to provide high-quality data.

In brief, the **quality** dimension assesses the measures adopted by portal managers to ensure the systematic and timely harvesting of metadata and the monitoring mechanisms in place to ensure the publication of metadata that is compliant with the DCAT-AP metadata standard and several deployment quality requirements. Table 38 summarises the key elements of the quality dimension.

Table 38: Indicators of the quality dimension

Indicator	Key elements
Metadata currency and completeness	A systematic approach is in place to ensure that metadata is up to date. Programmes that harvest metadata automatically are used to ensure that changes at the source are reflected with minimal delay on the national portal. The portal provides access to a vast range of historical and contemporary data. Preparations are under way to ensure that high-value data is interoperable with high-value datasets (HVDs) from other countries.
Monitoring and measures	Mechanisms are in place to monitor metadata quality on the national portal and compliance with licensing standards. Measures are in place to assist data providers in publishing high-quality metadata and choosing the right type of licence for their data.
DCAT-AP compliance	Compliance with the DCAT-AP standard regarding mandatory, recommended and optional classes is monitored. Guidelines and learning materials help data providers in ensuring compliance with DCAT-AP.
Deployment quality and linked data	A model is used to assess the quality of data and metadata deployment. The percentage of published open data that complies with specific deployment quality requirements, including having links to other data sources, is known, and improvements in terms of deployment are monitored.

This chapter will first present overall performance on the policy dimension and then provide a summary of the results and best practices for each indicator.

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6.1. Overall performance on the quality dimension

The quality dimension is the least mature dimension of the ODM assessment according to the EU-27 average in 2024 (Figure 13). The average maturity of EU Member States in the quality dimension is 80 %. This is a 2 percentage point (pp) decrease from 2023, primarily driven by a 6 pp decrease in the monitoring and measures indicator and a 4 pp decrease in the DCAT-AP compliance indicator. These decreases may be attributed to the introduction of 11 new questions or criteria related to the quality dimension in this year's questionnaire, which introduced a higher set of requirements that were not previously measured. In addition, several countries reported lower metadata quality scores on the same questions asked last year.

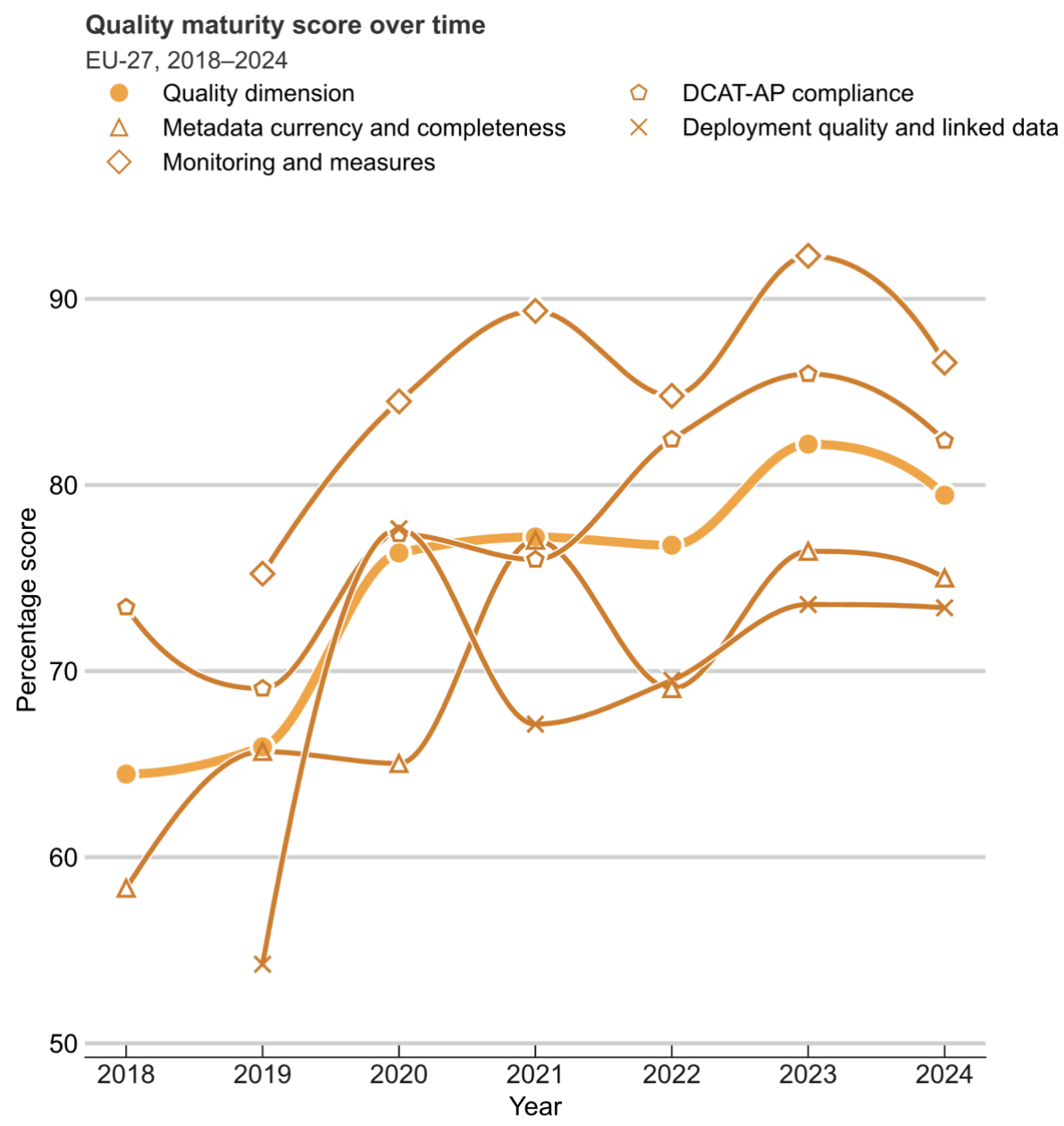

Figure 13: The EU-27 average score on the quality dimension decreased year-on-year but is still more mature than in years before 2023

In terms of individual country performance, **France** (100 %) is the most mature in the quality dimension, achieving full points in all four of the underlying indicators (Figure 14). **Latvia** (95 %) and **Ukraine** (94 %) follow closely, both demonstrating full maturity (100 %) in the monitoring and

measures and the DCAT-AP compliance indicators. In addition, **Denmark** (92 %) and **Poland** (91 %) are also notable performers, both achieving above 90 % maturity in this dimension. Demark is the only country besides France to achieve 100 % maturity on the deployment quality and linked data indicator, while Poland scores full points on the monitoring and measures and the DCAT-AP compliance indicators. Overall, 15 Member States score above the EU average of 80 %.

Highlight from France – automated metadata harvesting

One of the key practices highlighted in this year's report is the use of fully automated harvesting systems for metadata, whereby metadata is updated from the source rather than edited manually.

France ensures that 100 % of the essential metadata on its national portal, data.gouv.fr, is obtained automatically from the source through a comprehensive and robust system. The platform offers several methods for data publication:

- direct publication,
- publication via application programming interfaces (APIs),
- publication through harvesting.

Data.gouv.fr supports the harvesting of various metadata formats, including DCAT, Comprehensive Knowledge Archive Network (CKAN) and GeoNetwork. Data providers can set up a harvester, which the data.gouv.fr team must then validate to ensure accuracy and compatibility. This process involves establishing the mapping of fields for essential metadata while retaining additional properties for traceability.

Once harvesters are properly configured, data.gouv.fr can retrieve 100 % of the essential metadata for their model. Currently, harvested data accounts for approximately 50 % of the data.gouv.fr catalogue, highlighting the effectiveness and efficiency of this automated system in maintaining up-to-date and accurate metadata on the national portal. **Read more about this trend in Section 6.2**

Serbia (+ 17 pp), **Latvia** (+ 14 pp) and **Belgium** (+ 5 pp) demonstrated the greatest year-on-year improvement in the quality dimension. **Serbia's** improvement can be attributed to substantial progress on the DCAT-AP compliance indicator (+ 50 pp). Serbia now reports that it investigates the most common causes of non-compliance with DCAT-AP standards. Additionally, 90 % of Serbia's datasets now include metadata referencing a web page where the data can be accessed. Serbia also achieved a 6 pp increase in the deployment quality and linked data indicator. This increase can be attributed to the recent introduction of a model for assessing the quality of data deployment in the country.

Highlight from Serbia – discussion modules to improve metadata quality

One of the trends highlighted in this year's report is the use of data quality assessment techniques that either combine or go beyond the widely used 5-star open data model and the findable, accessible, interoperable and reusable (FAIR) principles.

In **Serbia**, each dataset comes with a discussion module through which users can share feedback regarding datasets. This feature allows users to share positive and negative opinions, report anomalies and directly suggest improvements to the dataset provider. Serbia uses this discussion module to facilitate more in-depth and actionable feedback, helping to improve the quality of data over time. This enables a rich dialogue between users and data providers, promoting continuous data quality improvement. See an example of the discussion module in action with the Address Register, a fundamental public register containing data on streets (determined by local government decisions) and house numbers across the Republic of Serbia. **Read more about this trend in Section 6.5.**

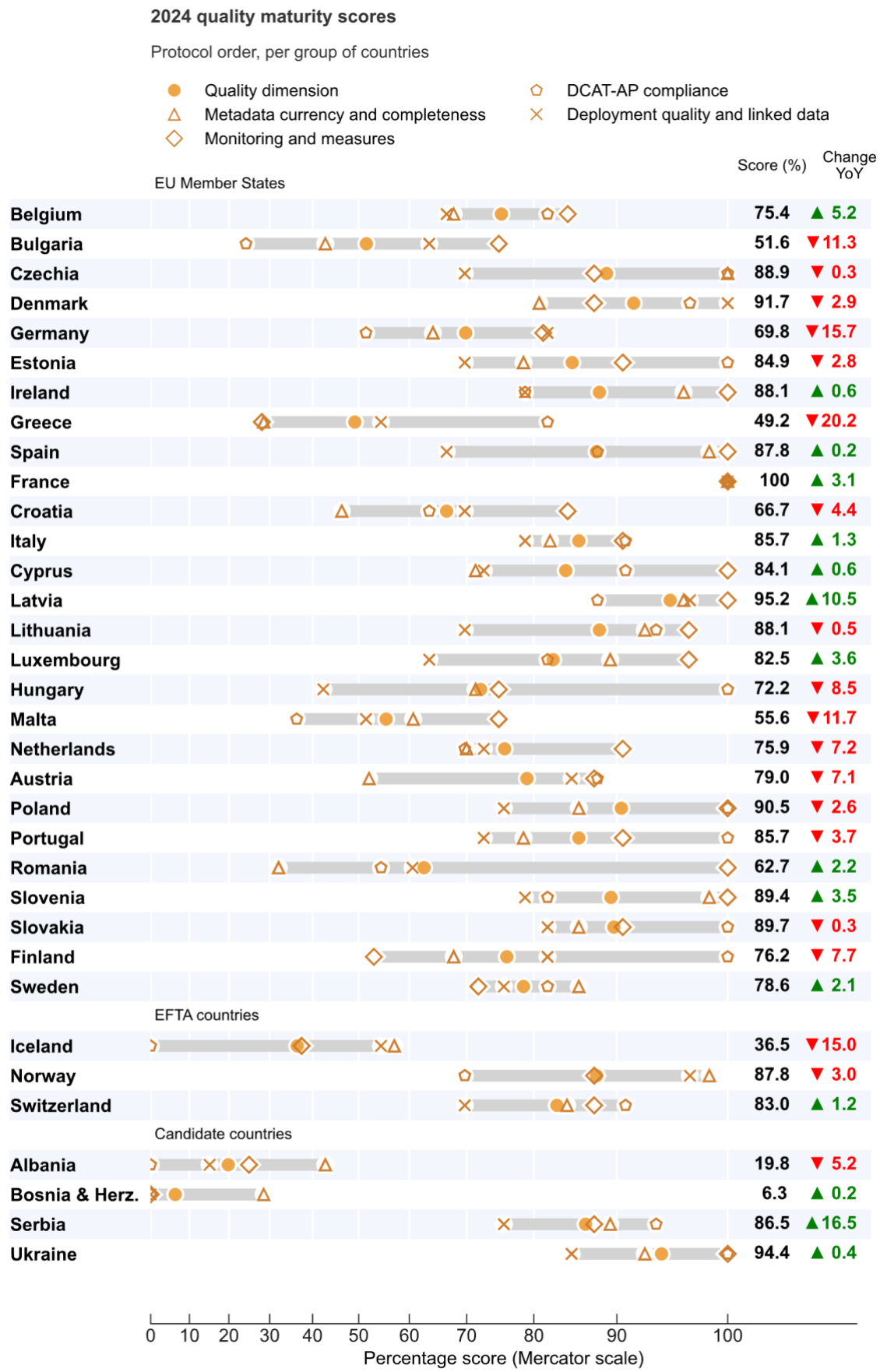

Figure 14: The scores of the majority of countries decreased on the quality dimension in 2024. (YoY: year-on-year).

Latvia's increase in its score on the quality dimension can be attributed to its 25 pp increase in the DCAT-AP compliance indicator. Additionally, Latvia saw a 19 pp increase in the monitoring and measures indicator, which may be attributed to its recently starting to publish information on the quality of its metadata on its open data portal. **Belgium's** increase in its score on the quality dimension can be attributed to its 21 pp increase in the metadata currency and completeness indicator and 13 pp increase in the deployment quality and linked data indicator.

Highlight from Belgium – enhancing metadata through automated pipelines
One of the key practices highlighted in this year's report is the use of an automatic metadata harvesting process that is operated under a centralised model, whereby multiple sub portals are interconnected under a single catalogue. In **Belgium**, using command line tools, metadata is automatically collected and then enhanced through SPARQL Protocol and RDF Query Language (SPARQL) queries and Simple Knowledge Organisation System (SKOS) data, which helps improve the structure and quality of the metadata. Once enhanced, the metadata is pushed on GitHub (a web-based platform for version control and collaboration), where different teams can access it. Finally, data.europa.eu collects the enhanced metadata from GitHub, ensuring that high-quality, standardised metadata is available at the European level. This workflow supports both automation and the enhancement of metadata quality across various systems. **Read more about this trend in Section 6.2.**

6.2. Metadata currency and completeness

This indicator assesses the extent to which countries systematically ensure that their data and metadata are up to date. The indicator also investigates automatic harvesting processes, which ensure that changes at the data source are reflected with as little delay as possible on the portal where the dataset is made discoverable. Furthermore, the completeness of data that has a time component and preparations to ensure that HVDs are interoperable with other datasets on the portal are also evaluated by this indicator.

Currency of metadata

Metadata plays a crucial role in enhancing the usability and reliability of open data, and its timely update is essential for maintaining data relevance and accuracy. A predefined approach to ensuring that metadata remains up to date involves implementing systematic processes and mechanisms tailored to the specific characteristics and update frequency of different datasets. An efficient method is automatic metadata sourcing, which is when metadata is generated and updated directly from the data source without manual intervention. By adopting these practices, organisations can ensure that metadata remains accurate, relevant and aligned with the characteristics and requirements of each dataset. Table 39 presents an overview of how countries responded to the questions on this topic.

Table 39: Countries' responses to questions on the currency of metadata

	Is there a predefined approach to ensure that metadata is kept up to date?	*What percentage of the metadata on the national portal is obtained from the source automatically rather than edited manually?*	*What is the average delay from when the metadata describing a dataset is updated at the source to when the change is visible on the portal?*
EU-27	26 Member States (96 %), **all except Bulgaria**, report having a predefined approach to ensuring that metadata is kept up to date.	Six Member States (22 %) report that 100 % of the metadata on their national portals is obtained automatically from the source. Five Member States (19 %) indicate that at least 90 % of their metadata is sourced automatically, while four Member States (15 %) report that at least 70 % of their metadata is sourced automatically.	19 Member States (70 %) report that the average delay from when the metadata describing a dataset is updated at the source to when the change is visible on the portal is less than one day. Five Member States (19 %) indicate that this delay is typically less than one week. **Croatia** and **Romania** note that the average delay is up to one month, while **Greece** reports that it can extend beyond one month.
EFTA	All three participating EFTA countries report having a predefined approach to keeping metadata up to date.	**Norway** and **Switzerland** report that at least 90 % of the metadata on their national portals is obtained automatically from the source. **Iceland** reports that this figure is less than 30 % of the metadata.	**Norway** and **Switzerland** report that the average delay in updating metadata from the source is less than one day. **Iceland** reports that this delay can extend beyond one month.
Candidate	**Albania**, **Serbia** and **Ukraine** report having a predefined approach to keeping metadata up to date.	**Ukraine** reports that at least 50 % of the metadata on its national portal is obtained automatically from the source. **Serbia** indicates that this figure is at least 30 %, while both **Bosnia and Herzegovina** and **Albania** report that less than 30 % is sourced automatically.	**Serbia** and **Ukraine** report that the average delay in updating metadata from the source is less than one day. **Bosnia and Herzegovina** and **Albania** report that this delay can extend beyond one month.

(Questions Q1, Q2 and Q3)

To ensure that metadata is kept up to date, most countries rely on automated harvesting systems, whereby data is continuously updated from the source. Many countries harvest metadata under a centralised model, whereby multiple sub portals are interconnected under a single (national) catalogue. This automated harvesting process comes in various forms. For example, **Estonia** and **Switzerland** report relying on a daily job scheduler, **Slovakia** conducts nightly updates via the LinkedPipes technology, and **Luxembourg** and **Slovenia** report utilising daily scripts. **Estonia**, **France**, **Luxembourg**, **Portugal** and **Romania** report using APIs to facilitate metadata harvesting. **Finland**, **France**, **Ireland**, **Luxembourg**, **Norway**, **Spain** and **Switzerland** note that their automated harvesting method accommodates different data formats (e.g. comma-separated values (CSV) and geographical JavaScript object notation (GeoJSON) and types of metadata. In addition to automated processes, some countries (e.g. **Denmark**, **Ireland**, **Austria** and **Portugal**) also note certain instances that warrant manual checks (e.g. for smaller data providers).

While most countries use time-triggered updates, such as **Italy's** weekly harvesting of the federated catalogue, **Austria** also incorporates event-triggered updates, which are activated by specific occurrences, such as legislative changes or significant weather events.

Several countries, such as **Estonia**, **Cyprus**, **Latvia** and **Slovenia**, also mention that they have legal frameworks and regulations that mandate the regular updating of metadata. In many cases, designated open data personnel and the open data portal administrators oversee the quality of metadata, conducting regular checks and informing data publishers of discrepancies. On the other hand, countries such as **Greece**, **Lithuania**, **Serbia**, **Slovenia**, **Spain** and **Switzerland** report that their metadata updates depend on the data publishers and that the data publishers set a frequency for the metadata to get updated or harvested.

Highlight from Spain – automatic metadata harvesting workflow

In **Spain**, a significant percentage (90–99 %) of the metadata on the national portal is obtained automatically from the source rather than being manually edited. This automation is facilitated through a well-structured workflow managed by the portal's back office, which includes a federation management console. This console enables publishers to manage and schedule automatic data harvesting tasks efficiently.

The process undertaken is as follows.

1. **Defining the source uniform resource identifier (URI).** Publishers begin by defining the URI of the resource description framework (RDF) / extensible markup language (XML) file that contains the source open data catalogue, ensuring that the national catalogue can accurately retrieve the metadata.
2. **Adjusting harvesting frequency.** Publishers can set the frequency for metadata harvesting based on their needs, with options including manual updates or automatic updates on a daily, weekly, biweekly or monthly basis.
3. **Automatic parsing and updating.** Once the URI and frequency are configured, the national catalogue automatically parses the RDF/XML file and updates the relevant datasets on the portal.

This automated process applies to all types of data published in source catalogues described using the RDF, ensuring that the metadata on the national portal remains consistent and up to date and requires minimal manual intervention.

Completeness of metadata

Having complete and up-to-date data is important, since the applications and reuse cases may require historical or current data to be feasible and impactful. How current this data needs to be depends on what the data is about. Datasets that represent phenomena that change in real time, such as weather or traffic data, should be updated close to real time to enable complex applications. For other datasets, a different frequency of updates may be appropriate. Gaps in a time series can also negatively affect the usability of datasets. Again, the definition of 'up to date' depends on what the data represents and the frequency with which it is collected. Table 40 presents an overview of how countries responded to the question on this topic.

Table 40: Countries' responses to the question on the completeness of metadata

	Do you undertake efforts to ensure that published data covers the full period from when it was first published?
EU-27	20 Member States (74 %) report undertaking efforts to ensure that published data covers the complete time series.
EFTA	**Iceland** and **Norway** report undertaking efforts to ensure that published data covers the complete time series.
Candidate	**Serbia** and **Ukraine** report undertaking efforts to ensure that published data covers the complete time series.

(Question Q4)

Regular monitoring, auditing and validation processes are common methods to ensure that data covers the full time series. Countries such as **Bulgaria**, **Estonia**, **Hungary** and **Serbia** report having monitoring systems in place, either through portal editors or national teams that validate the completeness of data over time. **Luxembourg** reports that it actively monitors the availability of new datasets and engages with data producers to explore the possibility of incorporating historical time-series data. Many countries also report providing direct support, guidance and recommendations to data publishers to maintain data integrity across time periods.

Furthermore, **Denmark** and **Slovakia** note that they use the attribute dcat:temporal within the DCAT standard and recommend it to publishers. This attribute explicitly documents the temporal scope of datasets. This is also helpful if, for example, datasets are discontinued. In these cases, the dcat:temporal attribute helps clarify which time periods the new datasets cover, and users can see the temporal break or shift in the data series.

Finally, automation is used in some countries to ensure the continuity of data publication and to prevent time gaps. For example, **Portugal** and **Slovakia** report that they use automated processes to update datasets and ensure no data is missed. At the same time, **Latvia's** portal includes a feature whereby data holders will see a message next to datasets if they are not updated by the specified deadline, indicating the need to update the dataset.

Highlight from Czechia – registration of data series
In **Czechia**, the national portal supports the registration of 'data series', which are collections of datasets connected by certain contextual relationships. These connections can be temporal (e.g. budget data over several years), spatial (e.g. lists of streets in different municipalities) or thematic (e.g. datasets from a particular system). See, for example, the data series on the **fiscal outlook** or the **administrative register of economic entities**. These measures help to ensure that datasets are comprehensive and that the data's temporal, spatial and thematic continuity is maintained.

Interoperability of high-value datasets

The DCAT-AP annotation for HVDs can help denote HVDs, making it easier for users to identify and access them. Moreover, by adhering to this standard, national portals can ensure that their datasets are interoperable with those from other countries. Such interoperability is key to unlocking the full potential of the data, enabling more comprehensive analyses. Table 41 presents an overview of how countries responded to the questions on this topic.

Table 41: Countries' responses to questions on the interoperability of HVDs

	Have you implemented the DCAT-AP HVDs tag to denote HVDs in your portal?	*Besides the DCAT-AP tag, have you implemented any other measures to ensure that HVDs are interoperable with datasets from other countries?*
EU-27	17 Member States (63 %) report that they have implemented the DCAT-AP HVDs tag in their (national) open data portal(s).	21 Member States (78 %) report that they have implemented other measures to ensure that HVDs are interoperable with datasets from other countries.

(Questions Q5 and Q6)

Non-EU countries were not surveyed on this question, since Commission Implementing Regulation (EU) 2023/138 on HVDs applies only to EU Member States.

Over half of Member States have implemented the DCAT-AP HVD annotations in their open data portals. However, some countries report challenges regarding compliance across all public bodies and adapting their CKAN systems to implement requirements for HVDs fully. Some countries, such as **Belgium** and **Germany**, emphasise the integration of DCAT-AP HVDs with existing geoportals. In **Germany**, Geoportal Berlin has an API connection to the Berlin open data portal, meaning that data published on the geoportal is automatically indicated in the open data portal. In **Belgium**, the properties for HVDs are collected during harvesting (i.e. the automated process of gathering and synchronising datasets) on geoportals like MetaWal, where there is also mapping between data covered under the infrastructure for spatial information in Europe (Inspire) directive (Directive 2007/2/EC), a European directive for geospatial data, and DCAT-AP HVDs. **Slovenia** and **Finland** also emphasise that they harvest data from geoportals and align it with the HVD structure. Indeed, several countries, including **Belgium**, **Spain**, **Austria** and **Romania**, with advanced initiatives related to geospatial, environmental and earth observation data, have relied on the Inspire directive's recommendations to ensure cross-border interoperability.

In addition to the DCAT-AP HVD annotations, Member States highlight various ways to ensure that their HVDs are interoperable with datasets of other countries. For example, **Czechia** and **France** note that they directly communicate with data producers from other countries. **Denmark** and **Ireland** note that they encourage the use of standardised licences (e.g. Creative Commons (CC)) or data formats (e.g. CSV, JavaScript object notation (JSON), XML and GeoJSON) to facilitate interoperability. **Belgium** and **Ireland** also report focusing on API development as a way to ensure data interoperability.

6.3. Monitoring and measures

This indicator assesses the extent to which mechanisms are in place to evaluate and improve metadata quality and its compliance with licensing standards. Moreover, the indicator looks at the support, guidelines and tools available to assist data publishers in publishing high-quality metadata and choosing the correct licence type for their data.

Monitoring the quality of metadata on portals

Monitoring metadata quality is important for ensuring datasets are discoverable, well documented and usable by stakeholders. From manual reviews to automated systems, countries use a range of methods to ensure compliance with standards. Dashboards and reports are effective tools for monitoring and visualising metadata quality, and providing public access to these resources enhances transparency and accountability. Table 42 presents an overview of how countries responded to the questions on this topic.

Table 42: Countries' responses to questions on monitoring the quality of metadata

	Do you monitor the quality of the metadata available on your portal?	*Do you publish information on the quality of the metadata available on the portal?*
EU-27	26 Member States (96 %), **all except Finland**, report monitoring the quality of metadata available on their portals.	22 Member States (81 %), with the recent additions of **Latvia**, **Malta** and **Romania**, report that they publish information on the quality of metadata available on their portals.
EFTA	All three participating EFTA countries report monitoring the quality of metadata available on their portals.	**Norway** reports that it publishes information on the quality of metadata available on its portal.
Candidate	**Serbia** and **Ukraine** report monitoring the quality of metadata available on their portals.	**Ukraine** reports that it publishes information on the quality of metadata available on its portal.

(Questions Q7 and Q8)

Most countries use automated systems to ensure metadata quality. For example, **Estonia**, **Germany**, **Lithuania**, the **Netherlands** and **Switzerland** report that they use automated systems for checking broken links, compliance with standards such as DCAT-AP and the completeness of data. Some countries such as **Bulgaria, Latvia** and **Ukraine** also report performing manual reviews through administrators. Additionally, **Lithuania**, **Austria**, **Poland** and **Romania** report enabling users to provide feedback on metadata quality, which portal administrators then take into account.

Highlight from Portugal – metadata quality box

In **Portugal**, the national open data portal (dados.gov.pt; Figure 15) provides a dedicated 'quality' box within the administration area to help users improve the quality of their published dataset's metadata. This tool offers an overview of how well the dataset's metadata is structured, highlighting areas that could be enhanced to improve discoverability and reuse. The system automatically analyses the metadata for each dataset, assessing whether it has been correctly filled out. Based on this analysis, it suggests improvements, such as adding more accurate and detailed descriptions, including additional tags, or attaching resources in more open, machine-readable formats. This proactive approach to monitoring and enhancing metadata quality ensures that contributors can easily publish high-quality, reusable data, benefiting the broader open data ecosystem.

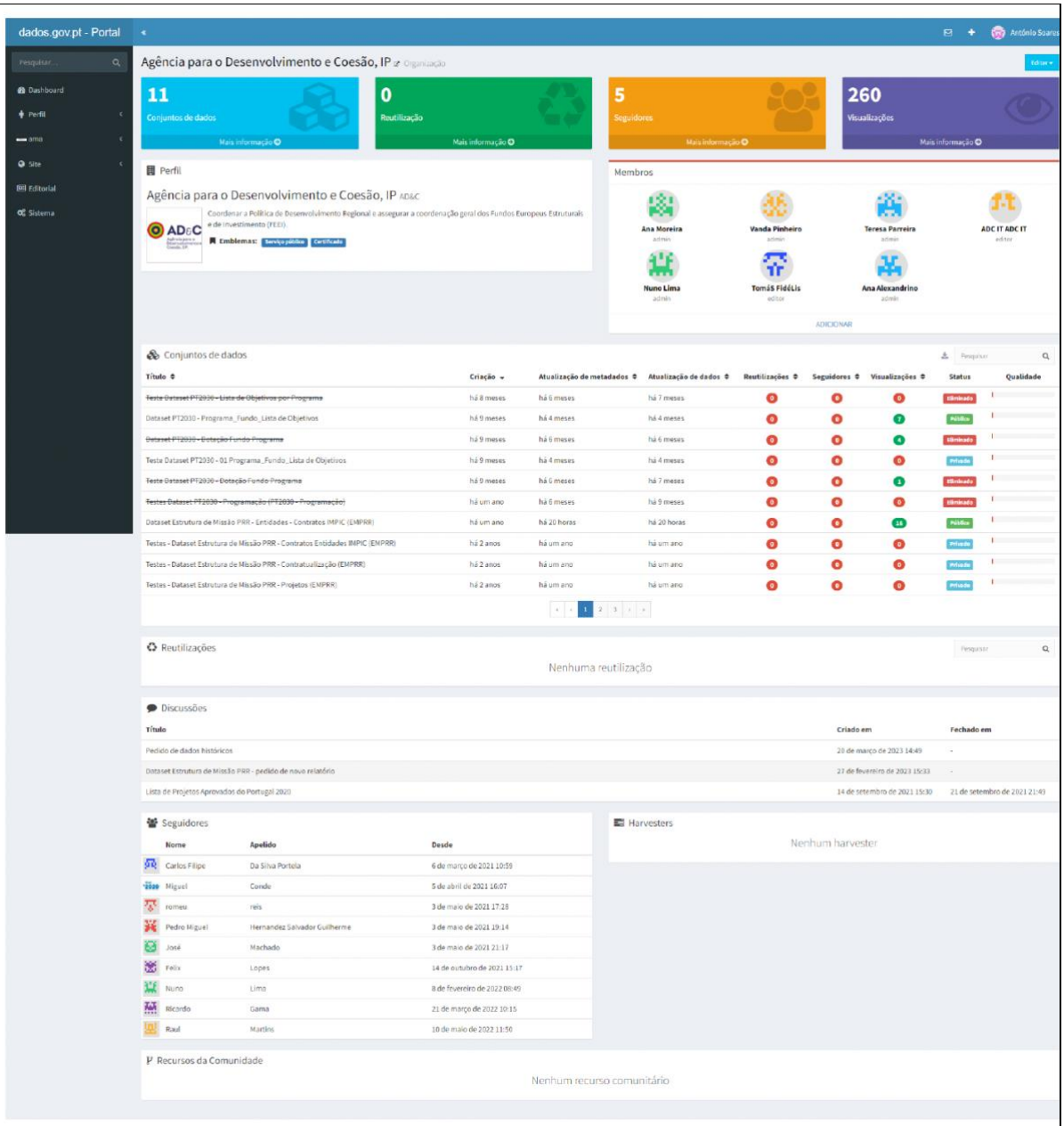

Figure 15: Screenshot of the data provider dashboard view on Portugal's portal

Many countries use dashboards and reports to monitor and visualise metadata quality. Some, such as **Italy**, **Poland**, **Spain** and **Ukraine**, report having publicly available dashboards and reports, while others, such as **France**, **Luxembourg** and **Serbia**, report that these resources are mainly used by internal personnel. In addition, **Czechia** and **Germany** integrate their public dashboards with SPARQL (a query language for databases) to allow users to access the metadata quality data through an interface or end point. Several countries, including **Hungary**, **Ireland**, **Norway** and **Romania**, report integrating standardised EU tools and frameworks, specifically the metadata quality assessment (MQA) methodology from data.europa.eu, to assess and monitor metadata quality.

Setting metadata standards and licensing requirements

Metadata serves as a foundational layer that describes the content, context and structure of datasets, enabling users to discover and utilise data effectively. Ensuring the quality of metadata is essential for fostering findability, interoperability and effective data sharing. Countries often set various standards and guidelines that organisations must implement to govern metadata quality and ensure the usability and reliability of open data. Licensing is a common way to govern open data and relevant metadata quality. Without a licence, data may be publicly available, but reusers will not have certainty about what permissions they have to access, use, change or share the data under copyright or database laws. Table 43 presents an overview of how countries responded to the questions on this topic.

Table 43: Countries' responses to questions on metadata standards and licensing requirements

	Do you set any standards on metadata quality that data providers must abide by?	*Do your open data publication or licensing guidelines recommend using CC licences?*	*What percentage of the open data available on the national portal is accompanied by licensing information?*	*How many different licences are used on your portal?*
EU-27	26 Member States (96 %), **all except Greece**, report that they set standards on metadata quality that data providers must abide by.	25 Member States (93 %), **all except Greece** and **Hungary**, report that their publication or licensing guidelines provide recommendations for using CC licences. **Italy** and **Finland** are the most recent additions to this group.	20 Member States (74 %) report that more than 90 % of their datasets have licensing information.	17 Member States (63 %) report having one to four licences on their portal. Only **Belgium**, **Czechia** and **Sweden** report having more than 10 licences on their portals.
EFTA	**Switzerland** reports that it sets standards on metadata quality that data providers must abide by.	All three participating EFTA countries report that their publication or licensing guidelines provide recommendations for using CC licences.	**Norway** and **Switzerland** report that over 90 % of their datasets have licensing information.	All three participating EFTA countries report having one to four licences on their portal.
Candidate	**Serbia** and **Ukraine** report that they set standards on metadata quality that data providers must abide by.	**Albania** (the most recent addition), **Serbia** and **Ukraine** report that their publication or licensing guidelines provide recommendations for using CC licences.	**Serbia** and **Ukraine** report that more than 90 % of their datasets have licensing information.	**Serbia** and **Ukraine** report having one to four licences on their portal.

(Questions Q10, Q11, Q12 and Q13)

Countries often set mandatory metadata fields that must be filled in when publishing datasets. Specifically, many countries tend to implement variations of the DCAT-AP metadata standard, such as specifying key metadata fields as mandatory and, in some cases, mandating the inclusion of additional metadata classes compared with those required by the general DCAT-AP framework.

Most countries also have specific requirements for and recommendations on the licences that must be applied to datasets. In many countries, the CC Attribution 4.0 International (CC BY 4.0) and CC Universal (CC0) licences are mandated by laws or national strategies for public sector data publication. For example, the **Austrian** framework for open government platforms serves as an official agreement between the federal and state levels. According to this agreement, CC BY 4.0 is mandatory for Austrian public sector bodies for the publication of open government data.

Several countries offer flexibility in terms of licensing, allowing data providers to choose from various CC licences, although CC BY 4.0 and CC0 are often highlighted as preferred options. For example, in the **Netherlands**, it is mandatory to select a licence. However, publishers are free to choose which licence from a list provided by the government. In **Cyprus**, public sector bodies must seek permission from the licensing authority to use a licence other than CC BY 4.0 or CC Attribution-ShareAlike 4.0 International (CC BY-SA 4.0).

Highlight from Cyprus –tailored DCAT-AP application

Cyprus has adopted a tailored version of the DCAT-AP framework to maintain high standards of metadata quality on its national data portal. This variation includes more mandatory classes than the standard EU framework, ensuring that metadata is more comprehensive and uniform. In addition to the required fields, optional DCAT-AP fields are also available to enhance the metadata's depth.

Two standardised usage licences were selected to further support uniformity and practicality: CC BY 4.0 and CC BY-SA 4.0. Public bodies can choose the most appropriate licence when publishing datasets, ensuring clear and consistent data usage rights.

Cyprus mandates a minimum of 15 fields for metadata, which include essential information such as:

- dataset title
- description
- topics
- licence to use
- geospatial coverage
- access uniform resource locator (URL).

Support activities for data providers

Activities to support data providers with publishing high-quality data can take many forms. Documents, tools, training and tailored guidance are common methods that countries use to ensure publishers supply high-quality datasets. Table 44 presents an overview of how countries responded to the questions on this topic.

Table 44: Countries' responses to questions on support for data providers

	Do you publish guidelines and have tools to assist publishers in publishing high-quality metadata?	*Besides providing guidelines, are regular activities conducted or mechanisms in place to assist publishers in supplying high-quality datasets?*
EU-27	23 Member States (85 %), **all except Bulgaria**, **Greece**, **Croatia** and **Malta**, report that they publish guidelines and have tools in place to assist publishers in publishing high-quality metadata.	22 Member States (81 %) report that they conduct regular activities or have mechanisms in place to assist publishers in supplying high-quality datasets.
EFTA	**Norway** and **Switzerland** report that they publish guidelines and have tools in place to assist publishers in publishing high-quality metadata.	**Norway** and **Switzerland** report that they conduct regular activities or have mechanisms in place to assist publishers in supplying high-quality datasets.
Candidate	**Serbia** and **Ukraine** report that they publish guidelines and have tools to assist publishers in publishing high-quality metadata.	**Albania**, **Serbia** and **Ukraine** report that they conduct regular activities or have mechanisms in place to assist publishers in supplying high-quality datasets.

(Questions Q9 and Q14)

Most countries publish manuals and handbooks that include information on publishing high-quality metadata. **Czechia**, **Denmark**, **Luxembourg**, **Hungary** and **Sweden** also report that they provide manuals on how to properly license metadata, helping to clarify how data can be used and whether it can be shared or modified.

Highlight from Spain – guides for improving data and metadata quality

In **Spain**, there are several guides aimed at improving the quality of both the metadata and the data itself. These include:

- *Practical Manual to Improve Open Data Quality*,
- *How to develop a plan of measures to promote openness and reuse of open data*,
- *Practical Guide for Publishing Linked Data in RDF*,
- *Practical Guide for Publishing Spatial Data*,
- *Practical Guide for Publishing Tabular Data in CSV Format*,
- *Practical Guide for Publishing Data through APIs*,
- *Introduction to Data Anonymisation: Techniques and case studies*,
- *How to Implement Linked Data: Real case of the Aragón open data portal*,
- *Open Data in Real Time: Use cases for smart cities*,
- *Guide for priority datasets to be published by municipalities*,
- *Data Visualisation Guide for Local Authorities*.

Furthermore, **Belgium**, **Germany**, **Estonia**, **France**, **Italy**, **Lithuania** and **Poland** provide metadata validation tools to ensure compliance with established standards such as DCAT-AP. For example,

Germany provides a self-service tool with detailed metadata end point testing and feedback. **Estonia's** open Rihake tool allows users to describe datasets, classifiers and services and to compile data dictionaries and business glossaries, while **Belgium** provides a lightweight validator tool that checks metadata against certain standards (via GitHub). Similarly, **Italy** reports that its national open data portal includes a metadata validator that checks the conformity of its metadata to its national metadata profile DCAT-AP_IT.

In addition to guiding documents, training is a prominent way in which governments help data providers to publish high-quality datasets. For example, **Czechia**, **Denmark** and **Romania** note that they regularly host webinars about ensuring high-quality data management. In addition, **Czechia**, **Estonia**, **Hungary**, **Ireland**, **Poland** and **Ukraine** report that they specifically utilise e-learning to train data providers on publishing high-quality data, which also includes information on the proper procedures for metadata.

Many countries also conduct ongoing meetings with data providers to improve data quality. These are often held regularly, allowing for a continuous dialogue and exchange of knowledge (e.g. on updates and best practices) between the open data team and data providers. **Ireland** and **Spain** frame these meetings as 'audits on data quality', at which data providers receive personalised evaluations of their data (and metadata) quality and discuss their results. While most countries report that these meetings with data providers are one-on-one, some countries, such as **Luxembourg**, **Norway** and **Switzerland**, have routine forums and peer exchanges with established networks and groups of public sector data providers. These sessions facilitate knowledge exchange on topics such as publishing high-quality data.

Highlight from Luxembourg – three-tier approach for ensuring high-quality datasets

Luxembourg has implemented a comprehensive, multi-tier strategy to continuously improve the quality of public sector open data.

1. **Training and capacity building.** The National Institute of Public Administration offers regular training sessions dedicated to public sector open data. These sessions are available to all public sector agents and cover the national portal and related open data topics. This ensures that public officials are well equipped with the knowledge and skills necessary to manage open data effectively.
2. **Open data representatives group.** In line with the Prime Minister's directive, public sector organisations are required to appoint official open data representatives. This group facilitates regular meetings to exchange best practices, technical support and general open data information. This network of representatives enhances collaboration and ensures that organisations meet the obligations of the open data directive (Directive (EU) 2019/1024) and national laws. The first meeting of this series took place in April 2024, marking the beginning of this collaborative effort.
3. **One-on-one support for data owners.** Luxembourg's open data team works closely with individual data owners, providing tailored advice and technical assistance when datasets are published. This personalised approach ensures a focus on data quality, including aspects like regular updates, resource formats and metadata completeness. Additionally, Luxembourg has implemented a link-checking programme to automatically verify the availability of datasets not hosted directly on the portal. The system runs monthly tests, and any issues (e.g. broken links) are addressed by contacting the relevant organisations. This has proven effective in maintaining data availability, as demonstrated with Luxembourg's national weather data provider, Meteolux.

6.4. DCAT-AP compliance

DCAT is a World Wide Web Consortium standard designed to facilitate interoperability between data catalogues published online. DCAT-AP is an extension to DCAT – an 'application profile' – developed by the European Commission to improve interoperability and foster the discoverability and reuse of open data across European catalogues. The DCAT-AP compliance indicator assesses the extent to which metadata on national portals complies with the DCAT-AP standard for describing public sector datasets and what efforts are taken to assist data publishers in following DCAT-AP.

Creating a framework for DCAT-AP compliance

Having a standard way to describe datasets helps to ensure that data catalogues from different organisations or regions are compatible. This is why many national portals follow the DCAT-AP framework or other standards to ensure interoperability with DCAT-AP. Many countries have created national extensions of DCAT-AP to tailor the general framework to their specific needs, enhancing its relevance and functionality for their contexts. Table 45 presents an overview of how countries responded to the questions on this topic.

Table 45: Countries' responses to questions on creating a framework for DCAT-AP compliance

	Does the national portal follow the DCAT-AP framework or, if not, are standards in place to ensure interoperability with DCAT-AP?	*Is there a national extension of the DCAT-AP standard developed for your country?*
EU-27	24 Member States (89 %), **all except Bulgaria**, **Greece** and **Malta**, report that their national portals follow the DCAT-AP framework or ensure interoperability with DCAT-AP.	15 Member States (56 %) report having a national extension of the DCAT-AP standard.
EFTA	**Norway** and **Switzerland** report that their national portals follow the DCAT-AP framework or ensure interoperability with DCAT-AP.	**Norway** and **Switzerland** report having a national extension of the DCAT-AP standard.
Candidate	**Serbia** and **Ukraine** report that their national portals follow the DCAT-AP framework or ensure interoperability with DCAT-AP.	None of the participating candidate countries reports having a national extension of the DCAT-AP standard.

(Questions Q15 and Q19)

Several countries ensure compliance with DCAT-AP by leveraging existing technical platforms or plug-ins designed with built-in DCAT-AP support. For instance, many countries note that they use the CKAN platform, which has a plug-in that allows users to describe datasets according to DCAT-AP standards. On the other hand, **Portugal** and **Serbia** report using the Udata platform, which follows the DCAT-AP standard and has tools for mapping other frameworks and standards (e.g. CKAN and operational data store (ODS)). **Ireland** and **Norway** highlight that they have implemented tools to automatically validate metadata against DCAT-AP standards.

Highlight from Ireland – automated audit tool for DCAT-AP

In **Ireland**, the national open data portal, data.gov.ie, fully adheres to the DCAT-AP framework to ensure interoperability and consistency with international open data standards. Compliance with DCAT-AP is mandated for all data published on the platform, which is outlined in the portal's technical framework and the publishing guidelines.

To ensure compliance, the portal advocates using URIs, which play a crucial role in improving data discovery and interoperability across platforms. Additionally, the portal provides an audit tool specifically designed to validate datasets against DCAT-AP standards. This tool checks for missing mandatory properties, verifies the correct use of controlled vocabularies and ensures adherence to the DCAT-AP schema.

Moreover, the portal offers a range of training resources to support data providers in creating high-quality, DCAT-AP-compliant metadata. These resources include best practices, examples and tutorials, all aimed at enhancing the quality and interoperability of published datasets. Through these measures, data.gov.ie ensures that all published data meets international standards, facilitating better data sharing and reuse.

Although not compulsory, many countries have developed national extensions of the DCAT-AP standard. These countries often emphasise that their modifications are intended to better serve the needs of their national contexts, particularly for the public sector and data communities. For example, **Czechia**, **Italy** and **Poland** report making such modifications to comply with their specific legal frameworks or regulations that govern data. These legal obligations often necessitate changes to metadata, vocabularies or properties to ensure compliance.

Other countries report that they have made national extensions to ensure more structured and comprehensive metadata. This often involves adding additional mandatory fields or adapting vocabularies to ensure consistency and data quality. For example, the **Netherlands** reports enriching the EU standard by enabling fewer free-answer options, which it believes allows easier verification of the metadata quality.

Compliance with the DCAT-AP specifications

DCAT-AP has various metadata properties that can be used to describe data. As a specification, DCAT-AP defines a hierarchy of properties, grouped as classes, that are mandatory, recommended or optional. Table 46 presents an overview of how countries responded to the questions on this topic.

Table 46: Countries' responses to questions on compliance with DCAT-AP specifications

	What is the percentage of metadata on your portal that is DCAT-AP compliant in terms of mandatory classes?	*What is the percentage of metadata on your portal that uses DCAT-AP recommended classes?*	*What is the percentage of metadata on your portal that uses DCAT-AP optional classes?*
EU-27	22 Member States (81 %) report that more than 90 % of their portals' metadata complies with DCAT-AP's mandatory classes.	19 Member States (70 %) report that more than 90 % of the metadata on their portals follows DCAT-AP's recommended classes.	16 Member States (59 %) report that more than 90 % of the metadata on their portals follows DCAT-AP's optional classes.

	What is the percentage of metadata on your portal that is DCAT-AP compliant in terms of mandatory classes?	*What is the percentage of metadata on your portal that uses DCAT-AP recommended classes?*	*What is the percentage of metadata on your portal that uses DCAT-AP optional classes?*
EFTA	**Norway** and **Switzerland** report that more than 90 % of the metadata on their portals is compliant with DCAT-AP's mandatory classes.	**Norway** and **Switzerland** report that more than 90 % of the metadata on their portals follows DCAT-AP's recommended classes.	**Switzerland** reports that at least 50 % of the metadata on its portal follows DCAT-AP's optional classes. For **Norway**, this percentage is at least 30 % and, for **Iceland**, it is less than 10 %.
Candidate	**Serbia** and **Ukraine** report that more than 90 % of the metadata on their portals is compliant with DCAT-AP's mandatory classes.	**Serbia** and **Ukraine** report that more than 90 % of the metadata on their portals follows DCAT-AP's recommended classes.	**Ukraine** reports that more than 90 % of the metadata on its portal follows DCAT-AP's optional classes.

(Questions Q16, Q17 and Q18)

Despite growing compliance with DCAT-AP, not all data providers publish data that fully aligns with the DCAT-AP standard. Investigating the common causes of non-compliance can help national portals to develop strategies to help data providers improve the quality of their metadata. Table 47 presents an overview of how countries responded to the question on this topic.

Table 47: Countries' responses to the question on non-compliance with the DCAT-AP standard

	Do you investigate the most common causes of the lack of DCAT-AP compliance?
EU-27	19 Member States (70 %), with **Greece** and **Sweden** as the most recent additions, report investigating the most common causes of the lack of DCAT-AP compliance.
EFTA	**Switzerland** reports investigating the most common causes of the lack of DCAT-AP compliance.
Candidate	**Serbia** and **Ukraine** report investigating the most common causes of the lack of DCAT-AP compliance. **Serbia** newly reports this.

(Question Q20)

The most common cause of a lack of compliance with DCAT-AP is a lack of training, awareness or expertise on the standard. In other words, some data providers are unfamiliar with the requirements of DCAT-AP and do not know how to properly manage and structure data in line with the standards.

Some countries note that some compliance issues relate to the need to map or integrate metadata from different systems or translate metadata based on a different standard from DCAT-AP. **Denmark** and **Lithuania** specifically note that there are challenges associated with mapping or converting geospatial datasets structured according to the Inspire standard to/into the DCAT-AP standard.

Other causes include the cost and complexity of updating the national platform while maintaining custom settings when the DCAT-AP specification is updated. When datasets are entered manually, metadata may be incomplete or incorrectly filled, leading to deviations from the standard.

6.5. Deployment quality and linked data

This indicator examines the extent to which countries use a model, such as the Berners-Lee 5-star open data model or the FAIR principles, to assess the quality of data deployment. This indicator also assesses the extent to which data is available under an open licence, in structured and machine-readable formats, with URIs and links to other data sources.

Use of models for deployment quality

A model for assessing data deployment is crucial because it enables national portal teams to judge systematically and adaptively whether a dataset is more or less likely to be reused, given the quality it offers portal users. Table 48 presents an overview of how countries responded to the question on this topic.

Table 48: Countries' responses to the question on the use of models for deployment quality

	Do you use a model to assess the quality of deployment of data in your country?
EU-27	24 Member States (89 %), **all except Bulgaria, Hungary** and the **Netherlands**, report using a model to assess the quality of deployment of data.
EFTA	All participating EFTA countries report using a model to assess the quality of deployment of data.
Candidate	**Serbia** and **Ukraine** report using a model to assess the quality of deployment of data.

(Question Q23)

The 5-star open data model is a framework designed to assess the quality and openness of data based on five progressive criteria. Each level of the model corresponds to a star, with more stars indicating higher levels of openness and usability. The 5-star open data model is the most frequently cited model used by countries for assessing data quality. Some countries, such as **Cyprus** and **Ukraine**, even report that using the 5-star model is written into their national guidelines and policies.

Many countries also integrate the FAIR principles into their data quality assessments. The FAIR data principles state that it should be possible to find data, there should be information about how to gain access to the data, the data should be compatible with other data and it should be possible to reuse the data. Countries including **Belgium**, **Estonia**, **Spain**, **Italy**, **Luxembourg** and **Finland** report incorporating both the 5-star model and the FAIR principles into their models for assessing the quality of deployment of data.

Some countries utilise different assessment techniques. For example, **Denmark** has established a 'common language for data quality', which is intended as a shared reference point for discussions related to data quality issues.

Highlight from Spain – comprehensive data quality model
In **Spain**, a comprehensive approach is utilised to ensure the quality of open data deployment by leveraging both the 5-star open data model and the FAIR principles. The 5-star open data model is used to classify distributions of datasets based on their publication format. In addition, the Government of Spain's Data Office uses the FAIR principles as a basis for defining the guiding principles for the data and its infrastructures and facilitating its reuse. Furthermore, the national portal promotes the publication of open data that achieves at least the 3-star level on the scale (see an example of this promotion, which describes the process of transforming tabular datasets in CSV (3 stars) into linked and semantically enriched data (5 stars)).

Activities for data providers to ensure high-quality data

The quality of data on national portals depends on the quality of data supplied by data providers. Therefore, assisting data providers with skills and tools is one way to improve the quality of published data. Table 49 presents an overview of how countries responded to the question on this topic.

Table 49: Countries' responses to the question on activities for data providers to ensure high-quality data

	Do you conduct activities to promote and familiarise data providers with ways to ensure higher quality data?
EU-27	26 Member States (96 %), **all except Bulgaria**, report conducting activities to promote and familiarise data providers with ways to ensure higher quality data.
EFTA	All participating EFTA countries report conducting activities to promote and familiarise data providers with ways to ensure higher quality data
Candidate	**Albania**, **Serbia** and **Ukraine** report conducting activities to promote and familiarise data providers with ways to ensure higher quality data. **Albania** is the most recent addition to this group.

(Question Q24)

Many countries use training programmes and workshops to educate data providers on best practices for data quality. This includes training on the 5-star open data model and FAIR principles. **Estonia** and **Ukraine** note that their general training schemes include theoretical knowledge and practical skills for effectively publishing datasets. **Norway** and **Spain** also report publishing blogs for data providers that disseminate best practices. Several countries have developed guidelines and best practices to assist data providers in understanding and achieving high data quality.

Additionally, many countries are promoting efforts to engage with data providers more, providing feedback on their datasets and sharing best practices. For example, **Belgium**, **Greece** and **Poland** report having regular consultations with data providers, working one-on-one to improve their data quality.

Highlight from Sweden – the data ambassador programme

In **Sweden**, the data ambassador programme, launched by the Swedish Agency for Digital Government, is a pioneering educational initiative aimed at enhancing the understanding and implementation of open data practices among public sector employees. Developed in response to the increasing need for effective data sharing following the enactment of the Open Data Act in August 2022, the programme targets individuals working operationally with open data and data sharing within public organisations.

This digital learning initiative offers a self-paced format that includes recorded videos, references for further reading and short knowledge assessments, focusing on fundamental processes and concepts of open data in alignment with the Open Data Act. By equipping participants with essential knowledge on how to share and utilise data effectively, the programme fosters an environment in which data sharing becomes a strategic resource.

The agency plans to expand the programme by offering additional courses tailored to various stakeholders, including subcontractors, managers and legal professionals. This initiative aims to strengthen the understanding of data as a strategic resource, ultimately promoting higher data quality across the public sector.

Deployment quality

Several best practices can enhance the accessibility and reusability of open data. These include ensuring datasets are made available under an open data licence (e.g. CC) and having licences provided in a structured format. Additionally, it is good practice to ensure that datasets are in an open and machine-readable format (e.g. CSV, JSON and XML) and to assign URIs to the datasets. Finally, datasets should also be linked to various sources, which through the use of URIs can expand the dataset's context and relevance. Table 50 presents an overview of how countries responded to the questions on this topic.

Table 50: Countries' responses to questions on deployment quality

	*What percentage of datasets are made available under an **open licence**?*	*What percentage of licences are provided in a **structured data format**?*	*What percentage of datasets are provided in an open and **machine-readable format**?*	*What percentage of datasets use **URIs**?*	*What percentage of datasets **link to other sources**?*
EU-27	22 Member States (81 %) report that over 90 % of their datasets have an open licence.	19 Member States (70 %) report that over 90 % of their datasets have structured licence data.	17 Member States (63 %) report that over 90 % of their datasets are in a machine-readable format.	8 Member States (30 %) report that over 90 % of their datasets use URIs.	5 Member States (19 %) report that over 90 % of their datasets are linked to other sources.

	*What percentage of datasets are made available under an **open licence**?*	*What percentage of licences are provided in a **structured data format**?*	*What percentage of datasets are provided in an open and **machine-readable format**?*	*What percentage of datasets use **URIs**?*	*What percentage of datasets **link to other sources**?*
EFTA	**Switzerland** reports that over 90 % of its datasets have an open licence.	All three participating EFTA countries report that over 90 % of their datasets have structured licence data.	**Iceland** reports that over 90 % of its datasets are in a machine-readable format.	**Norway** reports that over 90 % of its datasets use URIs.	**Norway** reports that over 90 % of its datasets are linked to other sources.
Candidate	**Serbia** and **Ukraine** report that over 90 % of their datasets have an open licence.	**Serbia** reports that over 90 % of its datasets have structured licence data.	**Serbia** and **Ukraine** report that over 90 % of their datasets are in a machine-readable format.	None of the participating candidate countries reports using URIs.	None of the participating candidate countries reports linking datasets to other sources.

(Questions Q25, Q26, Q27, Q28 and Q29)

6.6. Pilot indicator: automated tests of metadata quality

Pilot indicator – automated tests

In addition to gathering qualitative data about metadata quality, such quality can also be quantitatively assessed. The MQA is a tool designed to evaluate the quality of metadata harvested by data.europa.eu. It enables data providers and portals to assess their metadata and receive recommendations for improvement.

The MQA's methodology (which in undergoing a recalibration) examines five specific questions, which focus on:

- compliance with DCAT-AP and related standards,
- the disclosure of information beyond DCAT-AP requirements,
- the accessibility of referenced data,
- the machine readability of data formats
- the use of licences.

As a pilot project in the ODM assessment, we analysed five indicators from the MQA, calculating summary statistics across national catalogues that were findable on data.europa.eu. Certain countries, including **Albania**, **Bosnia and Herzegovina**, **Estonia**, **Greece** and **Malta**, were not

assessed, as their primary open data catalogues were not findable on data.europa.eu. The results presented below are the percentages of datasets across the selected catalogues that met each criterion. The metrics were extracted from the MQA on 31 October 2024. The findings did not contribute to the countries' maturity scores.

The **machine readability** indicator evaluates if a distribution is in a machine-readable format based on data.europa.eu's GitLab repository vocabulary.

- 65 % of the distributions assessed are machine readable. **Bulgaria** scored 100 % on this indicator.

The **DCAT-AP compliance** indicator evaluates metadata conformity with the DCAT-AP standard using the shapes constraint language (SHACL) validation from data.europa.eu. SHACL is a recommendation from the World Wide Web Consortium and is used for validating RDF graphs against a set of shapes.

- 21 % of the distributions assessed are DCAT-AP compliant, with **Hungary** scoring 100 % on this indicator.

The **download URL** indicator evaluates whether direct access to data is provided via a download URL.

- 35 % of the distributions assessed included a direct link, with **France**, **Italy**, **Cyprus**, **Lithuania**, **Poland**, **Slovakia** and **Finland** scoring 100 % on this indicator.

The **licence information** indicator evaluates if distributions specify licence details, facilitating reuse.

- 55 % of the distributions assessed provide licence information, with **Cyprus**, **Czechia**, **Germany**, **Iceland**, **Italy**, **Luxembourg**, the **Netherlands**, **Spain** and **Switzerland** achieving 100 % on this indicator.

The **licence vocabulary** indicator evaluates the accuracy of licence specifications (e.g. correctly versioned CC licences). The specifications are derived from the FAIR principles. The MQA recommends and credits the usage of controlled vocabularies. The data.europa.eu portal publishes its controlled vocabularies on GitLab. The vocabularies are derived from the EU vocabularies.

- 46 % of the distributions assessed include licence information that matches controlled vocabularies, with **Bulgaria**, **Ireland**, **Cyprus** and **Portugal** scoring 100 % on this indicator.

Chapter 7: Open data impact

The open data directive (Directive (EU) 2019/1024) and the implementing regulation on high-value datasets (HVDs) (Regulation (EU) 2023/138) encourage EU Member States to promote the reuse of public sector information, aiming to generate economic, environmental and societal benefits. Open datasets tend to be further processed to create new insights or solutions known as reuse cases. This typically involves transforming or integrating the data with other sources and using specialised tools or analytical methods to extract value. This is what can be referred to as the impact of open data. Impact is realised when open data is repurposed to create benefits in various fields.

The **impact** dimension of the open data maturity (ODM) assessment is designed to encourage countries to implement mechanisms for monitoring open data reuse and to better understand and address the needs of data users. Hence, the impact dimension evaluates how well countries define and measure data reuse, the steps taken to assess reuse and user needs, and the presence of reuse examples in the domains of government, society, the environment and the economy. Table 51 outlines the key components of this dimension.

Table 51: Indicators of the impact dimension

Indicator	Key elements
Strategic awareness	There is a national definition of open data reuse. Mechanisms are in place at the national, regional or local level to monitor and foster open data reuse, including in relation to HVDs. A methodology exists to measure the impact derived from reusing open data.
Measuring reuse	Tools are in place to understand which datasets are reused and how. There is a process for gathering and classifying reuse cases systematically. Activities are performed to better understand reusers' needs.
Created impact • **governmental** • **social** • **environmental** • **economic**	The impact created by open data has been systematically studied, and reuse examples exist that showcase the impact of open data in the governmental, social, environmental and economic domains.

This chapter will first present overall performance on the impact dimension and then provide a summary of the results and best practices for each indicator.

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7.1. Overall performance on the impact dimension

In 2024, the impact dimension is the third most mature dimension of the ODM assessment, with the EU-27 scoring 80 % on average (Figure 16). Maturity in this dimension has grown during 2022–2024, increasing by 6 percentage points (pp) between 2022 and 2023 and by 4 pp between 2023 and 2024. This increase at the dimension level has been driven by improvements in all three underlying indicators. Like the dimension overall, the indicators have demonstrated stable growth during 2022–2024, with the 'measuring reuse' indicator and the strategic awareness' indicator reaching 88 %, an increase of 8 pp and 5 pp on 2023, respectively., and the 'created impact' indicator reaching 75 % (an increase of 3 pp on 20243). The 'measuring reuse' indicator has grown the most since 2023, highlighting countries' efforts to set up methodologies for collecting and classifying reuse cases and to enhance activities aimed at understanding reuser requirements.

In terms of individual country performance, 11 countries reported performing all the activities investigated in the questionnaire, scoring 100 % on this dimension (Figure 17). **Denmark** and **Ireland** followed closely, reaching a nearly perfect score of 97 % and scoring 100 % on the 'strategic awareness' indicator. **Ukraine** is the only non-EU country to have scored 100 % on this dimension. Overall, 18 countries scored above the EU average of 81 %.

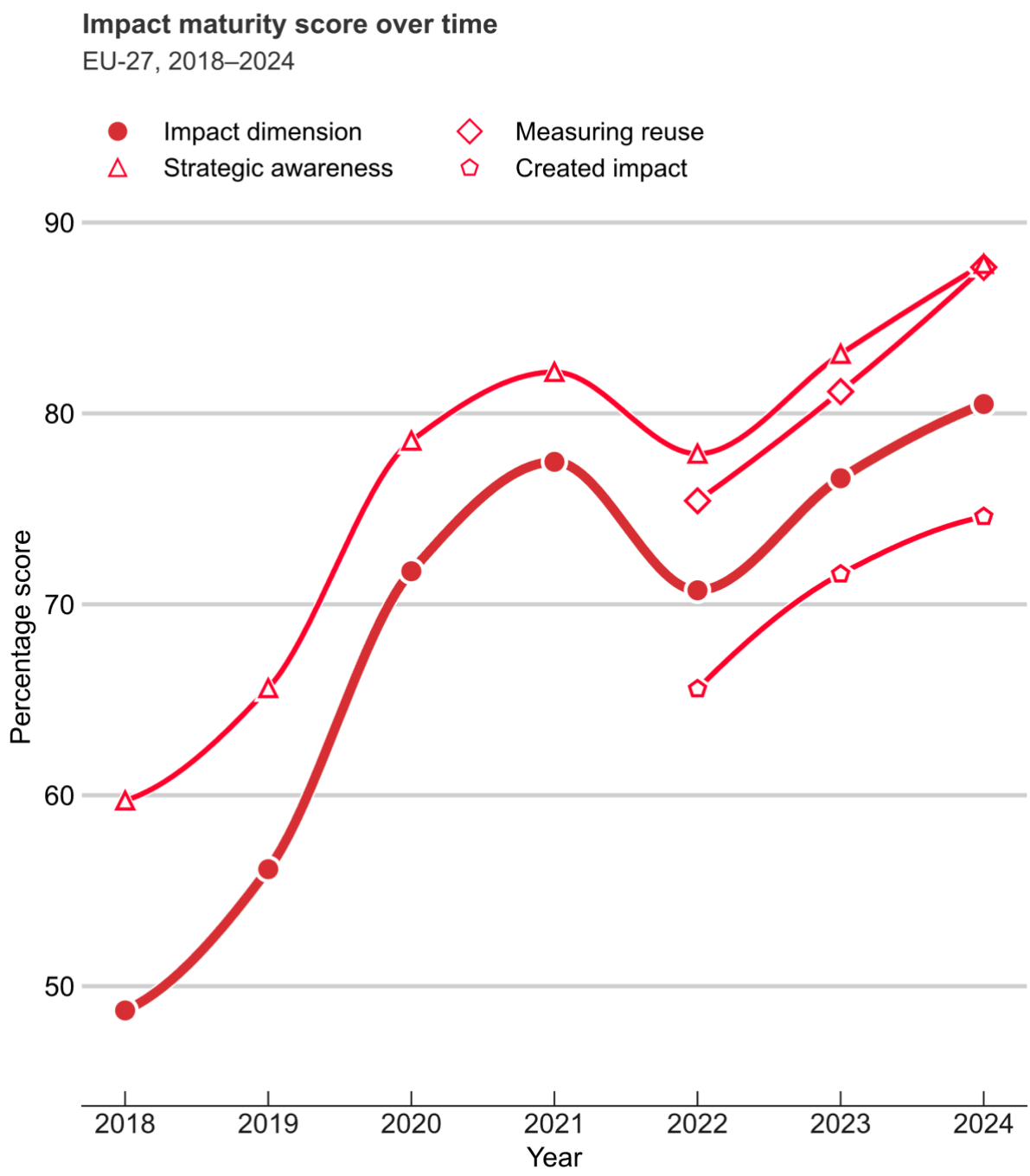


Figure 16: The EU-27 average score on the impact dimension has risen steadily during 2022–2024

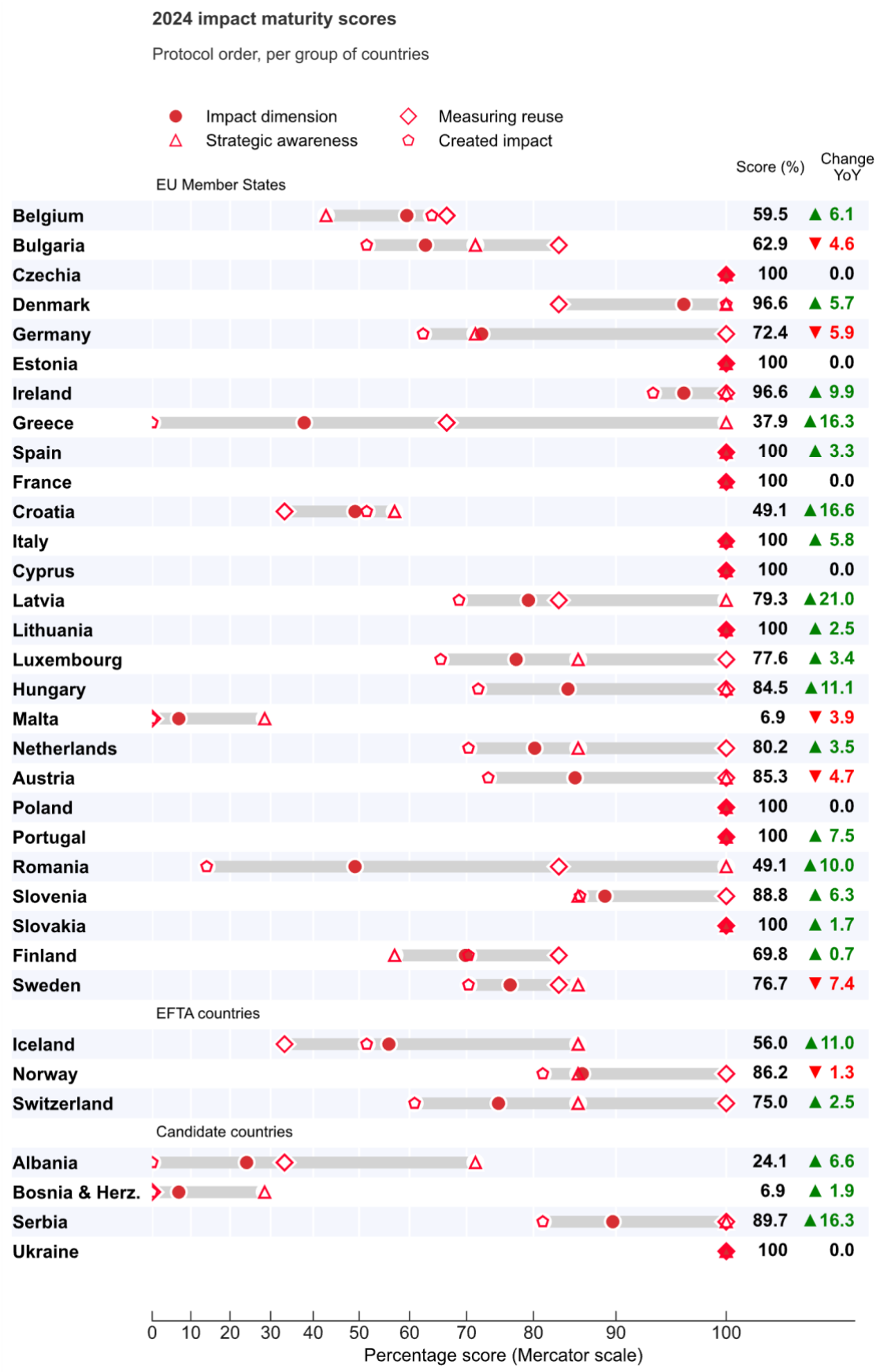


Figure 17: Twenty-two participating countries improved their score on the impact dimension in 2024. (EFTA: European Free Trade Association; YoY: year-on-year).

Highlight from France – measuring the impact of open data

Measuring the impact of open data presents a challenge, primarily due to the lack of a standardised definition of open data impact and the difficulty of quantifying the effects of open data reuse. To address this, many countries have developed standardised frameworks that combine qualitative and quantitative indicators to make the impact of open data more tangible. In several instances, these national frameworks have drawn inspiration from, or been aligned with, efforts undertaken at the EU level, particularly through initiatives like data.europa.eu.

In **France**, the data.gouv.fr team conducted an extensive impact survey in 2023 to measure how open data influences various sectors. The survey was guided by a methodology developed in France for impact measurement, which was inspired by EU-level work, specifically the indicators for an open data impact assessment framework. This framework is structured to measure the effects of open data on multiple dimensions, including governmental, environmental, social and economic impacts. The two main components of the framework are as follows.

- **Outputs.** The study measured indicators like the number of datasets, views, downloads, reuses and discussions in 2023, helping to quantify data usage and engagement.
- **Outcomes.** Reuse cases were selected from the data.gouv.fr reuse catalogue, the beta.gouv.fr platform for digital public services, and research publications. These cases were chosen based on their potential impact, the availability of information and their relevance across the four impact categories.

For each use case, the survey team analysed the specific impacts of data reuse, sometimes conducting interviews with the creators to better understand the services and benefits. The findings are presented in a paper that can be downloaded from data.gouv.fr.

Read more about this trend in Section 7.2.

Greece (+ 16 pp) and **Latvia** (+ 21 pp) are the two countries that showed the most significant year-on-year improvements in the impact dimension. **Greece's** improved maturity relates primarily to a large increase in the 'measuring reuse' indicator, because Greece now reports having set up monitoring mechanisms to collect and classify reuse cases. Like many countries, Greece has launched several initiatives to monitor open data reuse, such as actively involving academic institutions and the private sector in performing studies and analyses on open data usage. Additionally, efforts to increase public awareness are evident through the workshops, open dialogue sessions and hackathons that have been organised and that foster a culture of open data across different sectors. In future years, Greece can use these methods to gain a better overview of existing reuse cases and further improve its ODM maturity score.

Highlight from Greece – the Open Data Hackathon

An important practice observed in this year's report is organising hackathons that involve numerous stakeholders to foster a culture of reusing open data across different sectors.

For example, the Open Data Hackathon in **Greece** is an initiative to promote innovation using open data. The event encourages participants – developers, entrepreneurs, students and professionals – to create prototype applications addressing challenges related to digital transformation across various sectors like energy, transport and real estate. It aims to foster collaboration between public and private sectors, create an innovation ecosystem and improve citizen services. The hackathon includes a mix of participants from different fields and offers mentorship, with prizes and opportunities for those who design the best solutions.

Read more about this trend in Section 7.2.

Latvia's improved maturity is primarily driven by increased awareness of reuse cases that demonstrate open data impact, particularly in the environmental and economic sectors. The country has made significant strides in monitoring environmental impact, a trend observed in several countries. Many countries, including Latvia, have also introduced initiatives to raise public awareness of open data through official guidelines for both the public and government bodies. For example, Latvia's 'Open by default' guideline sets the standard at making all data open unless there is a strong reason not to, encouraging widespread data transparency and reuse.

Highlight from Latvia – the transport website

This year, a generalised trend across countries is the reporting of reuse cases that focus on monitoring air and water quality, carbon dioxide emissions and the transport sector. For example, the website transportdata.gov.lv in **Latvia** serves as a platform for open transport data. It offers various datasets, including traffic statistics, public transport schedules, infrastructure information and vehicle registration data. The website provides interactive maps to visualise transport datasets. Users can also find analytical tools they can use to explore and interpret the data more effectively. This functionality enhances the usability of the datasets, allowing for better insights and informed decision-making regarding transport planning and development.

This resource is useful for researchers, developers and policymakers, as it enables informed decision-making, promotes transparency and encourages innovation in transport solutions. Users can access and utilise these datasets for analysis and application development, which benefits public services and urban planning.

Read more about this trend in Section 7.4.

7.2. Strategic awareness

This indicator assesses how well countries define the reuse and impact of open data and their readiness to measure impact using monitoring systems and research methods, particularly for HVDs. It examines the actions taken to generate open data impact. In essence, strategic awareness involves establishing the essential foundations needed to evaluate the effectiveness of open data initiatives.

Definition of open data reuse

In general, open data reuse refers to using public sector information for purposes other than those for which it was originally created. Table 52 presents an overview of how countries responded to the questions on this topic.

Table 52: Countries' responses to questions on definition of open data reuse

Do you have a definition of open data reuse in your country?	
EU-27	Like in 2023, 26 Member States (96 %), **all except Finland**, report having a definition of open data reuse.
EFTA	**Iceland** and **Norway** report having a definition of open data reuse. This has remained stable since 2023.
Candidate	**Albania**, **Serbia** and **Ukraine** report having a definition of open data reuse. This is the same as in 2023.

(Question I1)

The definition of open data reuse varies across countries. Commonalities exist, such as the emphasis on reusing public data for a purpose other than the originally intended one and enabling innovation through the development of applications, analyses or services that benefit the public. However, differences emerge in the legal frameworks, the scope of data included and the conditions of use. For example, **Ireland's** definition of reuse follows the open data directive, defining it as the use of public sector documents by individuals or legal entities. Data is considered open if anyone can freely use, reuse and redistribute it, subject to minimal conditions like attribution.

> **'Public information contained in documents communicated or published by the administrations mentioned in the first paragraph of Article L. 300-2 may be used by any person who wishes to do so for purposes other than those of the public service mission for which the documents were produced or received'**
>
> **France, Code of Relations between the Public and the Administration**

Some countries stress creative and open reuse, while others highlight specific legal guidelines tied to national or EU directives. For example, in **Slovakia**, the reuse of open data is primarily defined as the creative use of open data by various sectors, including non-governmental organisations and universities, to generate new solutions like applications, analyses or software, improving transparency, efficiency and innovation.

> **'The use by natural or legal persons of documents held by public administrations or bodies governed by public law for commercial purposes or for non-commercial purposes other than the institutional purposes for which the documents were produced, with the exception of the exchange of documents between public administrations'**
>
> **Italy, Legislative Decree 200 of 8 November 2021 transposing the open data directive**

Countries sometimes include specific qualifications in their definitions. For example, **Bulgaria** explicitly excludes the internal exchange of documents within public bodies from its definition. Countries also sometimes link their definition to multiple frameworks. For instance, **Austria** noted that reuse is guided by the principles of open government and governed by the Creative Commons licence CC BY 4.0.

Monitoring open data reuse

Monitoring how open data is reused and encouraging public bodies to track the reuse of their own datasets can help inform strategies to enhance the reuse of open data. Table 53 presents an overview of how countries responded to the questions on this topic.

Table 53: Countries' responses to questions on monitoring open data reuse

	Are there any processes in place to monitor the level of reuse of your country's open data?	*Are there any activities in place to encourage public bodies to monitor the reuse of their own published data?*
EU-27	25 Member States (93 %), **all except Croatia** and **Finland**, report having processes in place to monitor the level of reuse.	23 Member States (85 %) report a strong focus on encouraging public bodies to monitor data reuse. This represents a two-country increase compared with 2023, with **Finland** and **Greece** being the latest additions.
EFTA	All three participating EFTA countries report having processes in place to monitor the level of reuse. **Switzerland** is the latest country to report doing this.	**Iceland** and **Switzerland** report encouraging public bodies to measure the reuse of their own open datasets.
Candidate	Like in 2023, **Serbia** and **Ukraine** report having processes in place to monitor the level of reuse.	Like in 2023, **Serbia** and **Ukraine** report encouraging public bodies to measure the impact of open data.

(Questions I2, I3)

Countries approach monitoring the reuse of open data differently. Some countries have established frameworks and methodologies for tracking reuse, while others rely on informal feedback mechanisms or community contributions. Many countries emphasise the importance of monitoring to improve open data quality and foster better services for users.

Sweden noted that its monitoring of reuse involves collecting qualitative feedback through events and social media. Additionally, the national data portal enables users to share their reuse cases and provides download statistics as a measure of reuse. In **Ukraine**, monitoring of the level of open data reuse is supported by legislative mechanisms that focus on various aspects of open data development, including policy, capacity and quality. The Ministry of Digital Transformation maintains a catalogue of applications that utilise open data, updated regularly by users.

Highlight from Slovenia – using Matomo to upgrade the monitoring framework
Slovenia has made significant strides in monitoring the reuse of open data through its open data portal (the Open Data of Slovenia (OPSI) portal). It is upgrading its monitoring framework and utilising Matomo analytics. The Surveying and Mapping Authority (GURS) has agreements in place to facilitate monitoring. Data use has been systematically tracked since 2005, with advanced analytics employed to understand user needs.

Furthermore, countries implement various activities to encourage public bodies to monitor the reuse of their published open data. These activities include training programmes, workshops and direct communication with public entities to foster awareness of data impact and to encourage them to undertake monitoring practices. Many countries have established frameworks or organised events that bring together different stakeholders to share knowledge, tools and incentives to promote the effective monitoring of open data reuse.

For example, **Cyprus** has implemented a structured training programme for public sector information liaison officers, which includes a module dedicated to understanding and measuring the impact of open data. The open data team also supports events that highlight government-to-government reuse, fostering awareness among public sector bodies. Moreover, **Finland's** operating model for sharing data includes specific guidance and instructions for public bodies on monitoring data reuse, thus helping to create a structured approach to assessing the impact of their published data.

High-value datasets

Having robust processes in place to monitor and measure the reuse of HVDs can support measures and strategies applying the implementing regulation on HVDs. Table 54 presents an overview of how countries responded to the questions on this topic.

Table 54: Countries' responses to the question on HVDs

Does your country have processes in place to monitor and measure the level of reuse of HVDs?	
EU-27	19 Member States (70 %) report having processes in place to monitor the reuse of HVDs.

(Question I4)

Non-EU countries were not surveyed on this question, since Commission Implementing Regulation (EU) 2023/138 on HVDs applies only to EU Member States.

Processes for monitoring and measuring the reuse of HVDs often involve using national portals for data management, consulting legislative requirements on metadata provision and implementing structured reporting mechanisms. For example, in **Hungary**, government bodies monitor the availability and reuse of HVDs primarily through the national open data portal. Act CI of 2023 mandates that all public bodies provide metadata to the national portal, facilitating oversight. The National Data Asset Management Agency serves as a central point for requests related to HVDs, and, from 2026, the agency will provide its own HVDs.

As another example, **Romania**'s methodological guidelines include templates for yearly reporting, mandating institutions to monitor the reuse of HVDs through various approaches. This structured approach aims to ensure comprehensive tracking of data usage and compliance with open data standards.

Furthermore, several countries are using the same processes to monitor HVDs as they do for other types of datasets. However, as noted by **Greece**, in some cases, datasets must still be denoted as HVDs before their impact can be fully monitored.

Defining and measuring the impact of open data

There is no universal definition of open data impact, particularly since open data can have an impact in diverse domains. Specifying what the impact of open data means in the national context can enable better measurement of the effectiveness of policies and other implementation measures in achieving the envisaged impact. Table 55 presents an overview of how countries responded to the questions on this topic.

Table 55: Countries' responses to questions on defining and measuring the impact of open data

	Has your government specified what 'impact of open data' means?	*Do you have a methodology in place to measure the impact of open data in your country?*
EU-27	25 Member States (93 %) report having a definition of open data impact, with **Greece** being the latest addition to the group.	23 Member States (85 %) report having a methodology in place to measure the impact of open data, with **Greece** and **Hungary** being the latest countries to report having such a methodology.
EFTA	All three participating EFTA countries report having a definition of open data impact.	**Norway** and **Switzerland** report having a methodology in place to measure the impact of open data.
Candidate	**Albania**, **Serbia** and **Ukraine** report having a definition of open data impact, with **Serbia** being the latest addition.	**Albania**, **Serbia** and **Ukraine** report having a methodology in place to measure the impact of open data.

(Questions I5 and I6)

Countries have made various attempts to measure the impact of open data. These efforts are usually integrated into a general national strategy on open data and have as their basis the methodological collection of open data through a variety of sources and the analysis of this data through quantitative indicators. While some countries apply the same methodology to all types of open data, others use a specific methodology according to the category of data they are dealing with.

Highlight from Spain – the Aporta initiative

Spain's approach to defining the impact of open data is framed within the Aporta initiative, which serves as the country's national strategy on open data. There follows a detailed breakdown.

1. **Current definition within the Aporta initiative**

According to the Aporta initiative strategy document (p. 5), impact is understood as: 'any positive effect or benefit, obtained directly or indirectly for individuals, communities or society, which occurs over a certain period and results from the development of various activities characterised by the use of open data toward a specific goal'. This definition encompasses both direct and indirect benefits and highlights that open data usage can have a long-term positive influence on different sectors of society.

2. **Measuring impact**

In practice, Spain considers it essential to evaluate open data's impact using both quantitative measures (e.g. data usage statistics, number of datasets released) and qualitative measures (e.g. societal and community benefits). This dual approach helps capture the volume of data reused and its broader effects on society, such as transparency, innovation and public service improvements. For more context, see the discussion on the Aporta blog 'Measuring the impact of open data'.

3. Future developments

The new national open data strategy, which is currently in development, seeks to refine this approach even further. It recognises the need to evolve from a largely quantitative framework to a more comprehensive approach that incorporates qualitative measures of open data impact. The goal is to create a more nuanced and accurate understanding of how open data benefits society beyond basic metrics. For the latest updates, refer to the draft of the new strategy.

With regard to monitoring the reuse of open data, **Sweden** noted the importance of a user-driven process for opening up data and maintaining continuous user dialogues. It collects insights into the reuse of open data through the following efforts.

- **Seminars.** Public events where stakeholders discuss the importance and effects of open data.
- **National projects.** These aim to boost the use of open and shared data.
- **Dialogues and networking.** Engagement with public organisations that release open data helps track reuse and impact.
- **Social media groups.** Monitoring relevant groups to gain insights into how data is used.
- **Open data portals.** Public bodies, including at the local level, monitor application programming interface usage and apply web analytics to understand how the data is being reused.

Taking a different approach, **Italy** has incorporated methodologies for measuring the impact of open data into broader ICT-related initiatives. The three-year plan for ICT in the public administration includes specific actions on data and open data, which are measured annually. The plan's monitoring platform provides insights into the extent of open data usage and its impact on digital services. Progress on the plan is monitored through a dedicated portal, where relevant data is available in an open format. By analysing the fulfilment of objectives set in the plan, the government can measure the influence of open data on various sectors. This approach provides a structured way to measure both the development and the reuse of open data, focusing on real-world applications and digital services created through open data access.

Highlight from Poland – the impact of open data on entrepreneurship

Poland has developed a methodology for a nationwide study on the size and characteristics of the public data reuse market in Poland. This has enabled it to define key parameters for assessing the impact of open data on entrepreneurship. With some modifications and further testing, these parameters can be adapted to measure the effects of open data on other economic and sociocultural areas, whether for specific social groups or society as a whole.

Poland conducted the study using a quantitative survey through computer-assisted telephone interviews with representatives of companies involved in data management or analysis, or those in other types of companies who were best informed about the company's data usage. The study team employed a stratified random sampling method to ensure representativeness, accounting for four business size categories and regional divisions across provinces. This approach meant that they were able to generalise their findings to the entire population of entrepreneurs. A total of 600 interviews were conducted.

Moving forward, Poland plans to apply this methodology, with necessary adjustments, to other social groups, enabling it to test and refine open data impact indicators. Thus, it views this survey among entrepreneurs as a pilot for a broader framework to measure the impact of open data.

Collaboration to create open data impact

One way to create impact with open data is for the public sector to work together with other stakeholders. Table 56 presents an overview of how countries responded to the questions on this topic.

Table 56: Countries' responses to questions on collaboration to create open data impact

Is there collaboration between government and civil society or academia to create open data impact in your country?	
EU-27	25 Member States (93 %) report that they ensure collaboration between government and civil society or academia to create open data impact. Unlike in 2023, **Germany** and **Malta** did not report doing this in 2024.
EFTA	All three participating EFTA countries ensure collaboration between different parties to create open data impact.
Candidate	All four participating candidate countries ensure collaboration between different parties to create open data impact.

(Question I7)

Collaboration among a diverse range of stakeholders is essential for maximising the benefits of open data. Fostering a robust open data culture and promoting a wide array of data collection efforts can increase overall impact. This year, numerous countries reported improved collaboration between the private and public sectors and educational institutions. These partnerships have led to initiatives such as hackathons, webinars and other events aimed at encouraging the innovative reuse of open data across various fields.

Highlight from Ireland – Open Data Engagement Fund

The **Irish** 2023/2024 Open Data Engagement Fund is an initiative designed to enhance the use and accessibility of open data in Ireland. With a total funding pool of € 30 000, this programme invites applications from a broad range of participants – including individuals, businesses, public bodies and civil-society groups – for support for projects that promote innovative uses of datasets available on the national open data portal. The fund aims to foster transparency, drive public engagement and encourage collaboration across various sectors by funding outreach activities, application development and research that illustrates the potential benefits of open data.

The initiative emphasises the strategic goal of maximising the impact of open data in improving public service efficiency and informed decision-making. By prioritising projects that demonstrate tangible benefits, the fund seeks to raise awareness about the available datasets and encourage the development of solutions that address current societal challenges.

7.3. Measuring reuse

This indicator assesses the actions taken to map reuse, the methodologies for collecting and classifying reuse cases, and the activities performed to understand the requirements of reusers.

The reuse of datasets and reusers' needs

Conducting activities to document which open datasets are reused and how, and what the needs of reusers are, can help public bodies devise approaches to further stimulate the reuse of open data. Table 57 presents an overview of how countries responded to the questions on this topic.

Table 57: Countries' responses to questions on reuse of datasets and reusers' needs

	Have any public bodies in your country launched or performed any activities in the past year to understand which (open) datasets are reused and how?	*Have any public bodies in your country launched or performed any activities in the past year to better understand reusers' needs in order to further stimulate the reuse of open data?*
EU-27	26 Member States (96 %), **all except Malta**, report performing activities to understand which datasets are being reused and how.	24 Member States (89 %) report that public bodies perform activities to better understand reusers' needs. This is an increase of one country, **Romania**, from 2023.
EFTA	All three participating EFTA countries report performing activities to understand which datasets are being reused and how.	**Norway** and **Switzerland** report that public bodies perform activities to better understand reusers' needs.
Candidate	All participating candidate countries, **except Bosnia and Herzegovina**, report performing activities to understand which datasets are being reused and how.	**Serbia** and **Ukraine** report performing activities to better understand reusers' needs.

(Questions I8 and I9)

The most common activity performed to understand how datasets are reused is running interviews or workshops with reusers (25 Member States; 93 %), followed by conducting surveys (19 Member States; 70 %) and using web analytics (18 Member States; 67 %). Similarly, the most common activity performed to understand reuser needs was feedback sessions with portal users (21 Member States; 78 %), followed by sentiment analysis of social media (13 Member States; 48 %). For example, **Finland's** Helsinki Region Infoshare (HRI) conducts an annual user survey to gather feedback on its services. Additionally, a separate survey was conducted in 2024 among employees of the City of Helsinki to assess their awareness of and experiences with HRI, revealing that, while few knew about HRI, those who did had had positive experiences.

Gathering and classifying reuse cases

Public bodies can develop systematic ways of gathering and classifying reuse cases to understand how datasets are reused and what impact they can potentially create. Table 58 presents an overview of how countries responded to the questions on this topic.

Table 58: Countries' responses to questions on gathering and classifying reuse cases

	Have any public bodies in your country developed any systematic way of gathering reuse cases?	*Are there any public bodies in your country that have developed a systematic way of classifying the gathered reuse cases?*
EU-27	24 Member States (89 %) report that public bodies have developed systematic ways of gathering reuse cases. This is an increase of three countries, **Greece**, **Latvia** and **Romania**, from 2023.	18 Member States (67 %) report that public bodies have developed systematic ways of classifying reuse cases. This is an increase of three countries, **Greece**, **Portugal** and **Slovakia**, from 2023.
EFTA	**Norway** and **Switzerland** report that public bodies have developed systematic ways of gathering reuse cases.	**Norway** and **Switzerland** report that public bodies have developed systematic ways of classifying reuse cases.
Candidate	**Serbia** and **Ukraine** report that public bodies have developed systematic ways of gathering reuse cases.	**Serbia** and **Ukraine** report that public bodies have developed systematic ways of classifying reuse cases.

(Questions I10 and I11)

In 2024, the emphasis on data reuse has increased, as indicated by the development of innovative strategies that promote collaboration and community involvement. Key trends include systematic documentation of reuse cases through user submissions and interviews, centralised portals showcasing best practices and the implementation of user-driven tagging systems for easier navigation. These initiatives reflect a growing recognition of data reuse as a vital driver of innovation and collaboration across various sectors.

For example, **Cyprus** outlined its multifaceted approach to gathering reuse cases in the country's latest impact survey. The mechanism includes a range of activities designed to systematically identify and collect reuse cases while fostering a more engaged and collaborative data ecosystem. These activities include:

- **annual desktop studies** that actively search for and document examples of data reuse;
- an **online submission form** through which users can submit their applications and reuse cases, which are then showcased on various data portals;
- **interviews with key data reusers**, providing insights into how data is being utilised and repurposed in innovative ways;
- leveraging **social media groups** to actively encourage discussions and sharing of reuse cases among the community.

In **Hungary**, a central function of the national open data portal is the collection and presentation of applications and visualisations that showcase data reuse. This process involves establishing cooperation agreements with public authorities, from which the agency gathers examples of how open data is being reused. By facilitating the documentation of such cases, the portal highlights best practices and successful applications, creating a valuable resource for both public and private stakeholders. The portal also provides a platform where reuse examples are regularly published, ensuring transparency and promoting further reuse of data.

Highlight from Luxembourg – the Luxembourgish open data platform
To organise reuse cases on its portal, **Luxembourg** uses thematic categories and tags to make navigating and identifying relevant examples easier. Each reuse case is linked to a specific topic, such as agriculture, economy and finance, or environment and climate. This enables users to browse reuse cases by sector of interest. Additionally, the portal supports user-generated tags, providing more flexibility in how reuse cases are classified. This tagging system enables users to add relevant keywords that further describe the nature of the reuse, creating a more detailed and customisable search experience. By combining these thematic categories with user-driven tags, Luxembourg ensures that the reuse cases are systematically classified and easily searchable by the broader public.

7.4. Created impact

The created impact indicator assesses the presence of data that provides evidence on the impact that open data is creating in a country (e.g. in the form of research studies, statistics or impact assessments) and the presence of reuse case examples (e.g. data applications, digital services or analysis used for decision-making). The created impact indicator is evaluated in four impact domains: government, society, the environment and the economy.

Governmental impact

The governmental impact subindicator evaluates the presence of research data on open data impact and reuse cases that pertain to (1) the efficiency and effectiveness of the government in delivering public services, (2) the transparency and accountability of public administrations, (3) the policymaking process and (4) decision-making processes in public administrations. Table 59 presents an overview of how countries responded to the questions on this topic.

Table 59: Countries' responses to questions on governmental impact

	*Is there **data on the impact** created by open data on governmental challenges?*	*Is there a reuse case example related to the **efficiency and effectiveness** of government operations?*	*Is there a reuse case example related to the **transparency and accountability** of public administrations?*	*Is there a reuse case example related to the **policymaking** process?*	*Is there a reuse case example related to **decision-making** processes in public administrations?*
EU-27	17 Member States (63 %) report having such data available. This is an increase of three countries from 2023.	23 Member States (85 %) gave an example of a reuse case on this topic.	24 Member States (89 %) gave an example of a reuse case on this topic.	21 Member States (78 %) gave an example of a reuse case on this topic.	21 Member States (78 %) gave an example of a reuse case on this topic.
EFTA	**Norway** reports having such data available.	Like in 2023, all three participating EFTA countries gave an example of a reuse case on this topic.	All three participating EFTA countries gave an example of a reuse case on this topic, with **Iceland** being the latest addition.	All three participating EFTA countries gave an example of a reuse case on this topic, with **Iceland** being the latest addition.	All three participating EFTA countries gave an example of a reuse case on this topic, with **Iceland** being the latest addition.
Candidate	**Ukraine** reports having such data available.	**Serbia** and **Ukraine** gave an example of a reuse case on this topic.	**Serbia** and **Ukraine** gave an example of a reuse case on this topic.	**Serbia** and **Ukraine** gave an example of a reuse case on this topic.	**Serbia** and **Ukraine** gave an example of a reuse case on this topic.

(Questions I12, I13, I14, I15 and I16)

The following are some interesting reuse cases reported on this topic.

Reuse case example from Serbia – the Open Budgets platform

Subdomain

Transparency and accountability.

Functioning and purpose

The Open Budgets platform is an open data portal providing access to Serbia's detailed public budget information. It is a government initiative aimed at promoting financial transparency by enabling users to explore how public money is being allocated and spent. The platform centralises data from around 200 national and local budgets, making it easily accessible and understandable for a wide audience. The portal enables users to:

- view and download budgetary data in various formats (e.g. charts, tables, raw data);
- explore different levels of budgetary information, from overall national expenditures to specific sectoral and municipal allocations;
- track historical trends and changes in budget planning and execution.

Once a specific region is selected, the user can delve into the municipality's revenues or expenditures. For example, Figure 18: Serbia's Open Budgets platform.displays the expenditure for the municipality of Belgrade. Here, the user can see where the budget comes from, which areas it is allocated to and how it is spent.

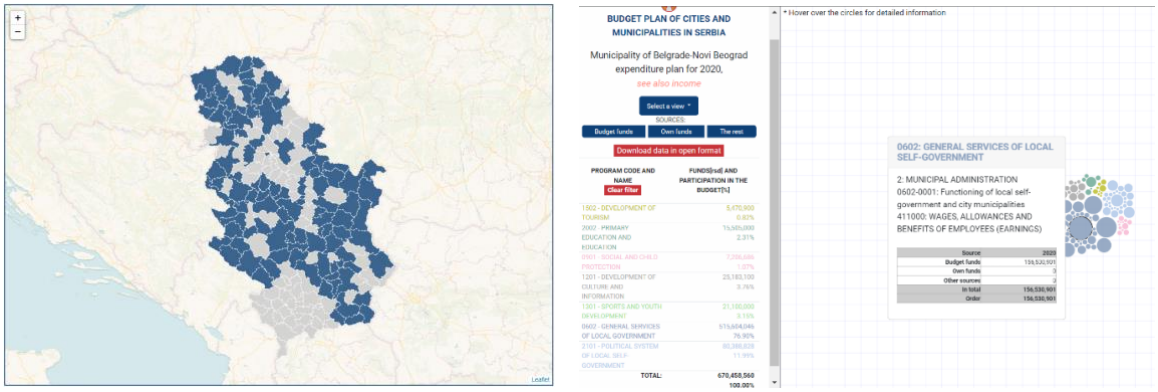


Figure 18: Serbia's Open Budgets platform

Target group

The users target are very diverse. The website provides instructions for using the platform in the form of video tutorials for citizens and local self-government units.

Datasets used

The datasets used include national budget data, local government budget data, historical budget data and data on sector-specific spending. All users who have created a visualisation, application or other use case that could enhance the user experience or the data provided by the portal are invited to contact the open data team at opendata@ite.gov.rs.

Impact

The platform plays a transformative role in governance by enhancing public oversight and fostering informed policy discussions. By providing accessible budget data, it empowers citizens and civil society to monitor government spending, promoting accountability and responsible fiscal management. This transparency builds trust between citizens and the government, and it enables researchers and policymakers to engage in meaningful discourse on fiscal policies. By helping them

to understand budget allocations, the platform encourages citizens to participate actively in democratic processes, advocating for effective governance, thus ensuring that their voices are heard in budgetary decision-making.

Reuse case example from Spain – the digital twin of Denia

Subdomain

Decision-making processes in public administrations.

Functioning and purpose

The city of Denia, in Alicante, Spain, has developed a digital twin, a virtual model of the city that integrates real-time data to help the local government analyse patterns and trends in tourism. This tool uses public datasets to simulate Denia's physical environment and tourism dynamics, enabling city planners to assess accessibility, plan new infrastructure and make data-driven decisions to manage tourism more effectively.

The digital twin provides detailed insights into tourists' movement, behaviour and spending patterns, making it possible to better allocate resources and improve public services. By understanding where national and international visitors concentrate, the model helps the local government and businesses optimise services, promote areas and forecast demand for public amenities. The primary goal of Denia's digital twin is to improve the city's tourism management by:

- identifying patterns and trends in tourist behaviour;
- assessing the accessibility of tourism resources, such as infrastructure, accommodation and tourist attractions;
- planning and optimising new tourism-related infrastructures based on data-driven insights;
- analysing visitor movement, traffic and spending habits to make more informed decisions about resource allocation and service provision;
- enhancing the overall tourism experience while optimising city planning.

Target group

The target groups for the digital twin initiative include local government officials, tourism agencies, civil engineers, researchers and citizens.

Datasets

The digital twin of Denia relies on several key datasets to construct and update its model:

- **Directorate-General of Cadastre dataset.** The dataset provides detailed information on buildings and property layouts in Denia, which is useful for urban mapping and infrastructure analysis.
- **PNOA-LiDAR dataset.** Light detection and ranging technology is used to create detailed 3D models of Denia's landscape, giving insights into topography and urban structures.
- **Tourism accommodation data from the open data portal of the Valencian Community.** The dataset lists hotels and accommodation, helping to map tourism hotspots.

Impact

Reusing open data significantly improves decision-making in the public sector, especially in tourism management and infrastructure planning. By utilising a digital twin, Denia can monitor tourist flow and analyse traffic and spending patterns, leading to better management of tourism resources, transport, healthcare and waste management. Ultimately, informed resource allocation and promotion of key areas can stimulate economic growth, attract new businesses and enhance services for both residents and visitors, fostering a more sustainable and vibrant community.

Social impact

The social impact subindicator evaluates the presence of research data on open data impact and reuse cases that pertain to (1) marginalised groups and inequality, (2) urban housing, (3) health and well-being and (4) education and skills. Table 60 presents an overview of how countries responded to the questions on this topic.

Table 60: Countries' responses to questions on social impact

	*Is there **data on the impact** created by open data on social challenges?*	*Is there a reuse case example related to **marginalised groups and inequality**?*	*Is there a reuse case example related to **urban housing**?*	*Is there a reuse case example related to **health and well-being**?*	*Is there a reuse case example related to **education and skills**?*
EU-27	14 Member States (52 %) report having such data available. **Belgium**, **Finland**, **Spain** and **Slovenia** are the latest additions.	19 Member States (70 %) gave an example of a reuse case on this topic.	22 Member States (81 %) gave an example of a reuse case on this topic.	23 Member States (85 %) gave an example of a reuse case on this topic.	21 Member States (78 %) gave an example of a reuse case on this topic.
EFTA	**Norway** reports having such data available.	**Norway** gave an example of a reuse case on this topic.	**Norway** and **Switzerland** gave an example of a reuse case on this topic.	**Norway** and **Switzerland** gave an example of a reuse case on this topic.	**Iceland** and **Switzerland** gave an example of a reuse case on this topic, with Iceland being the latest addition.
Candidate	**Serbia** and **Ukraine** report having such data available. **Serbia** is the latest addition.	**Serbia** and **Ukraine** gave an example of a reuse case on this topic.	**Serbia** and **Ukraine** gave an example of a reuse case on this topic.	**Serbia** and **Ukraine** gave an example of a reuse case on this topic.	**Serbia** and **Ukraine** gave an example of a reuse case on this topic.

(Questions I17, I18, I18, I20 and I21)

The following are some interesting reuse cases reported on this topic.

Reuse case example from Denmark – the Integration Barometer

Subdomain

Marginalised groups and inequality.

Functioning and purpose

The Integration Barometer is an online tool developed by the Danish Ministry of Immigration and Integration to track the progress of foreigners' integration into Danish society. It monitors key metrics related to social, economic and cultural integration. The platform collects and presents data across nine core indicators at both the national and municipal levels, providing a comprehensive view of how well integration policies are working in various regions of Denmark.

The barometer serves as a transparent, data-driven resource for policymakers, researchers and the public, enabling them to understand how immigrants are integrating into Danish society and where additional efforts may be needed. The main objectives of the *Integration Barometer* are to:

- monitor and track the success of integration initiatives across Denmark;
- provide a clear and actionable overview of the integration process for foreigners in areas such as employment, education, social engagement and health;
- enable policymakers to identify areas where integration efforts are succeeding and where progress is lacking, helping to shape targeted policies and interventions;
- promote transparency and accountability by making integration data publicly available to all stakeholders.

Target group

The target groups for the integration barometer include policymakers and government agencies responsible for immigration and integration policies at both the national and municipal levels. Municipal authorities can monitor integration trends in their areas and adjust policies as needed. Citizens and immigrant communities benefit from access to this data, which helps them to gain an understanding of progress on integration in communities across Denmark.

Datasets

The Integration Barometer compiles data from multiple national and municipal sources to monitor nine key indicators of immigrant integration in Denmark. These indicators include the employment rate, comparing the job status of immigrants with that of the native population; education levels, focusing on enrolment and attainment in primary, secondary and higher education; and language proficiency, which measures immigrants' ability to learn and use Danish. Additionally, the barometer tracks housing conditions, health outcomes, access to healthcare services, and political and civic participation in local and national processes. It also monitors crime rates within immigrant communities, assesses social inclusion to determine how accepted immigrants feel in Danish society and evaluates experiences of discrimination across various aspects of life.

Impact

The Integration Barometer has a significant impact on immigrant integration in Denmark by promoting data-driven policy decisions. It enables decision-makers to identify both successful areas and those needing improvement, fostering the development of targeted integration policies Additionally, the barometer enhances public understanding of the complexities of integration and the progress made, contributing to more informed public debates. Ultimately, the insights provided support organisations and initiatives that seek to assist immigrant communities and promote more inclusive and effective integration efforts.

Reuse case example from Lithuania – the Patient Waiting Time Dashboard

Subdomain

Health and well-being.

Functioning and purpose

The Patient Waiting Time Dashboard is an online tool developed by the Lithuanian Ministry of Health in collaboration with the State Patient Fund and the State Data Agency (

Figure 19). This dashboard uses real-time data from the advance patient registration information system to monitor and display waiting times for medical appointments across the country. It provides an easy-to-use interface enabling health administrators, policymakers and the public to track queue dynamics, identify bottlenecks in the healthcare system and assess the effectiveness of any measures aimed at reducing patient waiting times. The tool is part of an effort to improve transparency and efficiency in Lithuania's healthcare system by making relevant data readily accessible to all stakeholders. The Patient Waiting Time Dashboard was created with the aims of:

- monitoring patient waiting times for doctor appointments in real-time across healthcare facilities in Lithuania;
- identifying problematic areas where waiting times are disproportionately long, thus helping the health authorities to target resources more effectively;
- providing insights into how implemented measures (e.g. policy changes, staffing adjustments) are affecting the efficiency of the healthcare system;
- improving the overall quality of healthcare services by enabling data-driven decision-making and planning;
- increasing transparency and enabling patients and the general public to stay informed about the state of healthcare accessibility.

Figure 19: The home page of the Patient Waiting Time Dashboard

Target group

The Patient Waiting Time Dashboard is a valuable tool for various stakeholders in the healthcare system. It helps policymakers and government authorities to manage healthcare services and implement policies to reduce waiting times. Healthcare providers and administrators can monitor and enhance patient scheduling and appointment systems. Patients benefit from accessing real-time information on waiting times at different facilities, which enables them to make informed healthcare choices. Researchers can use the data for studies on healthcare efficiency and resource allocation.

Datasets

The Patient Waiting Time Dashboard integrates multiple datasets to provide comprehensive insights into patient waiting times. The datasets used are accessible via Lithuania's open data platform: Dataset on waiting times, Healthcare facility data, and Policy effectiveness tracking.

Impact

The Patient Waiting Time Dashboard enhances healthcare accessibility by identifying long waiting times and bottlenecks, enabling the Ministry of Health to take targeted actions to improve situations. It facilitates data-driven policymaking, helping the health authorities to make timely and informed decisions on resource allocation and staffing. The dashboard increases transparency and public trust by providing patients with accurate, up-to-date waiting time information, empowering better healthcare choices. It also promotes accountability, enabling hospitals and providers to be held accountable for their efficiency while tracking improvements. Overall, it improves planning and resource allocation by offering a clear picture of patient flow and facility usage, guiding investment to where it is most needed.

Reuse case example from Ukraine – an online resource on wartime higher education

Subdomain

Education and skills.

Functioning and purpose

Higher Education in Wartime is an online platform developed using open data from the Unified State Electronic Database on Education (Figure 20). This tool was designed to analyse and report on the state of higher education institutions in Ukraine during wartime. It leverages open data to provide a detailed overview of how universities and other educational establishments have been impacted

by the ongoing conflict, offering insights into disruptions, relocations and adjustments made to continue providing education during this challenging time. The resource is primarily aimed at journalists, researchers and educators interested in using open data to produce fact-based reports on education in Ukraine. The primary objectives of this project are to:

- provide transparent, data-driven reports on how the war in Ukraine has affected the country's higher education system;
- highlight the challenges faced and adaptations made by universities during wartime, including relocations, changes in student enrolment and changes in access to educational resources;
- offer a reliable source of information for journalists and researchers covering education and its intersection with conflict and crisis;
- support public awareness and policy discussions on the future of higher education in Ukraine during and after the conflict.

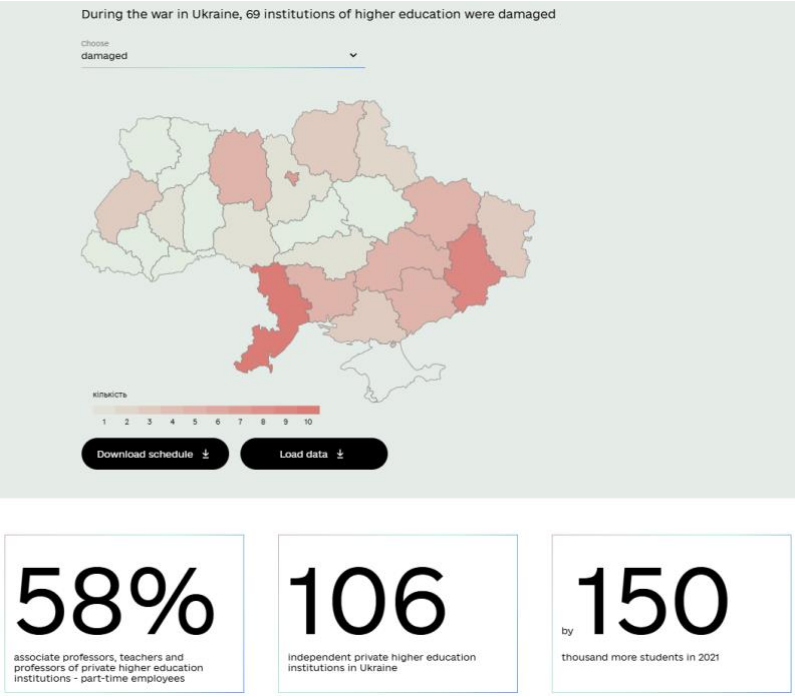


Figure 20: Some of the interactive features of the platform Higher Education in Wartime

Target group

The platform serves multiple stakeholders in the education sector: journalists, researchers and academics, education policymakers and students.

Datasets

The platform draws on the Unified State Electronic Database on Education, which includes data on institutions forced to relocate due to conflict, student enrolment figures reflecting wartime changes and institutional adaptation insights detailing how universities manage operations and support displaced students. These datasets are publicly available through Ukraine's open data initiative, providing a comprehensive view of the higher education landscape during the war.

Impact

The platform enables fact-based reporting on higher education in wartime, enhancing public understanding of the crisis. It supports policy decisions by providing insights critical for designing

interventions to assist universities and students. Additionally, it raises public awareness of the challenges faced by educational institutions in Ukraine, informing both the Ukrainian public and international communities. Finally, the resource promotes educational continuity by showcasing successful strategies for maintaining education during disruption, offering valuable lessons for future crises.

Environmental impact

The environmental impact subindicator evaluates the presence of research data on open data impact and reuse cases that pertain to (1) biodiversity, (2) environmentally friendly cities, (3) climate change and connected disasters and (4) energy consumption and the switch to renewables. Table 61 presents an overview of how countries responded to the questions on this topic.

Table 61: Countries' responses to questions on environmental impact

	*Is there **data on the impact** created by open data on environmental challenges?*	*Is there a reuse case example related to **biodiversity**?*	*Is there a reuse case example related to **environmentally friendly cities**?*	*Is there a reuse case example related to **climate change and connected disasters**?*	*Is there a reuse case example related to **energy consumption and the switch to renewables**?*
EU-27	15 Member States (56 %) report having such data available. **Denmark**, **Ireland**, **Latvia** **Portugal** and **Slovenia** report this for the first time.	24 Member States (89 %) gave an example of a reuse case on this topic.	24 Member States (89 %) gave an example of a reuse case on this topic.	23 (85 %) gave an example of a reuse case on this topic, with **Hungary** and **Latvia** being the latest additions.	24 Member States (89 %) gave an example of a reuse case on this topic. This is an increase of four countries, **Belgium**, **Croatia**, **Finland** and **Latvia**, from 2023.
EFTA	**Norway** reports having such data.	All three participating EFTA countries gave an example of a reuse case on this topic.	All three participating EFTA countries gave an example of a reuse case on this topic.	All three participating EFTA countries gave an example of a reuse case on this topic.	All three participating EFTA countries gave an example of a reuse case on this topic.
Candidate	**Ukraine** reports having such data.	**Serbia** and **Ukraine** gave an example of a reuse case on this topic.	**Serbia** and **Ukraine** gave an example of a reuse case on this topic.	**Serbia** and **Ukraine** gave an example of a reuse case on this topic.	**Serbia** and **Ukraine** gave an example of a reuse case on this topic.

(Questions I22, I23, I24, I25 and I26)

The following are some interesting reuse cases reported on this topic.

Reuse case example from Serbia – climate monitoring and grading system

Subdomain

Climate change and connected disasters.

Functioning and purpose

The climate monitoring and grading system is an initiative aimed at tracking progress in the fight against climate change while presenting information on the effects of climate change in the form of related disasters, such as rising sea levels and global warming. This project provides an overview of climate-related data and assessments, utilising open data from **Norway** and other countries. It incorporates a grading system that encourages the achievement of green results, which in turn influences policy decisions regarding climate change mitigation and adaptation. The main objectives of this initiative include the following.

- **Tracking climate progress.** Monitoring and reporting on advancements in climate action and their effectiveness in mitigating climate change.
- **Disaster impact assessment.** Evaluating and communicating the consequences of climate change, particularly related to environmental disasters like rising sea levels.
- **Policy guidance.** Using the grading system as a benchmark for setting goals and shaping policies aimed at achieving sustainable and environmentally friendly outcomes.

Target group

The initiative targets several key stakeholders: policymakers and government officials, researchers and academics, environmental organisations and non-governmental organisations, and the general public, who can use the data to enhance their understanding of climate change issues and engage with the measures being taken to address them.

Datasets used

The project utilises a variety of open datasets, including Norwegian climate data related to climate indicators, emissions and environmental assessments; international climate data from other countries, providing comparative insights into global climate efforts; and sea level and global warming data that tracks changes in sea levels and temperature patterns, illustrating the direct impacts of climate change.

Impact

The initiative promotes informed policy decisions by providing clear data and grading results that help policymakers align their strategies with climate goals. It increases accountability, thus motivating governments and other organisations to achieve green results and adopt sustainable practices. By making climate data accessible, it fosters public awareness about the significance of climate action and the effects of climate change, resulting in a more informed citizenry. Finally, the initiative encourages collaboration and data sharing among countries and organisations, facilitating a unified approach to tackling global climate challenges.

Reuse case example from Sweden – Klimatkollen (Climate Check-Up)

Subdomain

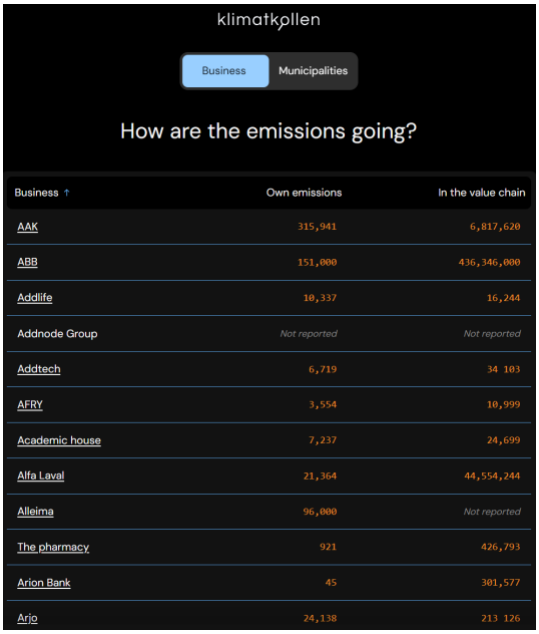
Energy consumption and the switch to renewables.

Functioning and purpose

Klimatkollen (Climate Check-Up) is a web service that provides citizens with access to information about carbon emissions in Swedish municipalities, specifically in relation to the carbon dioxide budget established by the Paris Agreement. The platform aims to raise awareness about climate change and promote community engagement in sustainability efforts. By making public data accessible, it empowers individuals and local governments to understand and address their carbon footprints. The primary objectives of the Klimatkollen initiative are as follows.

- **Raising awareness.** To educate citizens about the levels of carbon emissions in their municipalities and the importance of reducing these emissions to meet climate goals.
- **Promoting transparency.** To provide accessible information on carbon emissions and sustainability efforts, fostering accountability among local governments.
- **Encouraging action.** To motivate individuals and communities to take action to reduce their carbon footprints and support climate-friendly policies.

As exemplified in Figure 21, the platform analyses the emissions of both businesses and municipalities. In the former case, the data was used to conduct an analysis of 150 major Swedish companies' climate reporting. In the latter case, the platform displays an interactive map of the entire country, showing the changes in several climate indicators since the Paris Agreement. The indicators include, for example, carbon dioxide emissions and budgets to electric car and bike usage. The data can be consulted and downloaded freely.



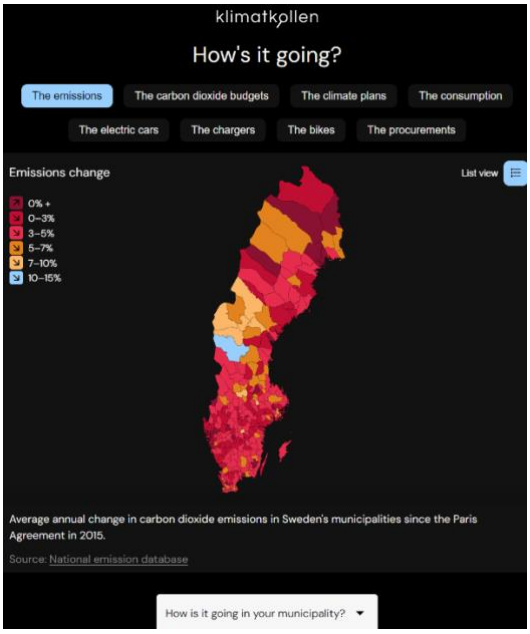


Figure 21: Overview of businesses' carbon emissions and their distribution within Sweden

Target group

Klimatkollen serves several key stakeholders: citizens interested in understanding their municipality's carbon emissions; local governments, which can assess their performance; researchers and activists; and educational institutions.

Datasets used

Klimatkollen relies on various public datasets to provide accurate information on carbon emissions. Users can find specific details about these datasets by visiting the data sources and methods section of the website and selecting 'Om våra källor' ('About our sources').

Impact

Klimatkollen promotes an informed citizenry by providing clear, accessible information about carbon emissions, empowering individuals to understand their impact on the climate. It increases local-level accountability by encouraging municipalities to be transparent about their emissions and engage in climate action. The platform supports data-driven decision-making for policymakers, aligning local actions with national and international climate goals. Additionally, by raising awareness of climate issues, it fosters community engagement and encourages collective action towards sustainability.

Economic impact

The economic impact subindicator evaluates the presence of research data on open data impact and reuse cases that pertain to (1) employment, (2) innovation and adoption of new technologies, (3) entrepreneurship and business creation and (4) productivity. Table 62 presents an overview of how countries responded to the questions on this topic.

Table 62: Countries' responses to questions on economic impact

	*Is there **data on the impact** created by open data on economic challenges?*	*Is there a reuse case example related to **employment**?*	*Is there a reuse case example related to **innovation and new technologies**?*	*Is there a reuse case example related to **entrepreneurship and business creation**?*	*Is there a reuse case example related to **productivity**?*
EU-27	16 Member States (59 %) report having such data available. This is an increase of two countries from 2023.	21 Member States (78 %) gave an example of a reuse case on this topic. This is an increase of four countries from 2023.	21 Member States (78 %) gave an example of a reuse case on this topic.	19 Member States (70 %) gave an example of a reuse case on this topic. This is an increase of two countries from 2023.	17 Member States (63 %) gave an example of a reuse case on this topic.
EFTA	**Norway** reports having such data available.	None of the participating EFTA countries gave an example of a reuse case on this topic.	**Iceland** and **Switzerland** gave an example of a reuse case on this topic.	All three participating EFTA countries gave an example of a reuse case on this topic, with **Iceland** as the latest addition.	None of the participating EFTA countries gave an example of a reuse case on this topic.
Candidate	**Ukraine** reports having such data available.	**Serbia** and **Ukraine** gave an example of a reuse case on this topic.	**Serbia** and **Ukraine** gave an example of a reuse case on this topic.	**Serbia** and **Ukraine** gave an example of a reuse case on this topic.	**Serbia** and **Ukraine** gave an example of a reuse case on this topic.

(Questions I27, I28, I29, I30 and I31)

The following are some interesting reuse cases reported on this topic.

Reuse case example from France – La Bonne Alternance and Emplois de l'inclusion

Subdomain

Employment.

Functioning and purpose

This initiative encompasses two interconnected services aimed at fostering job creation and improving access to employment opportunities: La bonne alternance and Emplois de l'inclusion. Both services leverage open data and digital tools to connect jobseekers with training centres and employers, focusing particularly on supporting young people and vulnerable individuals in finding meaningful work.

La bonne alternance is a digital public service designed to connect young people, apprenticeship training centres (CFAs) and companies (Figure 22). The platform provides a range of features to facilitate the apprenticeship process and improve job access for youth, including:

- a feature enabling small and medium-sized enterprises (SMEs) and CFAs to post job offers;
- a service that connects young people with CFAs;
- a feature enabling jobseekers to submit applications directly through the platform;
- modules to support communication with CFAs and provide assistance in finding host companies.

Achievements since the beginning of 2024 include the following:

- 12 171 job offers have been posted;
- 538 745 applications have been submitted;
- 48 942 contacts with CFAs have been established.

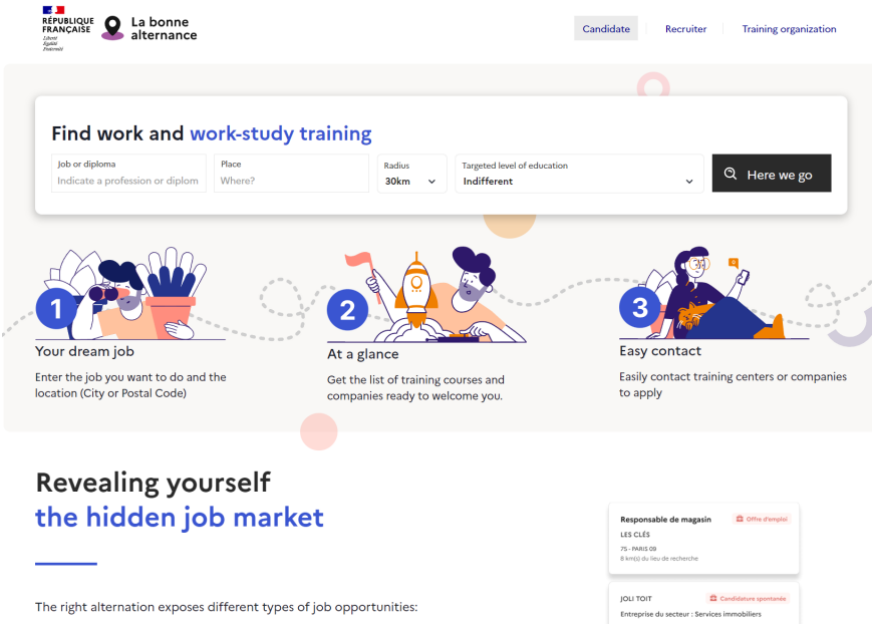


Figure 22: The home page of the website La bonne alternance

Emplois de l'inclusion, is another service that utilises open employment data to connect jobseekers with social enterprises. This initiative is aimed at helping vulnerable individuals access employment and training opportunities, facilitating their social integration through work. Key accomplishments include the following:

- 1 150 687 candidates have been hired through the service;

- 5 386 social enterprises have participated in recruitment.

The overarching goals of these services are set out below.

- **Job creation.** To facilitate job placements and enhance employment opportunities for young people and vulnerable populations.
- **Improving accessibility.** To streamline the connection between jobseekers and employers, particularly for those experiencing barriers to employment.
- **Support for vulnerable individuals.** To provide targeted assistance and resources for people from disadvantaged backgrounds to aid their integration into the workforce.

Target group

The platforms cater to young jobseekers looking for apprenticeships and placements, SMEs seeking to recruit young talent, social enterprises seeking to hire vulnerable people and the CFAs, which support the professional development of young people.

Datasets used

The services utilise datasets including **apprenticeship training offers**, **job offers** from SMEs and social enterprises, and **employment data** on candidates and hiring statistics. For more detailed insights, refer to the report *Measuring the Impact of Open Data: Analyzing governmental, environmental, social and economic impacts dimensions in France*.

Impact

The platforms enhance employment opportunities for young people and vulnerable individuals, aiding their integration into the workforce. They promote inclusivity by focusing on social enterprises and marginalised groups, and data-driven insights ensure continuous improvement. Additionally, the platforms foster community engagement by connecting employers, training centres and jobseekers, creating a supportive employment ecosystem.

Reuse case example from Slovenia – Sentinel Hub

Subdomain

Entrepreneurship and business creation.

Functioning and purpose

Sentinel Hub is an advanced geospatial data-processing engine that facilitates access to, visualisation of and analysis of vast amounts of satellite imagery and Earth observation data (Figure 23). Sentinel Hub enables users to leverage open satellite data, including imagery from the Sentinel and Landsat missions. It is designed to support application developers and researchers, with a user-friendly interface for browsing and processing satellite data at scale. The primary objectives of Sentinel Hub include the following.

- **Data accessibility.** To provide easy access to satellite imagery and Earth observation data for a wide range of applications, from agriculture to urban planning.
- **Supporting innovation.** To empower developers and researchers to build innovative applications using satellite data and machine learning.
- **Enhancing decision-making.** To assist stakeholders in various sectors in making informed decisions based on accurate and timely satellite imagery.

Figure 23: The functionalities of Sentinel Hub

Target group

Sentinel Hub serves developers and researchers, policymakers and businesses in sectors such as agriculture; these target groups use satellite data for applications such as environmental monitoring and urban planning.

Datasets used

Sentinel Hub leverages key datasets including Sentinel data from the Copernicus programme, Landsat imagery for historical land-use analysis and open Earth observation data, which ensures broad accessibility and fosters innovation (Figure 24).

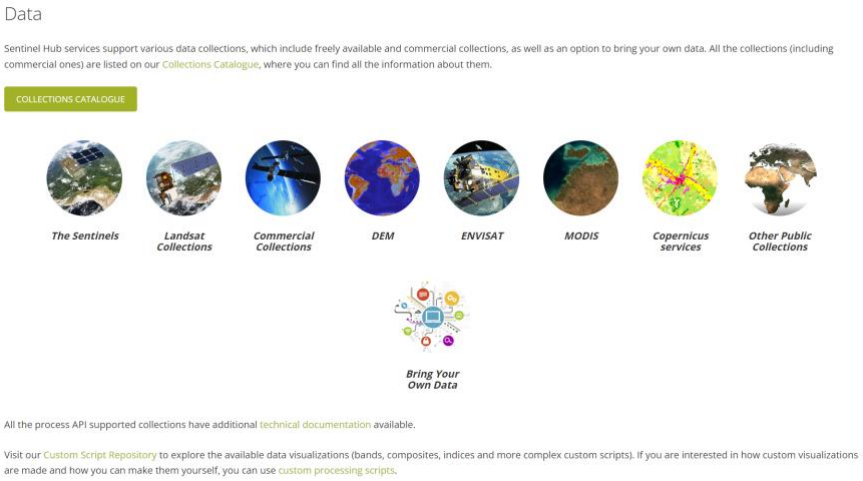


Figure 24: Overview of the data sources used by Sentinel Hub

Impact

Sentinel Hub revolutionises Earth observation by transforming access to satellite data, enabling faster and more efficient space applications. It accelerates innovation across sectors by making satellite imagery easily accessible, supports real-time data processing for timely decision-making, and offers global scalability, enabling users to process and visualise data on a global scale.

Chapter 8: Maturity-based clustering and recommendations

In this chapter, the participating countries are grouped into four clusters based on their overall maturity scores. Clustering countries on their level of open data maturity (ODM) helps to identify affinities. Countries in the same cluster can discuss strategies to overcome shared challenges. Moreover, countries in less mature clusters can learn from those in more mature clusters. Clustering also enables more focused recommendations to be formulated for each group of countries.

8.1. Clustering

To group the countries into clusters, the overall maturity scores were plotted from lowest to highest. Groups were demarcated where observable gaps in the ordered scores were identified. From the lowest to the highest performing, the four clusters are **beginners**, **followers**, **fast-trackers** and **trendsetters**. The clusters are visualised in Figure 25.

The distribution of composite maturity scores is skewed towards higher scores. The clusters are as follows.

- **Trendsetters (94–100 %).** Cyprus (CY), Estonia (EE), Italy (IT), Czechia (CZ), Lithuania (LT), Spain (ES), Ireland (IE), Slovakia (SK), Ukraine (UA), Poland (PL) and France (FR).
- **Fast-trackers (83–90 %).** Luxembourg (LU), Serbia (RS), Austria (AT), Norway (NO), Portugal (PT), Slovenia (SI), Latvia (LV) and Denmark (DK).
- **Followers (74–80 %).** Belgium (BE), Germany (DE), Hungary (HU), Finland (FI), the Netherlands (NL), Sweden (SE) and Switzerland (CH).
- **Beginners (15–69 %).** Bosnia and Herzegovina (BA), Albania (AL), Malta (MT), Iceland (IS), Greece (EL), Bulgaria (BG), Croatia (HR) and Romania (RO).

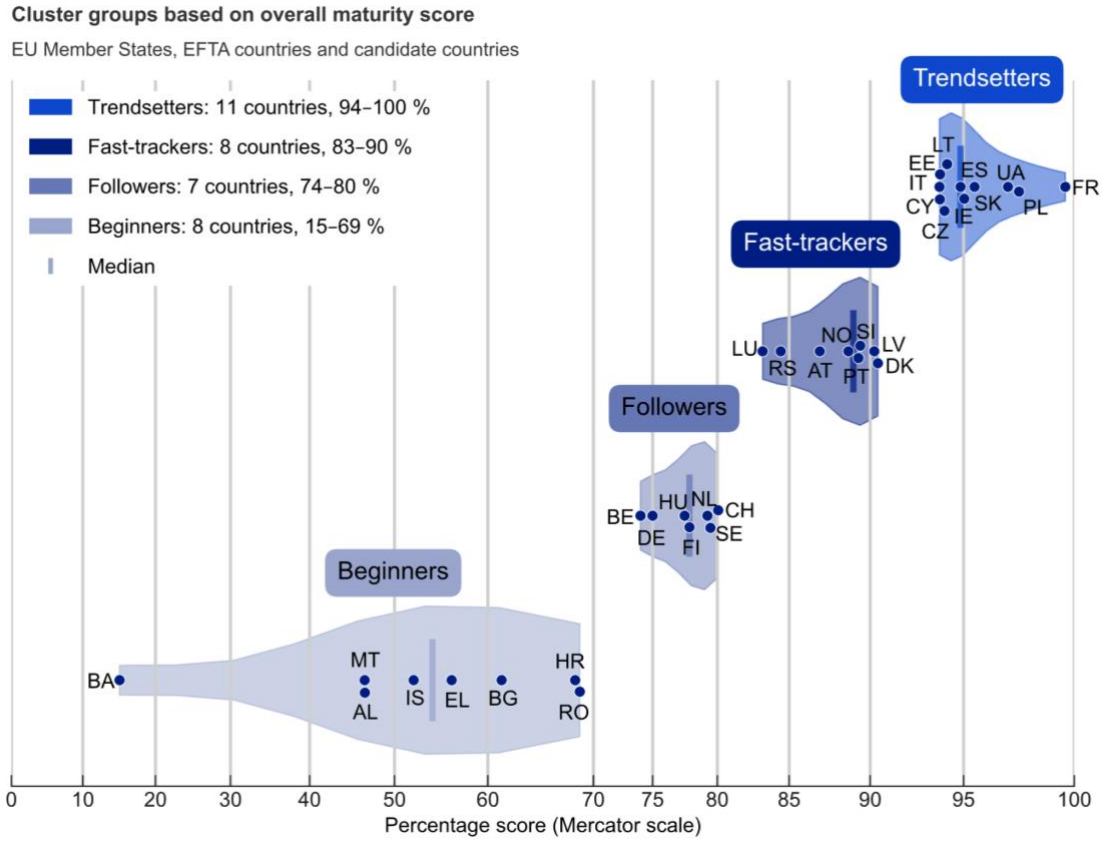


Figure 25: Four-group clustering of participating countries based on overall maturity score

8.2. Recommendations

Countries can use the following general advice to improve on their current ODM methodologies.

Trendsetters

Maintain the ecosystem, experiment and share knowledge

Cluster characteristics

The country has an advanced open data policy in place, with substantial coordination of open data activities at all levels of government. The national portal provides a wide range of features and caters to the needs of advanced users and publishers.

The quality of metadata accompanying open data in the country is very high, with various initiatives in place to ensure the publication of high-quality metadata and compliance with DCAT-AP.

Open data is taken up and reused for various purposes, creating impact in several domains. Activities to measure reuse are conducted, with methodologies in place to assess the impact in different domains. Few or no limitations on publication or reuse are observable.

1. Enhance and consolidate the open data ecosystems you support by developing thematic communities of providers and reusers. Continue to prioritise the categories specified as high-value datasets (HVDs).
2. Steer the network of open data officers to enable data-driven policymaking at their level of government, delegating and decentralising monitoring activities. Keep consistent the connection between the national strategy and objectives and the needs of agencies and local authorities, which will gain prominence over time.
3. Decide on and develop a strategy to ensure the sustainability of the national and local open data portal infrastructures. Experiment with alternative funding models. Share the outcomes of your experimentation with other countries.
4. Collaborate with other national data teams, universities, research institutions and data.europa.eu to develop an impact assessment framework. In addition, start developing country-specific metrics to measure impact beyond outputs. Consider options to assess both open data and data altruism initiatives. Operationalise monitoring the metrics and evaluating impact. Rely on a mix of methods (e.g. *ex ante* and *ex post* analyses, structured/semi-structured interviews, use cases, log analyses from the national portal) to gain a variety of insights. Improve your methods iteratively over time.
5. Continue to assess the impact of open data across sectors at both the micro- and macroeconomic levels. Showcase open data reuse cases in the economic, environmental and social domains to enhance and measure the impact of open data and to create an open data culture. Ensure that this impact is measured objectively by clearly defining open data impact. Repeat the assessments annually or biannually to observe change and refine activities and goals. Leverage the momentum created by showcasing the results to rally stronger political support.
6. Harness the wisdom of the crowd by enabling the broader open data community to contribute more to national open data programmes. Enable reusers to upload their own data and showcase their ideas and creations on the national portal. Ensure that publishers improve their data publication based on reusers' feedback and ratings.

7. Continue to improve the quality of data and its metadata by boosting the use of tools on your portal (e.g. for metadata validation). Explore the use of tools powered by artificial intelligence to improve metadata quality. Enable automated notifications to publishers to alert them to issues. Provide tools to convert data into alternative formats, possibly replacing non-machine-readable, proprietary formats. Invest in the portal so that you can use new workflows and tools that enable a better understanding of your reusers' profiles and needs while preserving their privacy.
8. After establishing an effective system for labelling and filtering HVDs on the portal, focus on maintaining this system and regularly monitoring dataset usage. Prioritise understanding reuse cases of HVDs and their potential positive impact on society. As part of these efforts, publish and promote successful reuse cases on the portal and regularly interact with data providers and users to better understand their needs and explore potential applications of these datasets.
9. Evaluate options for extending the open data portal such that it serves as a public register of data altruism organisations, or advise your government on which approach would best support the new initiatives in this area. Although the ODM assessment focuses on the open data directive (Directive (EU) 2019/1024), open data portals can be leveraged in efforts to implement other EU legislation, such as the Data Governance Act (Regulation (EU) 2022/868) and the Data Act (Regulation (EU) 2023/2854). For example, open data portals can be used to increase the visibility of public sector information, including protected data. Particularly for real-time data, link to various sources and evaluate means of incentivising custodians of real-time data to publish beyond the minimum legislative requirements.
10. Work with training institutions to provide advanced open data courses and training, and tailor training curricula to cover more advanced topics. Such training can include guidance on compliance with open data laws and education on data literacy. Make such courses formally recognised and provide certification upon successful completion.
11. Share your knowledge and the results of your experimentation with other countries to enable them to learn from your best practices and contribute to your research, for example in shared areas of focus or areas where you experience similar barriers. Reach out and cooperate with other countries to develop solutions to common challenges, including basic, reusable elements such as open-source software that your platforms can share (e.g. portal extensions).

Fast-trackers

Graduate from traction to impact

Cluster characteristics

The country shows a good level of maturity in all dimensions. Overall, the country demonstrates that it undertakes activities to boost data publication, with a strategic approach to increasing the quality of published metadata and increasing compliance with quality standards.

The national portal provides a good level of functionalities that cover the needs of basic and advanced users.

Substantial efforts are made to monitor the impact of open data. However, some issues in data publication or creating impact can still be observed, although measures are in place to tackle them.

1. Assist in the development of open data initiatives at the local and regional levels and seek to achieve better coordination with local and regional open data teams.

2. Activate the network of open data officers and enable them to set up monitoring activities within their organisation (e.g. by developing plans for data publication and monitoring practices). Track progress against these plans and assist open data officers in alleviating barriers to data publication identified in their organisations.

3. Ensure that existing open data courses and training materials are promoted and used. Cooperate with training organisations to develop new course offerings tailored to the needs of your national, regional and local administrations. Make such courses formally recognised and provide certification upon successful completion. Ensure that financial resources are allocated at all administrative levels to enable more civil servants to benefit from training.

4. Focus on organising activities that better target the delivery of sustainable solutions. Move beyond creativity-stimulating competition formats (e.g. hackathons) to formats that provide opportunities for the medium- to long-term engagement of businesses. Ensure funding and political sponsorship (e.g. by having an organisation serve as patron) for the winning ideas.

5. Promote and follow up on the performance of products and services built on open data. Develop strategic awareness of reuse and impact. Focus resources on a relevant field or sector to demonstrate impact, and use the specifications on HVDs for prioritisation. Set up thematic work groups in these areas. Create a framework for knowledge exchange and enable the development of a community of practice made up of providers and reusers. Increase your knowledge on the publication and reuse of data in the domain you have chosen to focus on and start thinking about a definition of impact in this field that can be operationalised through metrics.

6. Monitor access to and usage of the portal and enhance knowledge in your team of the profiles of your portal's typical users. Update the portal to better engage your audience. Include features that enable online interaction between data publishers and reusers. Showcase reuse examples prominently on the national portal and promote the datasets used to develop those reuse cases. Consider opportunities to promote the dataset developers as well. Enable the insights obtained from monitoring to flow into improving the portal features, access to data and the variety of data published in your country.

7. Establish and maintain a data inventory to ensure interoperability across systems and reduce redundant data collection. Conduct regular data audits to ensure that data is up to date and accurate.

8. Enhance the national portal's promotion of HVDs by adding advanced filtering options, allowing users to easily navigate to and explore datasets across the six HVD categories. Create dedicated sections on the portal where users can browse all available HVDs, learn about their importance and stay informed on the latest advancements in the field. As a best practice, consider studying the applications of these HVDs in depth to identify impactful reuse cases and showcase them on the portal to drive broader awareness and engagement.

9. Address any requirements relating to implementing the open data directive in your country that have not yet been addressed or are lagging behind in terms of features by revising and enhancing the portal's support for real-time data sources. Identify the primary real-time data holders and promote the publication of their data beyond the minimum requirements specified by law. Understand the concerns about and the costs of publication and work with publishers to facilitate the data publication process. Become aware of the requirements of the Data Governance Act and the Data Act and start exploring options to address them.

10. Think of ways to ensure the portal's sustainability by enabling more contributions from the open data community (e.g. submitted datasets, reuse cases developed, news articles and blog posts written by the community), by providing value-added features and by exploring additional funding options.

11. Enforce minimum standards on the quality of data by using analytics tools to monitor data publication – for both metadata (compliance with DCAT-AP) and data (publication formats). Develop validation processes for your national portal and report back to data providers. Act on the findings and provide tailored assistance to publishers to increase the quality of publication of both metadata and data. Explore the use of tools powered by artificial intelligence to improve metadata quality.

Followers

Strengthen governance, boost engagement

Cluster characteristics

The country has an open data policy in place that is supported by implemented measures. There is coordination on these activities. The portal has standard features but also some features that cater to the needs of more advanced users.

Some activities are conducted to boost the publication of high-quality metadata from different providers; however, often, a systematic approach to ensuring high publication quality across the board is lacking.

Limited activities are performed to monitor reuse and measure the impact of open data. Several limitations in terms of data publication and reuse still exist.

1. Update the national strategy on open data to reflect technical and policy developments at the EU level. If you have not yet done so, develop a definition of open data impact, setting up a framework to measure the benefits for society of reusing open data.
2. Set up a governance structure that accounts for the characteristics of your country. Engage potential reuse groups (e.g. data-gathering companies, research institutions, non-governmental organisations) in open data governance in your country. This will enable co-ownership around a common vision and buy-in for the actions of each sector.
3. Develop a yearly plan for online activities (e.g. events, conferences) to promote open data. Focus on competition formats that encourage publication and reuse by both the public and private sectors. Experiment with formats that both leverage creativity (e.g. hackathons) and enable the development of business opportunities in the medium to long term (e.g. data challenge competitions). Ensure funding and political sponsorship for the winning ideas. Promote and follow up on the performance of products and services developed.
4. Analyse user behaviour on the data portal responsibly, ensuring user privacy and being explicit about how insights will be used. Identify communities of reusers and conduct awareness-raising activities around open data within these groups (e.g. universities, data start-ups and data companies, research institutes, non-governmental organisations and journalists).
5. Encourage the network of open data liaison officers to set up data publication plans and monitor progress against these plans. Enable the open data officers to exchange knowledge and experiences between public sector bodies and with the broader network of reusers. Deepen the understanding within the network of open data officers of the benefits of open data reuse by the public sector.
6. Ensure that existing open data courses and training materials are leveraged and cooperate with public administrations and training organisations to develop open data training curricula for

national, regional and local administrations. Enable such courses to be formally recognised and provide certification upon completion. Ensure that financial resources are allocated at all administrative levels to training activities for civil servants working with data.

7. Enable meet-ups and engagement between reusers and publishers. Develop a deeper understanding of the demand side of open data and work with data providers to prioritise data publication accordingly. Focus on fostering open data reuse by the public and private sectors and encourage the open data community to share their reuse cases. Promote these open data use cases more prominently on the national portal, ideally in a section directly accessible from the home page.
8. Implement editorial tools, such as labels or tags, to increase the visibility of HVDs on the portal and encourage reuse by enabling users to filter specifically for these datasets. It would be beneficial to include a dedicated section of the portal that provides users with the latest updates and a clear overview of HVDs and their significance.
9. Regularly update the portal to reflect users' needs. Include features such as feedback and interaction mechanisms at the dataset level, designated login areas for users, access via SPARQL queries and application programming interfaces in general. Consider integrating data visualisation and analytics tools to allow portal visitors to gain insights from data through interactive charts and other visualisation tools. Monitor access to and usage of the portal. Draw insights from this data and enhance awareness of it within your team. Become aware of the requirements of the Data Governance Act and the Data Act.
10. Increase your understanding of the variety of data that your portal has (e.g. historical and current data) and work towards improving it. Identify data holders that do not publish their data or do not reach their full potential. Understand what friction they are experiencing and plan to address it. Enable publication of real-time data in your country.
11. Provide training and online materials focusing on metadata and data quality. Promote the DCAT-AP standard and existing guidelines to foster compliance. Create an understanding of the importance of publishing data in machine-readable, non-proprietary formats and of the licensing of data. Develop knowledge around existing open-source tools for cleaning up data, and specifically the use of validators for metadata compliance.

Beginners

Think big, act small

Cluster characteristics

The country is at an early stage of maturity in the four dimensions (or has yet to develop at the same pace as the countries in the higher-performing clusters). Fair progress towards an open data policy has been made, but this still needs to be supported by more robust implementing measures.

The open data portal has limited features or a limited number of datasets. No or very limited activities are performed to monitor the reuse and impact of open data.

More action is needed to enable high-quality data publication, and limited efforts are directed towards ensuring the adoption of DCAT-AP standards. Clear limitations exist regarding open data publication, with only a few reuse examples.

1. Develop a national strategy for open data and align it with broader strategies at the national level (e.g. digital strategies, strategies for the modernisation of the public sector). Ensure the development of legal frameworks and ethical guidelines to govern the use of open data and generally safeguard sensitive and personal information.
2. Rally support for the open data programme and political leadership from the top level of government. Showcase international research around the value of open data to emphasise the economic benefits of data exploitation. Use HVDs as a focal point.
3. Establish a team at the national level in charge of open data to ensure coordination of activities within the country and set up 'roadshows' to increase understanding of the team's scope and activities among primary public administrations. Include all levels of government in this process.
4. Organise a series of open data events at the national level and focus on engaging both data publishers and reusers in your country. Prioritise the promotion of reuse cases and best practices for data publication during such events.
5. Set up relevant communication channels and assign contact people for data publication within public administrations (e.g. open data liaison officers). Maintain an active dialogue with data officers and enable regular exchanges of knowledge among them, focusing on efficient online channels and face-to-face meetings.
6. Identify the primary data holders in the country and understand their main concerns and the barriers to data publication that they perceive. Take the first steps towards overcoming these barriers and unlocking the publication of data.
7. Organise workshops and awareness-raising sessions with the primary data holders. Use materials already developed in other countries and at the European level for content and as a source of inspiration.
8. Begin exploring HVDs by reviewing the legislation that came into effect in June 2024. As a best practice, consider adding a dedicated section to the portal to provide users with updates and a general overview of what HVDs are. As a next step, consider labelling relevant datasets as high value on the portal to increase their visibility and encourage reuse.
9. Develop guidelines to enable the publication of data and its metadata, as well as the take-up of suitable licensing conditions. If standard licences are not appropriate, as a last resort, investigate the possibility of developing a custom national licence. Learn from European best practices and reach out to colleagues in other countries when setting out to create such guidelines. Raise awareness among the leading data publishers of the importance of metadata and promote the DCAT-AP standard and specifications and existing guidelines developed at the European level.
10. Ensure that you run and maintain a modern portal that enables the publication and discoverability of open data. Scout for European best practices and compare solutions to choose the most appropriate ones to support the scope of your activities and your mission. Set up dedicated news and blog sections of the portal to promote relevant developments and showcase reuse. Ensure that feedback channels are seamlessly integrated into the national portal. Be aware of users' rights and privacy when performing web analytics, and choose your technology carefully.
11. Ensure that the national open data strategy guarantees the scoping, management and funding of the portal. Use action plans setting out specific activities and responsible entities or people to ensure that the strategy can be carried out. Ensure that sufficient resources are allocated to open data awareness-raising activities with publishers and potential reusers.

Chapter 9: Conclusions

Countries in Europe remain stable in terms of their open data maturity (ODM). This is despite an update to the ODM assessment methodology that set higher requirements for several questions. The intention of the update was to systematically stimulate ODM in Europe and to keep pace with policy and technological developments while ensuring consistency and comparability with previous ODM assessments.

In the EU, the **policy** dimension remains the most advanced, with its average score showing year-on-year improvement. This means that countries could provide the more detailed explanations requested in the revised questionnaire about their governance structures. The underlying 'open data implementation' indicator increased its score the most, reflecting the fact that EU Member States continue to implement their open data policies through specific measures and activities and have systems to assist data holders and address policy challenges. All Member States report that they are working towards applying the implementing regulation on high-value datasets (HVDs) (Commission Implementing Regulation (EU) 2023/138). Some data categories, such as statistical, geospatial and meteorological data, and some tasks, such as identifying HVDs and addressing legal barriers, show more progress than others. Nonetheless, there have been significant advancements (progress of more than 10 percentage points per category and task) compared with 2023.

The **portal** dimension remains the second most mature. However, this dimension saw the largest average year-on year decrease in score among the four dimensions year-on-year. In particular, the 'portal features' indicator experienced the greatest decrease. As part of the update to the ODM assessment methodology, questions about the presence of mature functionalities such as advanced search, filtering and download options were removed from the questionnaire. The absence of these points may have caused countries to score lower than in 2023 on this indicator. New requirements were also introduced regarding how portal managers use the data they collect from and about users to improve the portal. Overall, national portals probably remain similar to 2023, with the decrease in maturity scores related to the higher requirements set in this year's questionnaire. The automated tests on portal performance introduced in this year's assessment as a pilot indicator also highlighted various areas in which open data portals can invest efforts to improve their performance.

Scores on the **quality** dimension also decreased on average compared with 2023, and it is narrowly the dimension on which countries scored the lowest. However, scores on the dimension are still higher than in 2022. Several countries recorded lower metadata quality scores on the same questions asked last year. Presumably, this reflects more accurate reporting than in the previous year, perhaps indicating more accurate insights from their processes and monitoring tools. The computed metrics on metadata quality introduced in this year's assessment as a pilot indicator provide an automated evaluation of the metadata harvested by data.europa.eu. The goal of this pilot is to demonstrate the potential of using automatically measured metrics of metadata quality. The tool will need to undergo further scrutiny to enable more objective reporting in the future. DCAT-AP compliance, defined strictly using SHACL validation, is generally low. The pilot indicator highlights various areas in which metadata quality can still be improved.

The **impact** dimension again experienced the greatest year-on-year improvement. Building on the improvements from last year, Member States took further action to document the reuse of open data and collect and classify reuse cases. This translated into a greater awareness of available reuse cases, especially in the environmental and economic domains. However, examples of reuse cases are still more readily available than systematically collected data on the impact created by open data.

In the year ahead, Member States will continue to work to fully apply the implementing regulation on HVDs, for example by conducting the necessary technical upgrades to data publication processes (using application programming interfaces). In addition they will also ensure that they are no longer charging fees for the reuse of HVDs, that their metadata conforms to the DCAT-AP specification for

HVDs, implementing requirements of both the infrastructure for spatial information in Europe directive (Directive 2007/2/EC) and the implementing regulation on HVDs for certain datasets, as well as fulfilling obligations on reporting to the Commission.

In 2025, open data teams must continue to navigate the evolving data-sharing landscape and help implement, or coordinate with their peer civil servants leading, new and complementary government initiatives on data sharing. For example, the Data Governance Act (Regulation (EU) 2022/868) and the Data Act (Regulation (EU) 2023/2854) introduce measures to increase data availability and overcome technical obstacles to the reuse of data. Specifically, under the Data Governance Act, Member States must establish national single information points (NSIPs) to assist potential reusers in finding information on what protected data can be reused under specific conditions. Information will be collected from NSIPs and incorporated into the European Register for Protected Data held by the Public Sector, which will require their metadata to be structured and provided in a specific way; other technical and operational requirements for NSIPs will also need to be met. In addition, common European data spaces continue to be developed to increase the availability of data-sharing tools and services for the pooling, processing and sharing of industry data in accordance with European values and principles and with full respect for data providers' rights and for confidentiality.

Appendix: Methodology

This appendix describes the methodology of the 10th edition of the annual open data maturity (ODM) assessment conducted by data.europa.eu.

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Objectives of the open data maturity assessment

Since its launch in 2015, data.europa.eu ([1]) has been the main point of access at the EU level to public sector information published across Europe. The portal aims to improve access to open data, as well as to foster both high-quality open data publication and the reuse of open data to create impact.

Within this remit, data.europa.eu conducts an annual landscaping exercise of European countries on their ODM. Participation is voluntary, and the scope of the assessment includes the EU Member States, European Free Trade Association (EFTA) countries and candidate countries for EU membership.

The purpose of the ODM assessment is to evaluate the development of countries in making public sector information available and stimulating its reuse. The landscaping exercise offers a benchmarking and learning tool for use at both the national and European levels. The results of the assessment support countries in better understanding their relative level of maturity compared with other countries. The results also capture year-on-year developments in countries' ODM and help in identifying areas for improvement. Furthermore, the exercise also results in evidence-based recommendations on the activities that European countries could adopt to increase their ODM.

The ODM assessment is informed by the EU's open data policies, primarily the open data directive (Directive (EU) 2019/1024) and the implementing regulation on high-value datasets (Commission Implementing Regulation (EU) 2023/138). The ODM assessment also includes questions about data that cannot be made open, such as data covered by the Data Governance Act (Regulation (EU) 2022/868), since having an overview of such data is helpful when making publication plans, and open data portals can be used to assist potential reusers in finding information on what protected data can be reused under specific conditions.

([1]) data.europa.eu is the official portal for European open data. The portal was launched in 2021, formed from the merger of the European Data Portal and the European Union Open Data Portal into a single coherent core component of the public sector data infrastructure that has been set up by the EU, its institutions and the Member States.

History of the open data maturity assessment

The first three editions of the ODM assessment (2015–2017) used two dimensions to assess ODM: (1) open data readiness and (2) portal maturity, which evaluated policy developments at the national level and the degree of sophistication of national open data portals, respectively. In 2018, a major update to the landscaping methodology was carried out to better reflect open data developments across Europe. This revision of the methodology made the assessment more comprehensive and placed a stronger emphasis on the quality of metadata and the reuse of and impact derived from open data. The scope of the evaluation was broadened to cover four dimensions: (1) policy, (2) portal, (3) quality and (4) impact.

In 2019, additional layers of granularity were added to the four dimensions. The updates to the assessment aimed to provide further stimulus for national open data teams to redirect their focus onto new strategic areas – such as greater prioritisation of high-quality open data publication, active fostering of mechanisms to monitor open data reuse, and the development of advanced portal features such as multifaceted search and user feedback functionalities – and to raise awareness of the need for more inclusive and participative governance structures.

In 2022, the methodology underwent another structured revision. To this end, all four dimensions and related questions were reviewed. Across the four dimensions, questions were streamlined to better include initiatives at the regional and local levels and specific types of open data, such as real-time data and high-value datasets. In addition, the revision introduced a focus on countries' level of preparedness for the European Commission's upcoming implementing regulation on high-value datasets. A major change in the 2022 methodological update was the restructuring of the impact dimension. This was done to better acknowledge the challenge that countries face in assessing the impact of open data and to better distinguish between measuring the reuse of open data and measuring the impact created through that reuse. This involved adding a new indicator, on measuring impact, to the impact dimension.

In 2024, the method underwent another planned revision. The dimensions and indicators remained unchanged from the previous version of the methodology. In the policy dimension, more detailed explanations were requested regarding the national governance structure, and a question was added about the processes in place to update policies/strategies. In the portal dimension, some mature portal functionalities, such as search and download, were removed from the questionnaire. More detailed explanations were requested regarding how data about portal usage and user feedback are used to improve the portal. In the quality dimension, more detailed explanations were requested regarding the workflows and activities of the portal team to ensure that several aspects of high-quality metadata are achieved. Some questions about the type of support offered to data providers were merged due to overlapping responses from survey respondents. No major changes were made to the impact dimension, except that survey respondents needed to provide only one example of a reuse case for each category (instead of a maximum of three) and explain that case in more detail. Questions about high-value datasets were added across all dimensions, since the related implementing regulation was applicable from June 2024. EFTA and candidate countries could choose 'not applicable' when answering questions regarding specific EU legislative provisions and still be awarded full points under the scoring system.

Work approach

The data for the ODM assessment is collected through a voluntary self-assessment questionnaire sent to national open data representatives. This is done in collaboration with the European Commission and the Expert Group on Public Sector Information. Most questions have a predefined list of response options (e.g. 'Yes' or 'No') from which the respondents select. In addition, most questions request additional supporting information, such as a URL linking to relevant material or a description of related activities. Questions for which data from 2023 was available were prefilled in the questionnaire, enabling survey respondents to confirm if last year's response was still valid or provide a new response. This feature was newly introduced to support year-on-year consistency in responses.

Once the completed questionnaires are submitted, the research team validates the responses. First, the team performs a high-level check of each questionnaire for completeness. Following this, countries are given the opportunity to provide input on any missing answers. Then, an in-depth review of the completed questionnaires is conducted. The reviewers assess whether the explanations accompanying the answers are complete, relate to the question and sufficiently justify the response selected. The reviewers mark questions that are insufficiently answered and therefore require further input from the countries. Since the questionnaires were prefilled, allowing the survey respondents to confirm or change their responses, only answers that survey respondents changed from the previous year and answers for new questions were reviewed in detail.

Finally, a consultation round was held in which the survey respondents were invited to provide additional inputs and revise their responses to and supporting explanations for flagged questions. A preliminary scoresheet was shared with the survey respondents to validate the results. The research team finalised the scores based on the responses to the flagged questions.

Indicators and metrics

The indicators within each dimension are assessed through several questions that pertain to specific concepts. The tables below summarise the key concepts assessed for each indicator.

Dimension 1: Open data policy	
1.1. Policy framework	
1.1.1.	▪ Open data policies and strategies are in place at the national, regional and/or local levels. ▪ The open data policies/strategies include action plans with concrete measures.
1.1.2.	▪ The (national) open data strategy incentivises the public and private sectors to reuse open data. ▪ The (national) open data policies/strategies incentivise access to real-time and dynamic data, citizen-generated data and geospatial data. ▪ The (national) open data policies/strategies incentivise the development of data inventories in national, regional and local public bodies.
1.1.3.	▪ Measures are in place to implement the regulation on high-value datasets. ▪ Progress has been made in ensuring that public bodies holding high-value datasets are prepared to denote those datasets as such in their metadata.

Dimension 1: Open data policy	
1.2. Governance of open data	
1.2.1.	▪ An open data governance structure that ensures open data publication at all government levels is in place. ▪ The governance structure enables the development of open data initiatives at the local and regional levels.
1.2.2.	▪ Details of the person or team responsible for open data activities in the country are publicly available. ▪ A document describing the responsibilities and working approach of the national open data team (and possibly those of regional and/or local teams) is publicly available. ▪ Regular exchanges between the national open data team and the team maintaining the national and/or local portal(s) are ensured.
1.2.3.	▪ Open data officers have been appointed at each public body level. ▪ Regular exchanges between the national open data team and open data officers are ensured. ▪ Regular exchanges between open data officers, data providers and data reusers are ensured.
1.3. Open data implementation	
1.3.1.	▪ Data publication plans exist at the public body level, and progress against these plans is monitored at the national level. ▪ The number of public bodies still charging above the marginal costs for datasets is monitored.
1.3.2.	▪ Measures are in place to address the challenges faced in implementing the aforementioned open data policies/strategies. ▪ There are activities to assist data holders in making their data publicly available. ▪ There are processes in place to update the policies/strategies.
1.3.3.	▪ Training activities for civil servants working with (open) data are in place. ▪ Training activities result in certification and/or are formally recognised as professional development for civil servants. ▪ Society-wide open data literacy initiatives are in place.

Dimension 2: Open data portal	
2.1. Portal features	
2.1.1.	▪ Portal features ensure the discoverability of and access to datasets (including through APIs) and relevant content. ▪ Portal users can find documentation about using APIs and other tools that enable working with metadata, such as through search functionalities.
2.1.2.	▪ Advanced features enable users to provide content for the portal, give feedback on existing content and rate featured datasets.
2.1.3.	▪ The portal enables users to find information and news on relevant open data topics in the country.
2.1.4.	▪ The portal enables interaction and exchange between reusers and publishers.
2.1.5.	▪ Use cases are promoted through a designated section on the portal and mapped to the open data on which they are based. ▪ Reusers can submit use cases to the portal.
2.1.6	▪ Preview functions for both tabular and geospatial data are available.
2.1.7.	▪ The portal has features to promote the visibility and reuse of high-value datasets.
2.2. Portal usage	
2.2.1.	▪ Traffic to the portal (e.g. number of unique visitors, visitor profiles, percentage of outgoing portal traffic generated through APIs, number of downloads) is monitored by the portal team.
2.2.2.	▪ Analytics tools are used to derive insights into users' behaviour and needs. ▪ These insights are embedded in the portal update cycles.
2.2.3.	▪ The most and least consulted categories and datasets are known. ▪ The most used search keywords are known, and updates are performed to ensure greater discoverability of available content.
2.2.4.	▪ API usage is monitored and the results are used to gain insights into user profiles.
2.3. Data provision	
2.3.1.	▪ Most data providers can submit data to the national portal. ▪ Data providers that do not contribute to the national portal have been identified, and actions have been taken to enable data publication from these sources.
2.3.2.	▪ Local or regional data sources are discoverable through the national portal. ▪ Metadata from local or regional data sources is harvested automatically.

Dimension 2: Open data portal	
2.3.3.	▪ Access to real-time data is provided through the national portal. ▪ The percentage of real-time data in all data featured on the portal is known.
2.3.4.	▪ A separate section exists on the portal where community-sourced/citizen-generated data can be uploaded.
2.4. Portal sustainability	
2.4.1.	▪ Measures are in place to ensure that the portal reaches its target audience. ▪ The national portal has accounts and an active presence on social media platforms. ▪ The portal team helps to enhance the visibility of the portal and the featured datasets by organising/attending information sessions and/or events to promote the national portal.

Dimension 3: Open data quality	
3.1. Metadata currency and completeness	
3.1.1.	▪ A predefined approach is in place to ensure that metadata is up to date.
3.1.2.	▪ Mechanisms are in place to ensure that changes at the source are reflected with minimal delay on the national portal.
3.1.3.	▪ The portal provides access to a vast range of historical and current data.
3.1.4.	▪ Mechanisms are in place to ensure the interoperability of high-value datasets with those of other countries.
3.2. Monitoring and measures	
3.2.1.	▪ Mechanisms are in place to monitor the quality of metadata. ▪ Information on metadata quality is available to the broader public.
3.2.2.	▪ Guidelines and/or tools are available to assist data providers in choosing the correct licence for their data. ▪ The compliance level in terms of correct licensing information is monitored.
3.2.3.	▪ Support (e.g. documentation, tools, a helpline) is in place to assist data providers in improving data quality.
3.3. DCAT-AP compliance	
3.3.1.	▪ The national portal follows the DCAT-AP framework or is interoperable with it.
3.3.2.	▪ Compliance with the DCAT-AP standard regarding mandatory, recommended and optional classes is monitored.

Dimension 3: Open data quality	
3.3.3.	▪ Monitoring activities on the percentage of accessible distributions (i.e. the availability of 'accessURL' and 'downloadURL' properties) are in place.
3.4. Deployment quality and linked data	
3.4.1.	▪ A model (e.g. the 5-star open data model or similar) is used to assess the quality of data deployment. ▪ Activities are in place to familiarise data providers with ways to ensure the provision of high-quality data.
3.4.2.	▪ The percentage of published open data that complies with the chosen quality model is known.

Dimension 4: Open data impact	
4.1. Strategic awareness	
4.1.1.	▪ Reuse of open data is monitored at the national, regional or local level, for example through the national portal. This includes monitoring the reuse of high-value datasets.
4.1.2.	▪ Activities are in place at the public body level to boost and monitor the reuse of bodies' own published data.
4.1.3.	▪ A definition of reuse is in place. ▪ A methodology to measure the impact of open data is in place.
4.2. Measuring reuse	
4.2.1.	▪ Activities are in place to understand which datasets are reused and how, for example: ○ automated feedback mechanisms are in place to track users' access to datasets; ○ interviews/workshops are conducted with reusers to gather feedback; ○ surveys / other extensive research tools are used to measure the reuse of open data.
4.2.2.	▪ Activities are in place to better understand reusers' needs, for example: ○ feedback sessions with portal users are conducted regularly; ○ social media sentiment analysis is used.
4.2.3.	▪ A process is in place to systematically gather reuse cases. ▪ Reuse cases are classified according to categories (e.g. environmental, social, economic)
4.3. Created impact	
4.3.1.	▪ Data on the impact created by open data on governmental challenges is

Dimension 4: Open data impact	
	available in the country. ▪ Various reuse examples exist that showcase the impact of open data on: o increasing government efficiency and effectiveness in delivering public services; o increasing the transparency and accountability of public administrations; o enabling better policy- and decision-making.
4.3.2.	▪ Data on the impact created by open data on societal challenges is available in the country. ▪ Various reuse examples exist that showcase the impact of open data on: o better including marginalised groups and reducing inequality; o raising awareness of urban housing issues; o raising awareness of health- and well-being-related issues; o raising awareness of educational issues.
4.3.3.	▪ Data on the impact created by open data on environmental challenges is available in the country. ▪ Various reuse examples exist that showcase the impact of open data on: o raising awareness of biodiversity-related topics (e.g. air and water quality); o enabling more environmentally friendly cities; o raising awareness of climate change and related disasters; o encouraging lower energy consumption by reducing fuel use and switching to renewables.
4.3.4.	▪ Data on the impact created by open data on the economy is available in the country. ▪ Various reuse examples exist that showcase the impact of open data on the following indicators of economic growth: o employment, o technology and innovation, o entrepreneurship and business creation, o productivity.

Scoring

Countries are scored on a list of questions relating to each indicator. Each question-and-answer selection is worth a different number of points. Where relevant, choosing 'not applicable' as an answer is worth full points, for example when EU legislation does not apply to a country. The scores for the individual questions sum together to provide a total score for the indicator. In turn, the indicator scores are added together to give scores for the dimensions. The maximum scores for the indicators and dimensions are shown in the table below. The overall maturity score is calculated as the weighted percentage of all the dimensions, meaning that each dimension contributes 25 % towards the overall maturity score.

Dimension	Indicator	Number of scored questions	Maximum score per indicator	Maximum score per dimension
Policy	Policy framework	13	320	640
	Governance of open data	8	180	
	Open data implementation	7	140	
Portal	Portal features	21	230	670
	Portal usage	9	180	
	Data provision	8	150	
	Portal sustainability	5	110	
Quality	Metadata currency and completeness	6	140	630
	Monitoring and measures	8	160	
	DCAT-AP compliance	7	165	
	Deployment quality and linked data	7	165	
Impact	Strategic awareness	7	140	580
	Measuring reuse	4	120	
	Created impact	20	320	

Pilot indicator: automated metrics of metadata quality

Metrics were extracted from the metadata quality assessment (MQA) to quantitatively evaluate metadata quality. The MQA evaluates the quality of metadata of each catalogue harvested by data.europa.eu.

Five metrics were reported in the MQA as a pilot indicator of ODM quality. The level of compliance with these five metrics was taken for one catalogue per participating country. These metrics are evaluated largely based on the use of specific data catalogue vocabulary application profile (DCAT-AP) properties and the content of these properties in relation to specific controlled vocabularies across distributions in the catalogue. A summary of the metrics and their definitions is provided in Table 63.

Table 63: Selected metrics from the metadata quality assessment

Metric	What is being measured?	How is it measured?
DCAT-AP compliance	DCAT-AP compliance is calculated across all sources and datasets available in a catalogue. This check is only performed if the metadata is originally harvested as a DCAT-AP or as a valid derivate. DCAT-AP is a specification for describing linked public data in Europe.	The metadata is validated against a set of SHACL shapes. The metadata is not compliant if the SHACL validation reports at least one issue. The MQA uses data.europa.eu's DCAT-AP SHACL validation service.
Machine-readable	Checks if the format of the distribution is machine-readable.	The distribution is considered machine-readable if the specified format is contained in the corresponding data.europa.eu GitLab repository vocabulary. Distribution: **dct:format**
DownloadURL	The downloadURL is a direct link to the referenced data.	It is checked whether the property is set or not. Distribution: **dcat:downloadURL**
Licence information	A licence is valuable information for the reuse of data.	Whether the property is set or not is checked. Distribution: **dct:license**
Licence vocabulary	We would like to limit the provision of incorrect licence information. For example, we encounter many Creative Commons licences that lack versioning.	This metric describes all dimensions that the MQA examines to determine the quality. The dimensions are derived based on the principles of findability, accessibility, interoperability and reusability. The MQA recommends and credits the use of controlled vocabularies. The data.europa.eu portal publishes its controlled vocabularies in GitLab. The vocabularies are derived from the EU vocabularies. Distribution: **dct:license**

Pilot indicator: automated metrics of portal performance

In addition to gathering qualitative information on portals, there are technical/quantitative ways to evaluate portals. These tests extend the scope of ODM through standardised tools. Automated tools are online tests through which website URLs are entered and assessed on several criteria. As a pilot, four indicators (mobile friendliness, page speed, security and web accessibility) were measured using standardised online tests. The home page of the main open data portal reported in the ODM survey for each participating country was evaluated.

Mobile-friendliness

The mobile-friendliness indicator assesses how well a website is adapted for access on mobile devices, ensuring a seamless user experience for visitors on smartphones and tablets. This indicator is measured through the Bing Mobile Friendliness Test Tool, which runs checks on the following key factors.

- **Viewport and zoom control configuration.** The viewport meta tag needs to be set correctly in order for mobile-friendly pages to work well on devices of different sizes and orientations. In general, this means that the viewport is set with the content width equal to the device width. While it is possible for pages with an alternate viewport configuration to be mobile friendly on certain devices, they may not work equally well on all devices. The zoom control check verifies if the configuration of the viewport hampers the user's ability to pinch and zoom the page. In general, not using the scale-related viewport settings should result in your page being zoomable on most mobile browsers. However, the improper use of these settings (user scalable, maximum scale, minimum scale) could result in hampering access to some content on the page. Some mobile-friendly pages prevent user zoom by design, and the Bing test takes that into account before flagging an error.
- **Width of page content.** In general, the content width should not exceed the screen width. The Bing test has some tolerance built in, but any page that requires excessive horizontal panning will be flagged for the error 'Page content does not fit device width'.
- **Readability of text on the page.** It is important to understand that readability is a function not just of font size, but also of viewport scaling. It is useful to think of readability as the average area occupied by text when the page is fully zoomed out to fit the device's width.
- **Spacing of links and other elements on the page.** This indicator is related to touch friendliness. The Bing test looks at all input elements and hyperlinks on the page to see if they occupy an area considered 'tap-friendly' at maximum zoom-out. If that is not the case, the page will be flagged with 'Links and tap targets are too small'.
- **Use of incompatible plug-ins.** Another warning that Bing detects is when the page is incompatible with plug-ins (e.g. Flash) or the page is otherwise not intended for use on mobile devices. The Bing tool detects any error messages that are produced by the page on a typical mobile device and currently captures those as warnings in the mobile friendliness test.

Additionally, the tool checks for and reports on resources that are needed to analyse the page fully but that the Bing tool was not able to assess due to robots.txt constraints. This way, rendering issues can be fixed by webmasters by updating robots.txt in such a way that Bing can accurately determine the mobile friendliness of the sites. To analyse a website, the Bing mobile crawler fetches and renders the page, extracting important features that are used by the tool to determine how the page performs

against each of the above factors. The outcomes are then aggregated to provide a consolidated mobile friendliness verdict for the page.

The scoring is as follows:

- if a website passes all the tests, a score of 100 % is attributed;
- if a website fails any of the tests, a score of 0 % is attributed.

Speed and performance

The speed and performance of a website are important parts of its usability. This indicator measures a selection of speed and performance standards from Google's page speed insights.

The following indicators are included:

- **Time to interactive** is the amount of time it takes for the page to become fully interactive. This is an important user-centric metric because it measures how quickly visitors are able to fully interact with the page. It measures a page's load responsiveness and helps identify situations in which a page looks interactive but, in fact, it is not.
- **First contentful paint** measures the time from the start of loading to when elements of the content of the page appear on the user's screen (including images, text, scalable vector graphics and non-white elements). It measures the time from when the page is completely blank until the first element appears on the screen
- **Largest contentful paint** measures the time a website takes to show the user the largest piece of content on the screen, complete and ready for interaction.
- **Cumulative layout shift** measures the largest burst of layout shift scores for every unexpected layout shift that occurs during the entire lifespan of a page. A layout shift occurs whenever a visible element changes its position from one rendered frame to the next.

Each website either passes or fails based on the thresholds set by the tool (Table 64).

Table 64: Google page speed insights thresholds

Test	Pass threshold
Time to interactive	Less than 3.8 seconds
First contentful paint	Less than 1.8 seconds
Largest contentful paint	Less than 2.5 seconds
Cumulative layout shift	Less than 0.1 milliseconds

Security

All URLs were run through the publicly available security testing tool internet.nl, which was developed by the Dutch national government. This tool tests several complementary items, which are considered to contribute to basic cybersecurity hygiene. Each test results in either a pass or fail based on whether or not the URL meets the requirements set.

- **IPv6: reachable through a modern internet address?** Overall, this test checks if the website is reachable for visitors using a modern address (IPv6), making it fully part of the modern internet. The test includes the following subtests.
  - **IPv6 addresses for name servers.** This test checks if your domain name has at least two name servers with an IPv6 address.

- **IPv6 reachability of name servers.** This test checks if all name servers that have an AAAA record with an IPv6 address are reachable through IPv6.
- **IPv6 addresses for web servers.** This test checks if there is at least one AAAA record with an IPv6 address for a web server.
- **IPv6 reachability of web servers.** This test checks if it is possible to connect to a web server through IPv6 on any available ports (80 and/or 443). Additionally, all IPv6 addresses that are received from the name servers are tested. A partial score is given if not all IPv6 addresses are reachable. If an IPv6 address is (syntactically) invalid, it is considered unreachable.
- **Same website on IPv6 and IPv4.** This test compares the response and content received from a web server over IPv6 with that received over IPv4.

- **Domain name system security extensions (DNSSEC): domain name signed?** This test checks if the domain is signed with a valid signature (DNSSEC). If so, visitors with domain signature validation enabled are protected against manipulated translation from the domain into rogue internet addresses.
  - **DNSSEC existence** checks if the domain, more specifically its start of authority record, is DNSSEC signed. If a domain redirects to another domain through a canonical name (CNAME), then it also checks if the CNAME domain is signed (which is conformant with the DNSSEC standard). If the CNAME domain is not signed, the result of this subtest will be negative.
  - **DNSSEC validity** checks if the domain, more specifically its start of authority record, is signed with a valid signature, making it 'secure'.
- **Hypertext transfer protocol secure (HTTPS): secure connection?** Overall, this test checks if information in transit between the website and its visitors is protected against eavesdropping and tampering. This includes the following subtests.
  - **HTTPS available** checks if the website is reachable on HTTPS. If so, it also checks in the below subtests whether HTTPS is configured sufficiently securely in conformance with the *IT Security Guidelines for Transport Layer Security (TLS)* from National Cyber Security Centre in the Netherlands. HTTPS guarantees the confidentiality and integrity of the information exchanged. Because how (privacy) sensitive and valuable information is depends on the situation, a secure HTTPS configuration is important for every website. Note that, for performance reasons, the tests in the HTTPS test section are only run for the first available IPv6 and IPv4 addresses.
  - **HTTPS redirect** checks if a web server automatically redirects visitors from HTTP to HTTPS on the same domain (through a 3xx redirect status code like 301 or 302) or if it offers support for only HTTPS and not HTTP. If the server does redirect visitors, a domain should first upgrade itself by redirecting to its HTTPS version before it redirects to another domain. This also ensures that the HTTP strict transport security (HSTS) policy will be accepted by the web browser. Note that this subtest is only conducted if the given domain correctly redirects from HTTP to HTTPS. An eventual further redirect to a different domain (including a subdomain of the tested domain) is not tested.
  - **HTTP compression** makes a secure connection with a web server vulnerable to a browser Reconnaissance and exfiltration via adaptive compression of hypertext attack. However, HTTP compression is commonly used to make more efficient use of the available bandwidth. This subtest checks if a web server supports HTTP compression at the root

directory level. However, it does not check additional website sources like images and scripts.

- **HSTS** checks if your web server supports HSTS. Browsers remember HSTS per (sub)domain. Not adding a HSTS header to every (sub)domain (in a redirect chain) may leave users vulnerable to man-in-the-middle attacks. Therefore, this subtest checks for HSTS on first contact (i.e. before any redirection).
- **Transport layer security (TLS) version** checks if a web server supports only secure TLS versions. A web server may support more than one TLS version.
- **Cyphers (algorithm selections)** checks if a web server only supports secure (i.e. 'good' and/or 'sufficient' cyphers (also known as algorithm selections)). An algorithm selection consists of cyphers for four cryptographic functions: (a) key exchange, (b) certificate verification, (c) bulk encryption and (d) hashing. A web server may support more than one algorithm selection.
- **Cypher order** checks if a web server enforces its own cypher preference ('I') and offers cyphers in accordance with the prescribed ordering ('II').
- **Key exchange parameters** checks if the public parameters used in Diffie–Hellman key exchange by a web server are secure.
- **Hash function for key exchange** checks if a web server supports secure hash functions to create the digital signature during key exchange.
- **TLS compression** checks if a web server supports TLS compression. The use of compression can give an attacker information about the secret parts of encrypted communication. An attacker that can determine or control parts of the data sent can reconstruct the original data by performing a large number of requests. TLS compression is used so rarely that disabling it is generally not a problem.
- **Secure renegotiation** checks if a web server supports secure renegotiation.
- **Client-initiated renegotiation** checks if a client (usually a web browser) can initiate a renegotiation with a web server. Allowing clients to initiate renegotiation is generally not necessary and leaves a web server open to denial-of-service attacks inside a TLS connection. An attacker can perform similar denial-of-service attacks without client-initiated renegotiation by opening many parallel TLS connections, but these are easier to detect and defend against using standard mitigation procedures.
- **Zero round trip time resumption** checks if a web server supports zero round trip time resumption.
- **Online Certificate Status Protocol stapling** checks if a web server supports the TLS certificate status extension, also known as Online Certificate Status Protocol stapling.
- **Trust chain of certificate** checks if it is possible to build a valid chain of trust for a website certificate. To have a valid chain of trust, the certificate must be published by a publicly trusted certificate authority, and the web server must present all necessary intermediate certificates.
- **Public key of certificate** checks if an elliptic curve digital signature algorithm or a Rivest–Shamir–Adleman algorithm digital signature of a website certificate uses secure parameters.
- **Signature of certificate** checks if the signed fingerprint of a website certificate was created with a secure hashing algorithm.

- **Domain name on certificate** checks if the domain name of a website matches the domain name on the certificate.
- **Domain-name-system-based authentication of named entities (DANE) existence** checks if the name servers of a website domain contain a correctly signed TLS authentication record for DANE. As DNSSEC are a precondition for DANE, this test will fail if DNSSEC are missing on the website domain or if there are DANE-related DNSSEC issues (e.g. no proof of 'denial of existence').
- **DANE validity** checks if the DANE fingerprint presented by a domain is valid for the web certificate.

Accessibility foundations

This indicator evaluates the accessibility status of websites, assessing how usable websites are for a large variety of users (regardless of, for instance, their visual abilities). The open-source Axe-core tool (browser extension) is used to measure this indicator. This indicator can also be defined as the extent to which websites comply with the foundational parts of the EN 301 549 standard (web content accessibility guidelines (WCAGs) level AA).

The tool takes into account the most recent WCAGs and covers 20 of the 50 success criteria, with tests across all of the four main principles (perceivability, operability, understandability and robustness). For this pilot indictor, the following seven success criteria were measured.

- **Alternative text (WCAG 1.1.1)** evaluates whether a website offers text alternatives for non-text content, enabling it to be transformed into formats like large print, braille, speech, symbols or simplified language to meet diverse user needs.
- **Colour contrast (WCAG 1.4.3)** evaluates if the visual presentation of text and images of text on a website has a contrast ratio of at least 4.5:1.Exceptions include cases of large text, text or images part of an inactive user interface component and text that is part of a logo or brand name.
- **Page/document title (WCAG 2.4.2)** evaluates if a website has titles that describe the topic or purpose.
- **Link name (WCAG 2.4.4)** evaluates the clarity and accessibility of links on a website.
- Language attribute (WCAG 3.1.1) evaluates if the primary language of each web page is specified in a way that can be identified by software, such as screen readers and search engines.
- **Valid language code (WCAG 3.1.2)** evaluates if the language of each passage or phrase in a website's content can be identified and defined by software, allowing assistive technologies (e.g. screen readers) to accurately convey content in the appropriate language.
- **Name, role and value (WCAG: 4.1.2)** evaluates the accessibility and compatibility of user interface components of a website with assistive technologies.

If no violations are found, the website is at least potentially accessible. If violations are found, the website is at least not fully accessible. The tool reports on the number and types of violations found.

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