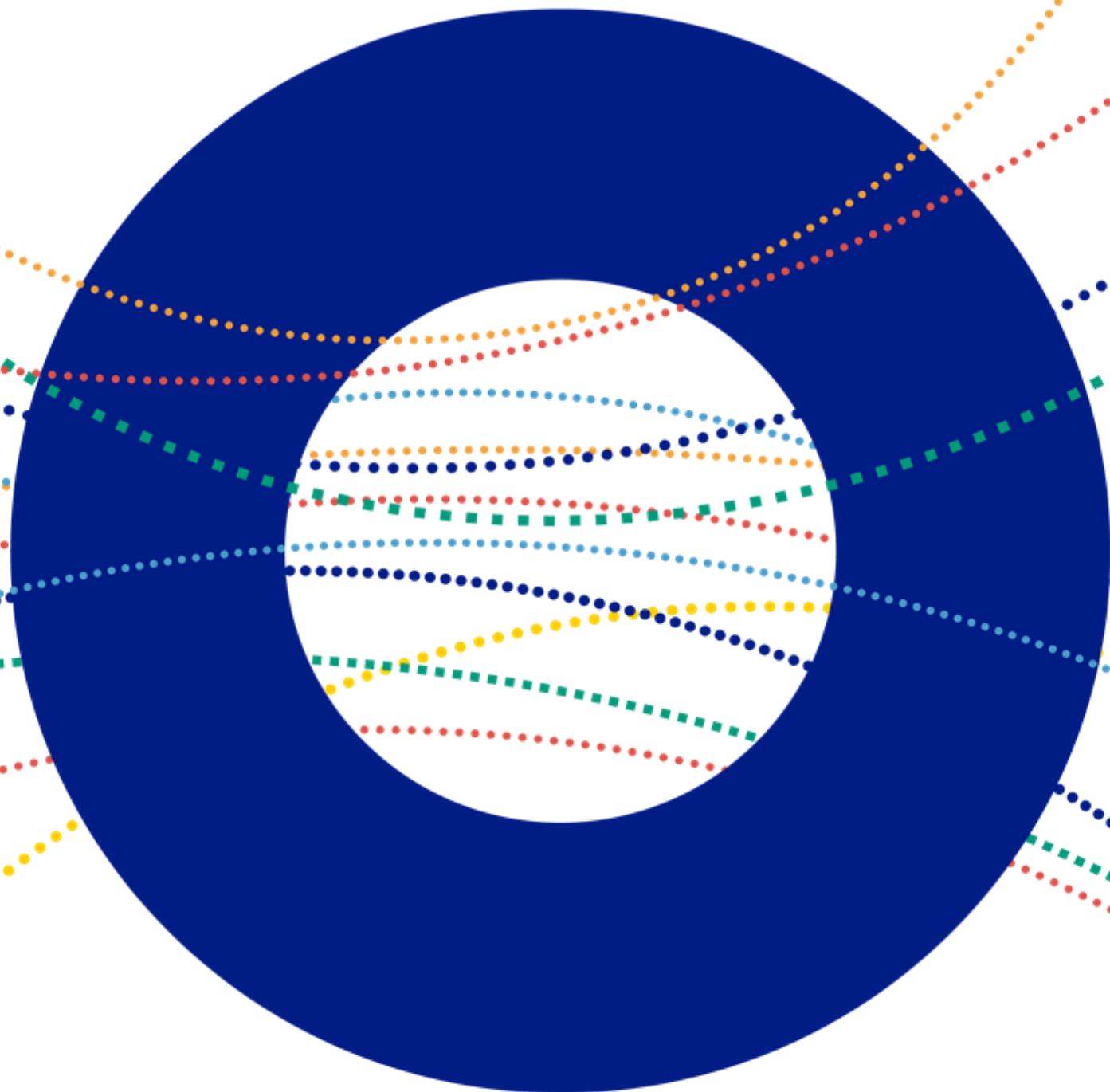




# 2023 Open Data Maturity Report



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## Executive summary

The 2023 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 35 countries participated in this ninth consecutive annual assessment, including the 27 EU Member States, 3 European Free Trade Association countries (Iceland, Norway and Switzerland) and 5 candidate countries (Bosnia and Herzegovina, Montenegro, 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 2023 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 those policies and strategies.
- **Impact** analyses the willingness, preparedness and ability of countries to measure both the reuse of open data and the impact created through this reuse.
- **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.

### *Open data maturity scores in 2023*

Figure 1 shows the ODM scores of all 35 participating countries for 2023. Highlights from these results include the following points.

- A total of 25 countries increased their ODM year-on-year, 3 countries scored the same overall as in 2022 and 7 countries experienced a decrease in their maturity score (for 6 countries, the decrease was less than 4 percentage points (pp)).
- Maturity scores are concentrated at the higher end of the spectrum, with most countries (27 out of 35; 77 %) having a maturity score above 73 %.
- The EU Member States improved their average maturity score by 4 pp, increasing from 79 % in 2022 to 83 % in 2023.
- The most mature countries in the EU-27 are **France** (98.3 %), **Poland** (97.9 %) and **Estonia** (96.2 %). The most mature European Free Trade Association country is **Norway** (90.2 %) and the most mature candidate country is **Ukraine** (96.3 %).
- The biggest climbers are **Slovakia** (+ 32 pp), **Latvia** (+ 23 pp), **Montenegro** (+ 13 pp) and **Iceland** (+ 12 pp).

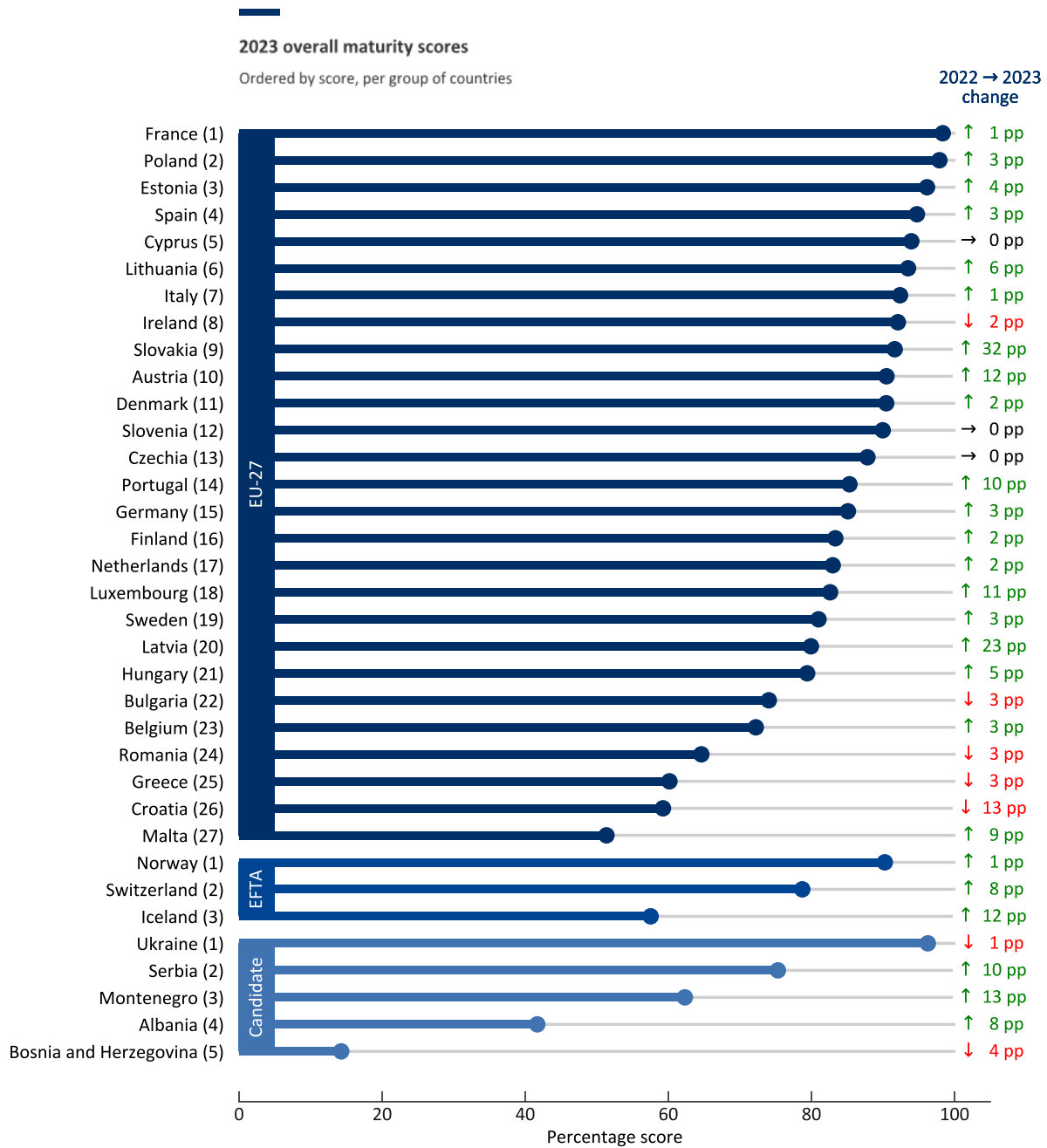


Figure 1: Overall maturity scores for all participating countries in 2023, ranked from highest scoring to lowest scoring within the groups of countries

### *Highlights from the four dimensions of the 2023 open data maturity assessment*

EU Member States continue to increase their ODM by improving in all dimensions. Figure 2 shows scores for 2018–2023 on the four maturity dimensions for the EU Member States.

**1. The **policy** dimension remains (as it has been since 2015) the most mature dimension on average (89 %), with governance and implementation of open data initiatives improving since 2022 to better support the policy framework.**

- Compared with 2022, more countries reported that their governance structures and operating models were published online and publicly accessible (from 19 to 25 Member States), suggesting that transparency is becoming a priority for Member States.
- Furthermore, more countries reported having processes to ensure that their open data policies and strategies were implemented (from 21 to 26 Member States).
- All but one Member State indicated that the national open data policy or strategy included measures to incentivise the publication of and access to geospatial data.
- Compared with 2022, fewer Member States stated that their national strategies and policies outlined measures to incentivise the publication of and access to real-time or dynamic data (from 24 to 21 Member States). Only 11 Member States reported that they had measures in place to incentivise the publication of and access to citizen-generated data.
- Compared with 2022, in 2023 more Member States organised events to promote open data and data literacy among the general public (from 14 to 19 Member States).
- All Member States reported that:
  - ✓ they had an open data policy;
  - ✓ their governance structures enabled the participation and inclusion of various stakeholders in open data policies;
  - ✓ regular exchanges took place between public sector bodies (i.e. data providers) and open data reusers;
  - ✓ they had measures in place to assist data providers with open data publication.

**2. The **impact** dimension remains the least mature dimension, but it saw the greatest year-on-year improvement, making up lost ground after a sharp decrease in 2022.**

- Year-on-year, more countries reported that they had a definition of open data impact (from 20 to 24 Member States).
- Regarding documenting the reuse of open datasets, fewer Member States than in 2022 are using automated feedback mechanisms and surveys; instead, they favour holding workshops with reusers and analysing log files on portal usage.
- Compared with 2022, more Member States reported having incentives in place to encourage public bodies to monitor the reuse of their own published data (from 18 to 21 Member States).
- Compared with 2022, more Member States reported systematically classifying reuse cases (from 10 to 15 Member States).
- However, typically, less than 50 % of Member States have gathered data on the impact created by open data (e.g. through impact assessments) in various impact domains (i.e. governmental, social, environmental and economic). Nonetheless, there is a high level of awareness of examples of open data reuse cases.
- All Member States reported:
  - ✓ having established collaboration between government and civil society or academia to create open data impact.

**3. The portal dimension remains the second most mature but shows the least improvement. Although the provision of data continues to improve, portal features are not becoming more sophisticated.**

- EU Member States are making more data openly available and engaging with the community of open data reusers through their national portals. There is a consistent trend of one or two additional countries, compared with 2022, introducing new processes and activities for each of the elements evaluated in the portal dimension of the ODM methodology.
- However, there has been a consistent decrease over the past 3 years in Member States having a preview feature for tabular and geospatial data on their portals.
- Compared with 2022, more Member States indicated that portal users were able to link documentation and supporting materials to a given dataset (from 19 to 24 Member States).
- X (formerly Twitter) remains the most popular platform for communication, promotions and awareness raising (17 national portals). Facebook (13 national portals) and LinkedIn (8 national portals) are runners-up as the two other most used platforms. Most national portals are present on more than one social media platform.
- All Member States reported:
  - ✓ having a national open data portal that offers users advanced data search functions, the ability to download datasets and the ability to search for datasets by data domain;
  - ✓ having metadata written in a language that is understandable to humans and machines;
  - ✓ having identified the data providers not yet publishing data on the national portal and taking practical action to assist them with their publication process;
  - ✓ that they had a strategy to ensure the portal's sustainability.

**4. The quality dimension shows accelerated improvement, closing the gap with the portal dimension after 3 years of stagnant maturity.**

- The quality dimension shows accelerated improvement (82 %), closing the gap with the portal dimension after 3 years of stagnant maturity (77%).
- Compared with 2022, more Member States are working to ensure the interoperability of datasets, particularly high-value ones (from 17 to 22 Member States). This is also reflected in the increased use of DCAT-AP mandatory classes to describe metadata on national portals (from 19 to 23 Member States).
- Compared with 2022, more Member States are using models to assess the quality of data deployment (from 20 to 23 Member States).
- All Member States reported:
  - ✓ monitoring metadata quality on their portals;
  - ✓ assisting publishers in choosing appropriate licences by producing guidelines;
  - ✓ regularly conducting activities or having mechanisms in place to motivate data providers to publish data accompanied by high-quality metadata and to assist them in doing so.



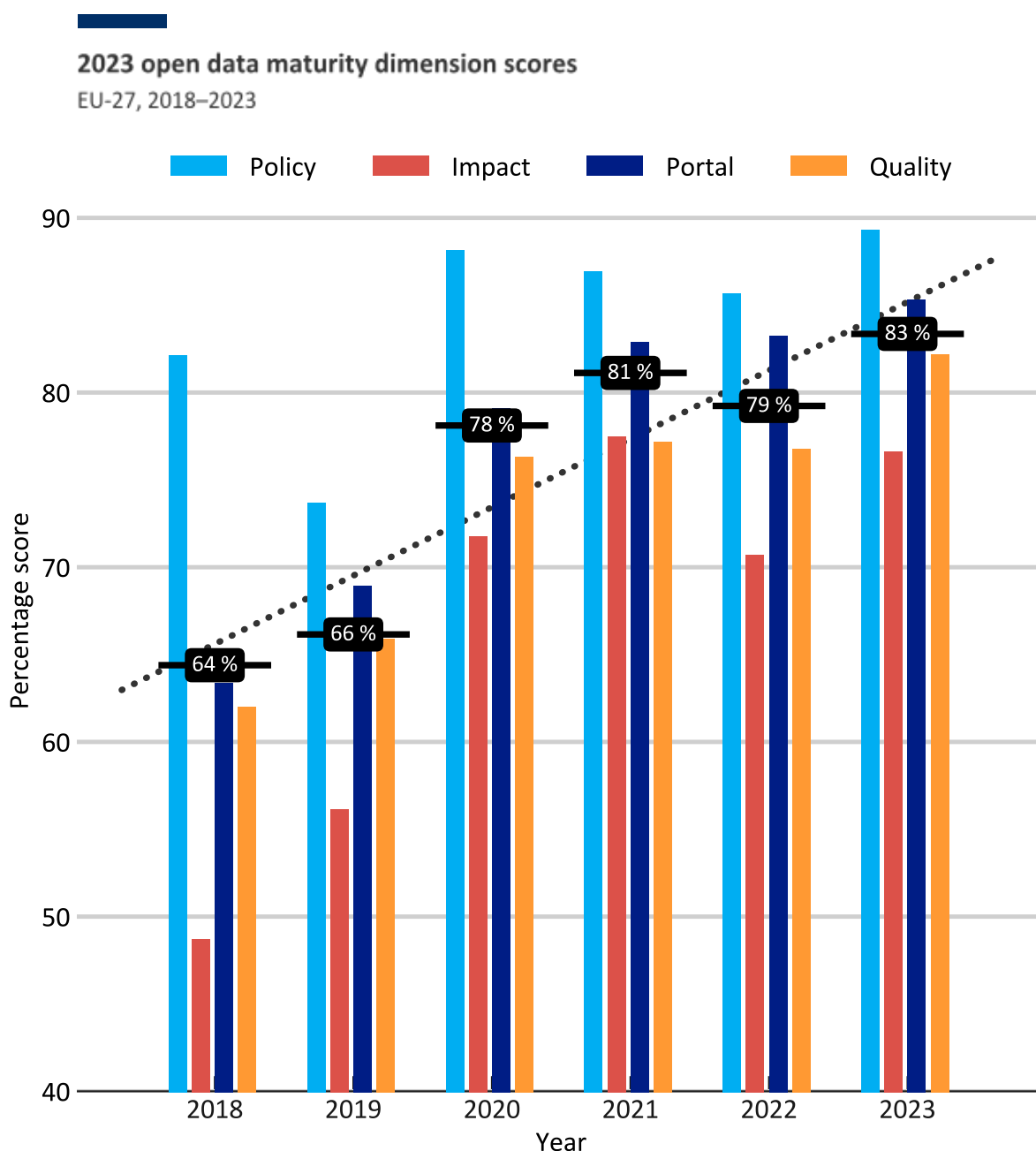


Figure 2: Average ODM scores in the EU-27 by dimension, 2018–2023 (black bar represents the EU-27 average score across all dimensions)

In addition, EU Member States are progressing in applying the implementing regulation on high-value datasets (Commission Implementing Regulation (EU) 2023/138), especially with regard to inventorying datasets and preparing geospatial and statistics datasets.

The regulation specifies six thematic categories of data that have significant benefits for society, the environment and the economy. It also sets out legal and technical requirements on this data. **Estonia, Finland, Denmark, Latvia, Czechia and Slovenia** are well ahead of the other EU Member States on preparing for high-value datasets (Figure 3).

On average, EU Member States are making more substantial progress on geospatial and statistics datasets than other categories. Regarding the underlying technical and legal requirements, progress on identifying and inventorying high-value datasets and addressing legal barriers is most advanced. In general, requirements on technical aspects such as metadata quality, standardised structures and machine-readable formats is less advanced.

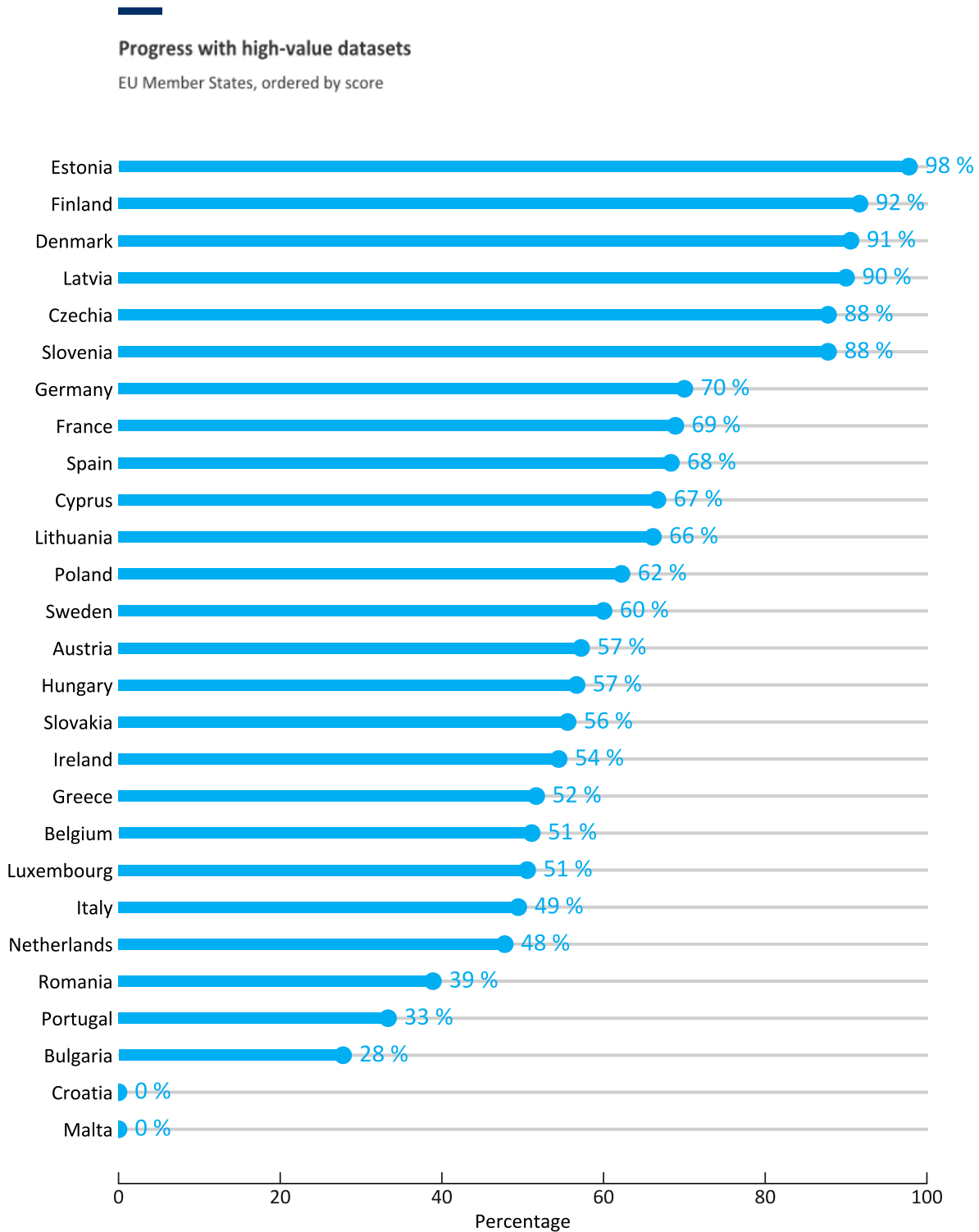


Figure 3: Average progress reported by the EU Member States towards implementing the technical and legal requirements on the six categories of high-value datasets

## 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.

This dynamic is also reflected in the dimensions measured longitudinally using the ODM methodology. European countries have long been further ahead on the policy dimension than the other dimensions. The portal dimension sits comfortably in second place behind the policy dimension. In 2023, the EU-27 maturity score on the quality dimension increased, and it is almost on a par with the EU-27's average maturity score overall (82 % versus 83 %).

Two and a half years after the open data directive needed to be transposed into national law (by July 2021), EU Member States are implementing their open data **policies** through practical measures and activities. Increasingly, the policy framework is accompanied by transparent governance structures.

Moreover, the provision of data on national **portals** and portal usage continue to increase. Several Member States have recently modernised their portals or launched new ones with more advanced features. Overall, however, portal features have not changed significantly since the last benchmarking exercise in 2022.

Furthermore, Member States are supporting data providers to increase the **quality** of their metadata. These efforts are reflected in improved compliance with DCAT-AP, a metadata standard, and increased data deployment quality. Specifically, 23 Member States report that more than 90 % of the metadata on their national portals complies with DCAT-AP mandatory classes.

Finally, performance on the **impact** dimension has recovered after a drop last year that coincided with the addition of a new indicator, measuring reuse, to the ODM methodology. In 2023, Member States increased 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, systematically collected measurements of the impact created through this reuse are largely unavailable in European countries. Therefore, the impact dimension still trails behind the other three dimensions by a large margin. Despite the challenge of measuring impact, countries should ensure that their relatively high maturity in the other three dimensions is leveraged to stimulate open data reuse.

## Introduction

### *Background: open data policy in the European Union*

‘Open data’, when referring to data issued by government, means public sector data and publicly funded data made available for reuse for any purpose <sup>(1)</sup>. A licence will specify the terms of that reuse. The open data directive (Directive (EU) 2019/1024) <sup>(2)</sup> on the reuse of public sector information provides a common legal framework for a European market for government-held data. Specifically, the open data directive encourages EU Member States to make as much publicly accessible information as possible available for reuse. Data is already collected to support the business of government; however, additional value can be derived from this data by reusing it for other purposes and allowing it to be used by others.

The impact assessment on the review of the open data directive <sup>(3)</sup> identified various areas in which this data can create additional value for society and the economy. The direct economic value of public sector information was calculated in the impact assessment at EUR 52 billion in 2018, estimated to increase to EUR 149 billion by 2030 <sup>(4)</sup>. A more recent study estimated that the size of the market for open data in 2020 was EUR 76 billion <sup>(5)</sup>. The same study estimated that 100 000 jobs in open data were created in Europe in 2020. Furthermore, the impact assessment estimated that public sector information could create 645 000 new jobs by 2027 <sup>(6)</sup>.

Moreover, open government data has the potential to bring about many societal and environmental benefits. One study estimated that in the EU in 2020 open data had saved 2 550 hours spent finding parking and reduced energy consumption by 16 % <sup>(7)</sup>. Another study from 2020 estimated that annually open data could save EUR 20 billion by reducing time spent in traffic, 27 million hours by reducing public transport journey times and 5.8 million tonnes of oil equivalent by reducing household energy consumption <sup>(8)</sup>. Overall, a more robust supply of open data that is easier to reuse is expected to enable more data-driven innovation across all economic sectors.

The open data directive also mandated the adoption of an implementing act listing high-value datasets. The European Commission adopted the corresponding implementing regulation in December 2022 and published it in January 2023 (Commission Implementing Regulation (EU) 2023/138) <sup>(9)</sup>. The implementation regulation will take effect in June 2024. High-value datasets are public sector datasets that have significant benefits for society, the environment and the economy. They fall into six categories: geospatial, earth observation and environment, meteorological, statistics, companies and

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<sup>(1)</sup> <https://data.europa.eu/en/dataeuropa-academy/what-open-data>.

<sup>(2)</sup> <https://digital-strategy.ec.europa.eu/en/policies/legislation-open-data> and <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1561563110433&uri=CELEX:32019L1024>.

<sup>(3)</sup> <https://digital-strategy.ec.europa.eu/en/library/impact-assessment-review-directive-200398ec-reuse-public-sector-information>.

<sup>(4)</sup> <https://digital-strategy.ec.europa.eu/en/library/impact-assessment-review-directive-200398ec-reuse-public-sector-information>.

<sup>(5)</sup> [https://data.europa.eu/sites/default/files/analytical\\_report\\_n9\\_economic\\_benefits\\_of\\_open\\_data.pdf](https://data.europa.eu/sites/default/files/analytical_report_n9_economic_benefits_of_open_data.pdf).

<sup>(6)</sup> <https://digital-strategy.ec.europa.eu/en/library/impact-assessment-review-directive-200398ec-reuse-public-sector-information>.

<sup>(7)</sup> [https://data.europa.eu/sites/default/files/analytical\\_report\\_n9\\_economic\\_benefits\\_of\\_open\\_data.pdf](https://data.europa.eu/sites/default/files/analytical_report_n9_economic_benefits_of_open_data.pdf)

<sup>(8)</sup> <https://data.europa.eu/sites/default/files/the-economic-impact-of-open-data.pdf>.

<sup>(9)</sup> [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L\\_.2023.019.01.0043.01.ENG](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2023.019.01.0043.01.ENG).

mobility<sup>(10)</sup>. Due to their importance, high-value datasets must be made available for reuse with minimal legal and technical restrictions and be free of charge. In addition, these datasets must be provided through application programming interfaces (APIs) and, where relevant, as a bulk download.

Not all public sector information can be released as open data. For example, some information is classified as confidential or sensitive, or the public administration that holds it may not have all the necessary rights to permit others to (re)use it. Other legislation, such as the Data Governance Act<sup>(11)</sup> and the Data Act<sup>(12)</sup>, includes measures to stimulate the reuse of public sector data that has specific access regimes.

### *Measuring open data in Europe*

The data.europa.eu initiative<sup>(13)</sup> 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. Under data.europa.eu, the Publications Office of the European Union and the Directorate-General for Communications Networks, Content and Technology have conducted an annual benchmarking exercise since 2015 to assess the maturity of the open data landscape in Europe<sup>(14)</sup>.

The objective of this open data maturity (ODM) assessment is to evaluate the maturity of countries in the field of open data and to document their year-on-year progress. It measures the progress of each country in making public data resources available and stimulating reuse, as well as supporting the development of open data best practices across Europe.

### *Countries participating in the 2023 open data maturity assessment*

A total of 35 European countries participated in the 2023 ODM assessment. These countries are grouped into Member States of the European Union (the EU-27)<sup>(15)</sup>, member states of the European Free Trade Association (EFTA)<sup>(16)</sup> or candidate countries for EU membership<sup>(17)</sup>. The ODM results are generally discussed in relation to these groups throughout this report.

- **EU Member States.** 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.
- **EFTA countries.** Iceland, Norway and Switzerland.
- **Candidate countries.** Bosnia and Herzegovina, Montenegro, Albania, Serbia and Ukraine.

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<sup>(10)</sup> <https://op.europa.eu/en/publication-detail/-/publication/641366a4-8d47-11ec-8c40-01aa75ed71a1/language-en/format-PDF/source-286775476>.

<sup>(11)</sup> <https://digital-strategy.ec.europa.eu/en/policies/data-governance-act> and <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022R0868>.

<sup>(12)</sup> <https://digital-strategy.ec.europa.eu/en/policies/data-act> and <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A68%3AFIN>.

<sup>(13)</sup> [data.europa.eu](https://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 (which was the point of access to public data from Member States) and the EU Open Data Portal (which was the point of access to public data published by the EU institutions, agencies and other bodies).

<sup>(14)</sup> <https://data.europa.eu/en/publications/open-data-maturity>.

<sup>(15)</sup> [https://european-union.europa.eu/principles-countries-history/country-profiles\\_en](https://european-union.europa.eu/principles-countries-history/country-profiles_en).

<sup>(16)</sup> <https://www.efta.int/>.

<sup>(17)</sup> [https://european-union.europa.eu/principles-countries-history/joining-eu\\_en](https://european-union.europa.eu/principles-countries-history/joining-eu_en).

### *The structure of this report*

This report provides an analysis of the benchmarking exercise for 2023. The findings of this analysis are presented in several sections.

- **Chapter 1** summarises how the assessment measures ODM.
- **Chapter 2** describes the overall results of the assessment.
- **Chapters 3–6** discuss the findings of the assessment for each of the four dimensions of ODM, namely policy (Chapter 3), impact (Chapter 4), portal (Chapter 5) and quality (Chapter 6). Within these chapters, the results for the EU-27, the EFTA countries and the candidate countries are discussed in separate sections.
- **Chapter 7** clusters the participating countries into four groups according to their overall performance and outlines recommendations for each cluster.
- The final chapter, '**Conclusions**', summarises the key messages of the 2023 assessment.

In addition to this report, a method paper and the associated raw and processed data are published online<sup>(18)</sup>. Furthermore, factsheets are published giving an overview of the situation in each participating country<sup>(19)</sup>.

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<sup>(18)</sup> <https://data.europa.eu/en/publications/open-data-maturity>.

<sup>(19)</sup> <https://data.europa.eu/en/publications/country-insights>.

## Chapter 1: Methodology

In this assessment, the concept of ODM in Europe is considered in terms of four dimensions: (1) policy, (2) impact, (3) portal and (4) quality. This is the ninth edition of the annual ODM assessment. While the assessment was initially focused on EU Member States, it has expanded to include several EFTA and candidate countries over the years.

During 2015 – 2017, the assessment’s methodology was based on two dimensions: open data readiness and portal maturity. These correspond to the current policy and portal dimensions, respectively. The four dimensions in the current methodology have been used since 2018. Over time, the questions asked to assess the four dimensions have undergone revision to adapt to changes in policy and in the progress of European countries on their ODM. Please refer to the method paper for a historical perspective on the methodology.

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 Public Sector Information Expert Group. (The reviewed questionnaires are made available as raw data.) Most questions have a predefined list of answer options (e.g. ‘Yes’ or ‘No’) from which the respondent selects an appropriate response. In addition, most questions request a supporting explanation of the chosen answer, such as a URL link to relevant material or a description of relevant activities. Once the completed questionnaires are submitted, they undergo three rounds of validation. The first round involves a high-level check of the questionnaire to identify missing answers. The second and third validation rounds involve two independent reviews. The reviewers assess whether the explanations accompanying the answers are complete, relate to the question at hand and sufficiently justify the answer option selected. After each validation round, the reviewed questionnaire is shared with the national open data team for additional input and clarification.

Each of the four dimensions is subdivided into indicators. Countries are scored on a list of questions relating to each indicator. 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 average percentage score across the four dimensions gives the country’s overall ODM score. In other words, each dimension is weighted equally in the overall score. EFTA and candidate countries can choose ‘not applicable’ when answering questions regarding specific EU legislative provisions and still be awarded full points in the scoring schema. Please refer to the method paper for further details on the scoring and to the questionnaire for the points allocated to the individual questions<sup>20</sup>.

The four open data dimensions are summarised below. The indicators comprising each dimension and their key elements are outlined in Table 1.

**Open data 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: (1) policy framework, (2) governance of open data and (3) open data implementation.

**Open 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: (1) strategic awareness, (2) measuring reuse and (3) created impact.

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<sup>20</sup> <https://data.europa.eu/en/publications/open-data-maturity>.

**Open data 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: (1) portal features, (2) portal usage, (3) data provision and (4) portal sustainability.

**Open data 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. This dimension provides an all-around evaluation 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: (1) metadata currency and completeness, (2) monitoring and measures, (3) DCAT-AP compliance and (4) deployment and linked data.

Table 1: Dimensions and their indicators in the ODM methodology

Dimensions	Indicators	Key elements
Policy	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, as well as access to real-time, geospatial and citizen-generated data. Preparatory activities regarding high-value datasets are in place. Open data policies and strategies align with the European Commission's priorities for 2019–2024 ( <a href="https://commission.europa.eu/strategy-and-policy/priorities-2019-2024_en">https://commission.europa.eu/strategy-and-policy/priorities-2019-2024_en</a> ).
	Governance of open data	Governance models and regular coordination activities across public sector bodies are in place to ensure the publication of open data 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 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.
Impact	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 high-value datasets. 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



Dimensions	Indicators	Key elements
		systematically. Activities are performed to better understand reusers' needs.
	Created impact	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.
Portal	Portal features	Portal features ensure access to datasets and relevant content, and include more advanced features such as SPARQL search, discussion forums, rating of datasets, requesting datasets and providing transparency on the progress status of requested datasets. Activities to promote the visibility and reuse of high-value datasets through the portal are planned.
	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 APIs 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 enable publication by data providers. In addition, access to real-time data is provided through the portal, and data that does not stem from official sources 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.
Quality	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 a minimum of delay on the national portal. The portal provides access to a vast range of data, both historical and contemporary. Preparations are under way to ensure that high-value data is interoperable with high-value datasets from other countries.
	Monitoring and measures	Mechanisms are in place to monitor metadata quality on the national portal, as well as its compliance with licensing standards. Measures are in place to assist data providers in

Dimensions	Indicators	Key elements
		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.

## Chapter 2: Overall maturity scores

Countries across Europe continue, on average, to improve their ODM. The average score for all participating countries increased by 4 percentage points (pp), from 75 % in 2022 to 79 % in 2023 (Figure 4). **France** (98.3 %), **Poland** (97.9 %), and **Ukraine** (96.3 %) remain in the top three positions, although Poland rose from third to second place this year. **Ireland** dropped from fourth place in 2022 to ninth in 2023 (92.1 %), although this represents only a 2 pp decrease in the country's total score. The fourth spot in 2023 is, instead, taken by **Estonia** (96.2 %), which increased its score by 4 pp on the previous year. New entrants into the top 10 since last year include **Lithuania** in seventh position (93.5 %) and **Slovakia** in tenth place (91.6 %). Displaced from the top 10 in 2023 are **Norway** (90.2 %) and **Slovenia** (90.0 %), now in 13th and 14th place, respectively.

The maturity scores of countries ranked in the top 10 fall within only a 7 pp range of each other, demonstrating the similarly high degree of maturity of these countries. This tight range also arises from countries continuing to improve year-on-year. Overall, 25 participating countries improved their maturity level over the past year, 3 countries remained at the same level and 7 experienced a drop in their overall maturity score.

The following sections discuss each group of countries separately: (A) the EU-27, (B) EFTA countries and (C) candidate countries. See Chapters 3 to 6 for an analysis of the dimension scores.

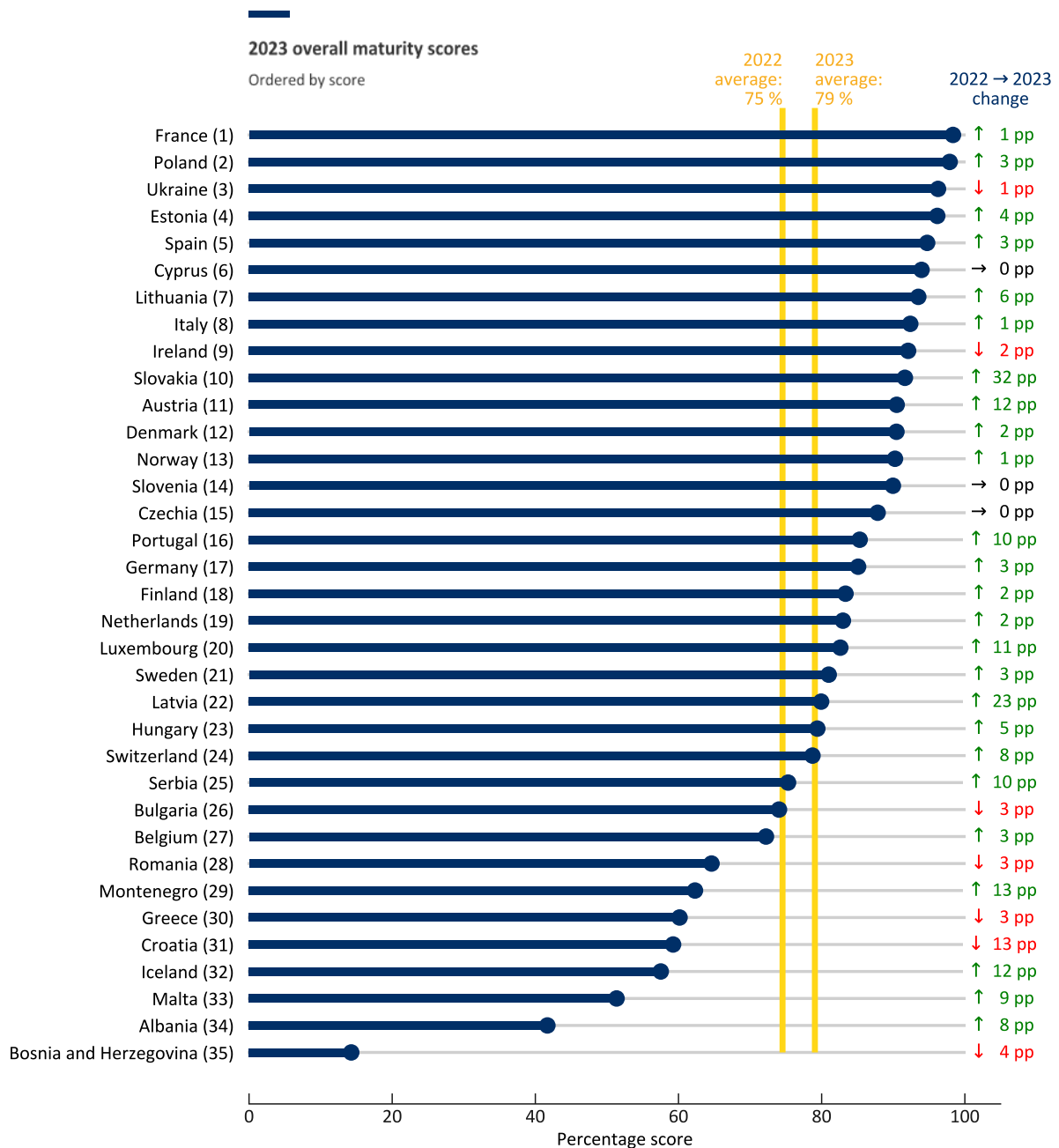


Figure 4: Overall maturity scores for all participating countries in 2023, ranked from highest scoring to lowest scoring

### A. EU Member States

The EU Member States improved their average maturity score by 4 pp, increasing from 79 % in 2022 to 83 % in 2023 (Figure 5). The biggest climber is **Slovakia**, which increased its score by 32 pp compared with 2022. The rise in Slovakia’s overall score is driven by a significant increase in its scores on the **impact** (+ 52 pp) and **portal** (+ 39 pp) dimensions. Slovakia also improved in the **quality** (+ 21 pp) and **policy** (+ 18 pp) dimensions. To achieve this significant improvement in the impact dimension, Slovakia defined what ‘impact of open data’ means and developed a methodology to measure it. It also collected preliminary data, using the methodology, on the impact created in Slovakia. Moreover, it launched initiatives to document which open datasets are reused and how and to understand reusers’

needs. Furthermore, it developed a systematic method of gathering reuse cases through the national portal.

The second-biggest climber is **Latvia**, which increased its score by 23 pp compared with the previous year. Following a similar pattern to Slovakia, Latvia improved across all four dimensions, especially the **impact** dimension (+ 34 pp) and the **portal** dimension (+ 27 pp). Some highlights of Latvia’s substantial improvement in the portal dimension include the introduction of new portal features such as a discussion forum, conducting analyses of portal traffic and surveys on user satisfaction, making local and regional portals discoverable and automatically harvested on the national portal and enabling official and non-official data to be published on the national portal.

Other countries with significant increases in their overall scores in the past year include **Austria** (+ 12 pp), **Luxembourg** (+ 11 pp), **Malta** (+ 10 pp) and **Portugal** (+ 10 pp). On the other hand, **Croatia** has the largest decrease in overall score compared with the previous year (– 13 pp), driven primarily by a decrease in scores on the **impact** (– 20 pp) and **policy** (– 17 pp) dimensions.

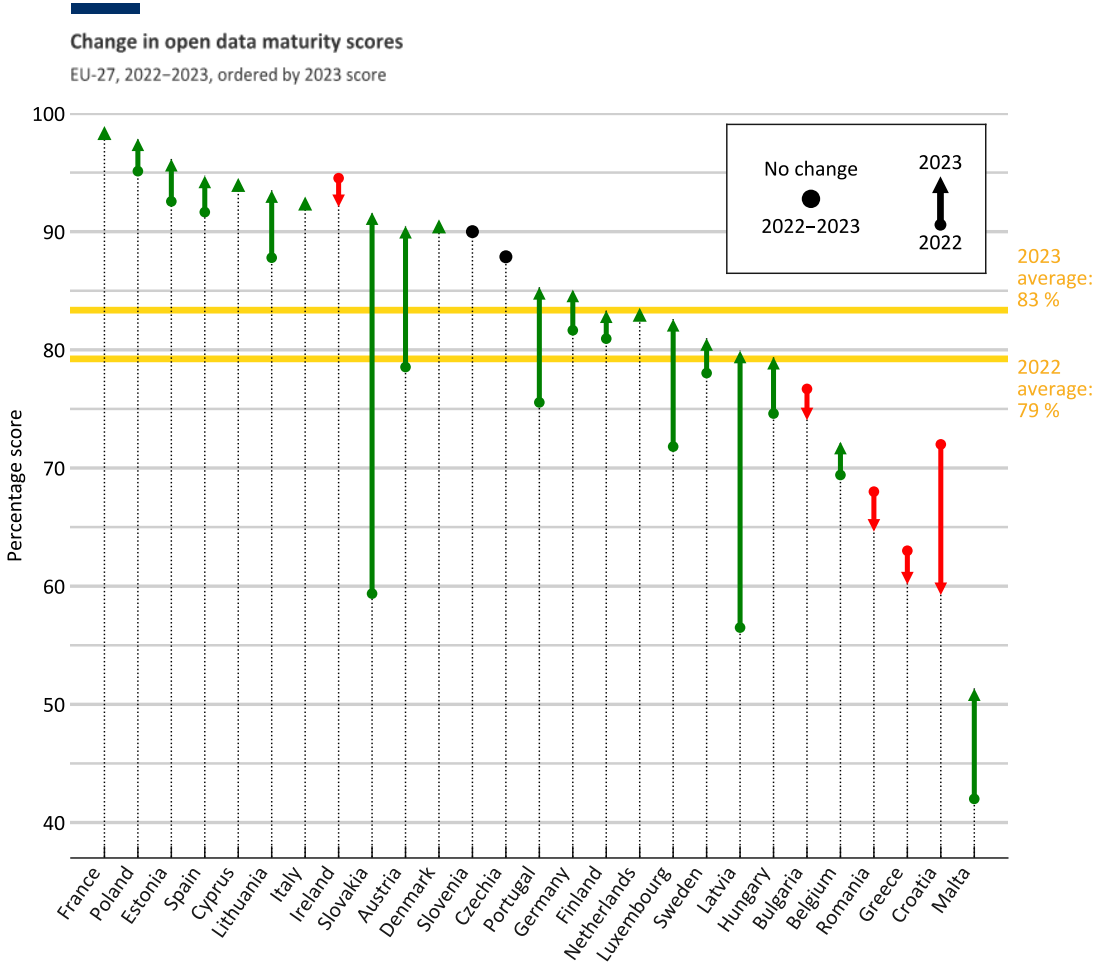


Figure 5: Change in the overall maturity scores of EU Member States between 2022 and 2023

Underlying the rise in the average maturity score of the EU-27 are increases in the scores on all four dimensions. The most significant increases are in the **impact** (+ 6 pp) and **quality** (+ 5 pp) dimensions (Figure 6). The policy dimension remains the most mature (89 %), followed by the portal (85 %) and quality (82 %) dimensions. The impact dimension remains the least mature on average (77 %).

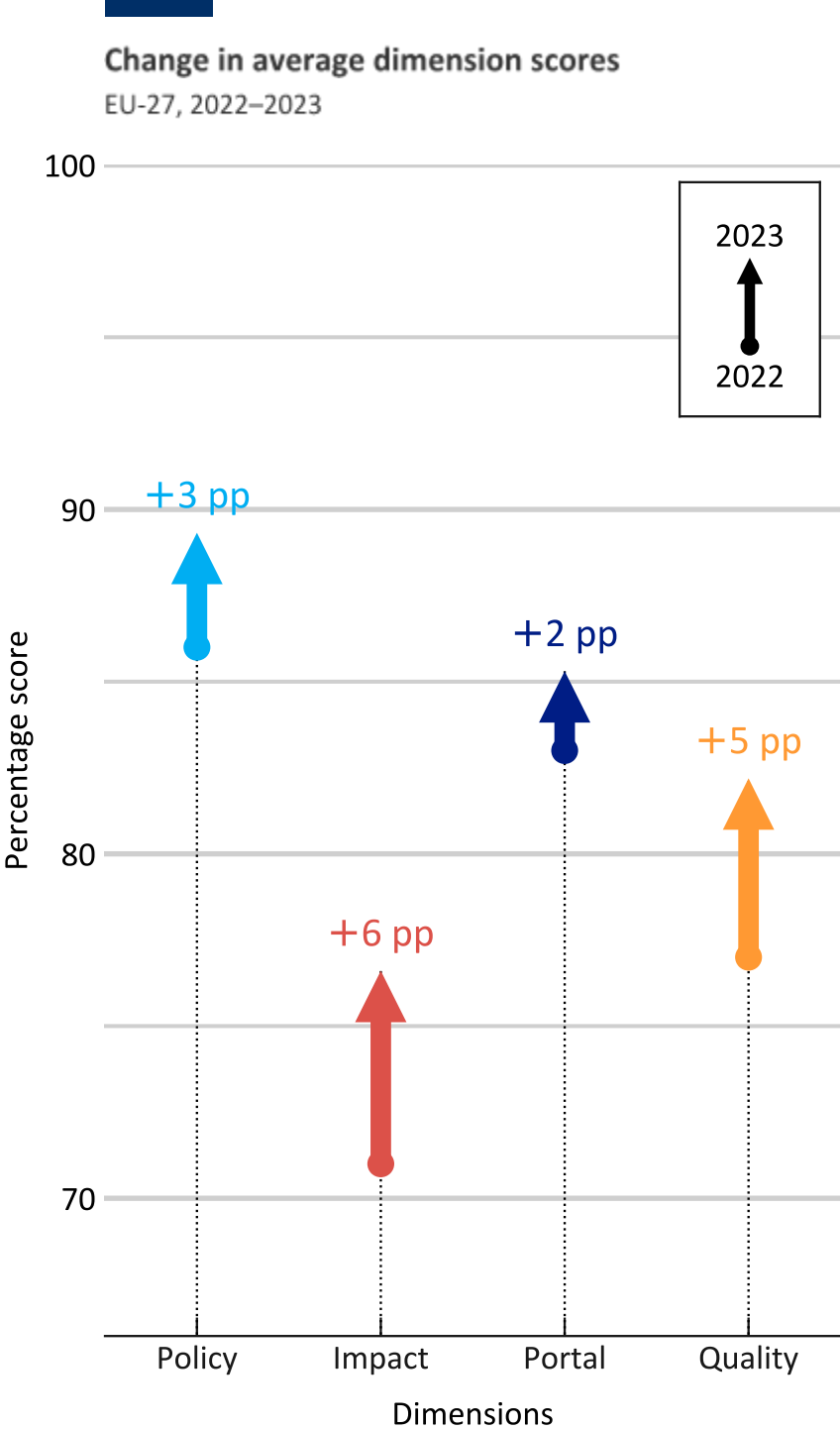


Figure 6: Change in the average dimension scores of EU Member States between 2022 and 2023

### B. European Free Trade Association countries

All three EFTA countries participating in this year’s ODM assessment improved their overall maturity score compared with the previous year (Figure 7). The biggest climber is **Iceland**, which increased its overall score by 12 pp to 57.5 % in 2023. The increase in Iceland’s overall score is driven by its improvement of 35 pp in the **impact** dimension and, to a lesser extent, by improvements in the **quality** (+ 10 pp) and **policy** (+ 7 pp) dimensions. To achieve this significant improvement in the **impact** dimension, Iceland put processes and incentives in place to monitor the level of open data reuse, launched initiatives to document which open datasets are reused and how, and decided on a definition of open data impact. These activities also resulted in a greater awareness of reuse case examples in the various domains of impact.

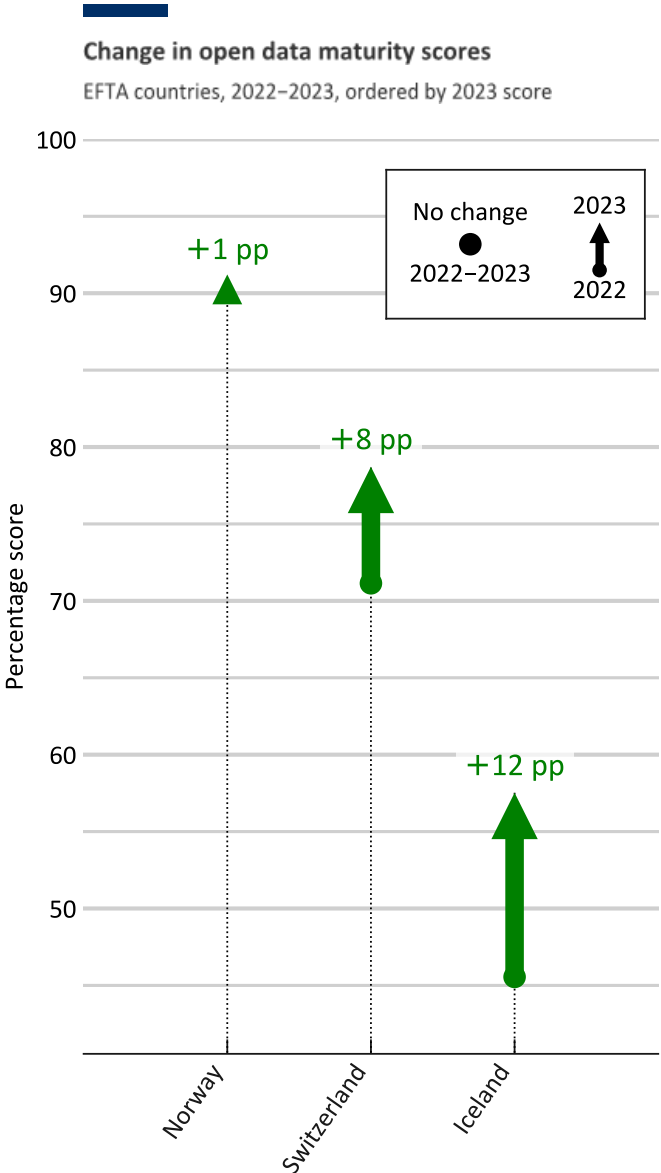


Figure 7: Change in the overall maturity scores of EFTA countries between 2022 and 2023

### C. Candidate countries

Three of the five candidate countries that participated in this year's ODM assessment improved their overall maturity score compared with the previous year (Figure 8). **Montenegro** has the most significant increase in overall score (+ 13 pp). This is driven by similar levels of improvements in the **policy** (+ 20 pp), **impact** (+ 17 pp) and **portal** (+ 16 pp) dimensions. Some highlights that drove Montenegro's improvement in the policy dimension include several measures and a strategy to support the reuse of open data, derived from the country's action plan for the implementation of the initiative Open Government Partnership Montenegro for 2023–2024 <sup>(21)</sup>. In addition, the formation of an open data management council <sup>(22)</sup> is under way; the council will serve as a governance structure for open data activities. Another key project that was launched is the Digital Academy <sup>(23)</sup>, which is one of the first strategically designed projects intended to recognise the potential and evaluate the achievements of government employees in the field of digital transformation.

**Serbia** achieved the second-largest increase in overall score between 2022 and 2023 (+ 10 pp). Unlike that of Montenegro, Serbia's improvement is driven primarily by increased scores on the **portal** (+ 16 pp) and **quality** (+ 14 pp) dimensions. Some key activities Serbia that reported having undertaken to improve in the **quality** dimension include creating guidelines and conducting regular activities to assist data providers in publishing high-quality metadata. It also reported that, compared with the previous year, more metadata is obtained automatically from its source, and most datasets on the national portal have an open licence available in a structured format.

On the other hand, **Bosnia and Herzegovina** saw the largest decrease in overall score among the participating candidate countries (– 4 pp). This decline is driven by a large decrease in the country's score on the **portal** dimension (– 20 pp). **Ukraine** experienced only a slight decrease of 1 pp, despite the ongoing Russian military aggression.

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<sup>(21)</sup> <https://www.opengovpartnership.org/documents/montenegro-action-plan-2022-2024-december/>.

<sup>(22)</sup> <https://www.gov.me/dokumenta/352c5ca5-d625-4125-bd7f-1061fcb3b672>.

<sup>(23)</sup> <https://www.gov.me/clanak/digitalna-akademija>.



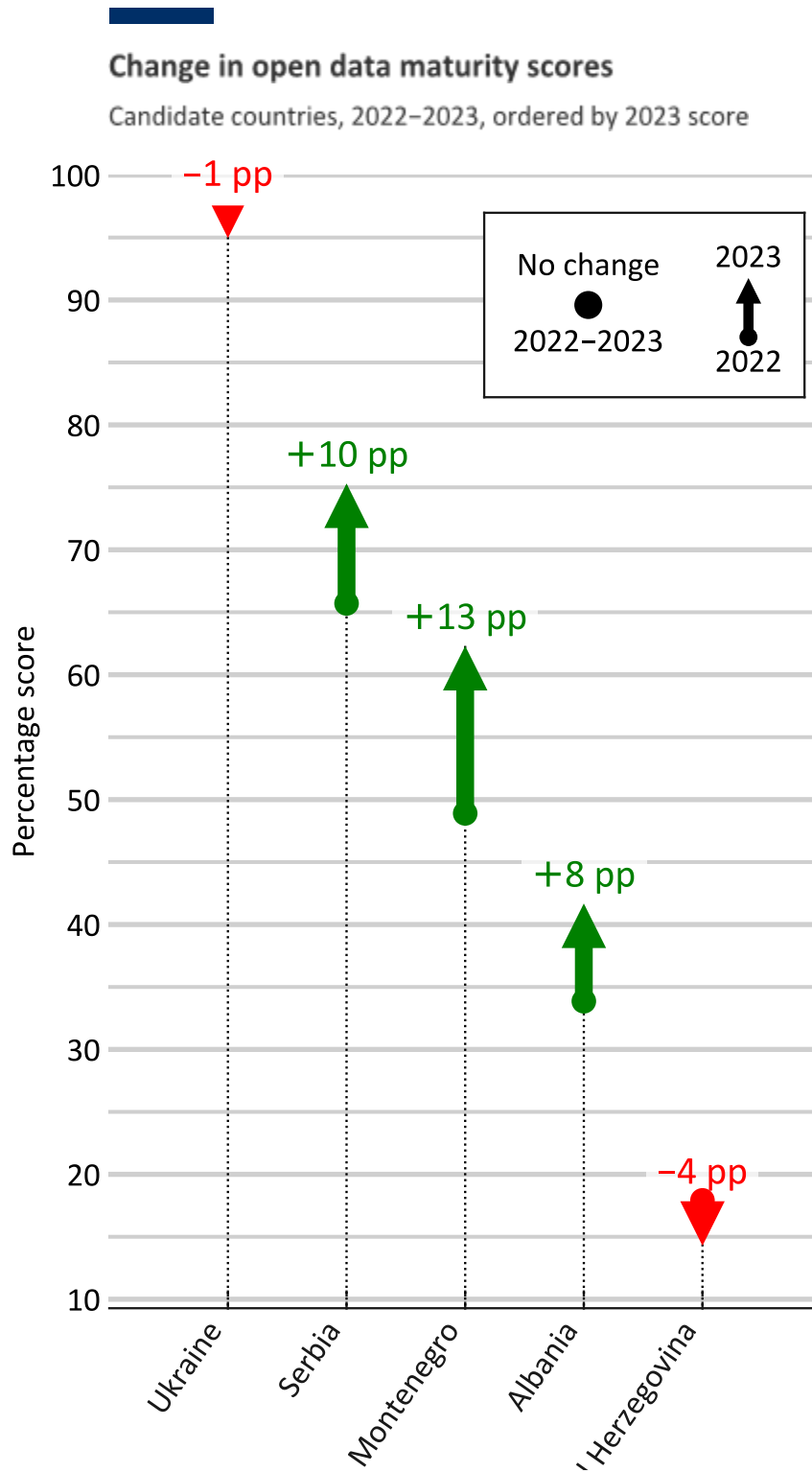


Figure 8: Change in the overall maturity scores of candidate countries between 2022 and 2023

## Chapter 3: Open data policy

The open data directive (Directive (EU) 2019/1024) <sup>(24)</sup>, which had to be transposed into national law by July 2021, established the framework for open data policy in the EU. The directive applies to a wide range of information, such as written texts, databases, audio files and film fragments, held by public sector bodies in EU Member States at the national, regional and local levels. This includes public sector information held by ministries, state agencies, municipalities and organisations funded mostly by, or under the control of, public authorities, such as meteorological institutes. The directive also applies to some data held by public undertakings, and to publicly funded and accessible research data.

Some of the directives specific aims include stimulating the publication of dynamic data and the uptake of APIs, limiting the exceptions under which public bodies may charge more than the marginal costs of dissemination for the reuse of their data and strengthening the transparency requirements applicable to public–private agreements involving public sector information.

The directive also introduced the concept of high-value datasets, which are public datasets associated with important socioeconomic benefits for society, the environment and the economy. An implementing regulation (Commission Implementing Regulation (EU) 2023/138) was published in January 2023 that sets out rules intended to ensure that high-value datasets are made available free of charge and in machine-readable formats <sup>(25)</sup>. Moreover, high-value datasets must be provided through APIs and, where relevant, as a bulk download.

The EU's open data policy is designed to stimulate the process of making existing data held by the public sector open, and it offers guidance on the preprocessing of such datasets through, for example, specifications on metadata and interoperability requirements. Furthermore, measures such as limiting the exceptions that allow public bodies to charge reusers more than the marginal costs of disseminating their data incentivise the uptake of open data by reusers. The directive and implementing regulation also create the legal basis for the activities of national open data teams.

The **policy** dimension of the 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 set out 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.

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<sup>(24)</sup> <https://digital-strategy.ec.europa.eu/en/policies/public-sector-information-directive> and <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32019L1024>.

<sup>(25)</sup> <https://digital-strategy.ec.europa.eu/en/news/commission-defines-high-value-datasets-be-made-available-re-use> and [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L\\_.2023.019.01.0043.01.ENG](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2023.019.01.0043.01.ENG).

Table 2: Indicators of the policy dimension

Indicator	Key elements
<b>Policy framework</b>	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, as well as access to real-time, geospatial and citizen-generated data. Preparatory activities regarding high-value datasets are in place. Open data policies and strategies align with the European Commission’s priorities for 2019–2024.
<b>Governance of open data</b>	Governance models and regular coordination activities across public sector bodies are in place to ensure the publication of open data 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 non-governmental organisations.
<b>Open data implementation</b>	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.

The following sections discuss each group of countries separately: (A) EU Member States, (B) EFTA countries and (C) candidate countries. Further detail on the indicators is provided in the analysis of the EU-27. The sections on the EFTA and candidate countries discuss the dimension and indicator results of these two groups.

## A. EU Member States

### 3.1. 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 practical mechanisms are in place to support the publication, discoverability and reuse of several data types, and access to them, including real-time, geospatial and citizen-generated data.

#### Open data policies

All Member States (100 %) reported having an open data policy, although national approaches vary. In some Member States, the national law that transposes the open data directive focuses specifically on open data. For example, the directive is incorporated into national law through **Austria**’s Federal Law on the Reuse of Information from Public Bodies, Public Companies and Research Data <sup>(26)</sup> and **Ireland**’s Statutory Instrument No 376/2021 – European Union (Open Data and Re-use of Public Sector Information) Regulations 2021 <sup>(27)</sup>.

In other countries, provisions about open data are included alongside more general provisions in broader strategic plans on data and digital government. For example, **Spain** explained that its national data policy has existed since 2007 and has been developing alongside the guidelines set by the EU. The

<sup>(26)</sup> <https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20011973>.

<sup>(27)</sup> <https://www.irishstatutebook.ie/eli/2021/si/376/made/en/html>.

open data directive was implemented through Law 37/2007 <sup>(28)</sup>. Moreover, Spain has various digital strategies that complement measures specifically on open data, such as the national artificial intelligence strategy <sup>(29)</sup>, which includes provision to measure the availability of open data for the operation and training of artificial intelligence systems.

Another example is **Sweden**. In 2017, the Swedish government outlined a broad national digitalisation strategy <sup>(30)</sup>, which led to the establishment of the Agency for Digital Government in September 2018. The primary purpose of the agency is to support digitalisation in public administration by providing technical infrastructure and shared digital services. It is mandated to promote the reuse of public information and data-driven innovation. Sweden specifically mentioned that the transposition of the open data directive forms a strategically important area in its data strategy <sup>(31)</sup>.

Often, open data policies are integrated into extensive policy frameworks. For example, the Ministry of Digital Affairs in **Poland** pursues an open data policy that is implemented through several documents, such as the country's Law on Open Data and Reuse of Public Sector Information <sup>(32)</sup>, its open data programme <sup>(33)</sup> and its guidelines on open data standards <sup>(34)</sup>. Its open data programme for 2021–2027 complements the country's open data legislation by providing practical and technical mechanisms to support open data.

Indeed, open data policies are often accompanied by practical guidelines. In **Italy**, the legislative decree that transposed the open data directive (No 200/2021 <sup>(35)</sup>, which amended Decree No 36/2006 <sup>(36)</sup>), also introduced guidelines on the implementation of the arrangements set out in the decree and in the directive <sup>(37)</sup>. These guidelines focus on supporting public administrations and others to provide and reuse open data by setting requirements and recommending best practices.

**Lithuania** also built on existing legislation when transposing the open data directive by amending its Law on the Rights of Receiving Information and Reuse of Data <sup>(38)</sup>, and **Finland** amended both the Act on Public Administration Information Management (906/2019 <sup>(39)</sup>) and the Act on the Openness of Government Activities (621/1999 <sup>(40)</sup>) to transpose the directive.

In many cases, contemporary open data policy builds on established legal principles. **France** argues that Article 15 of the Declaration of the Rights of Man and the Citizen of 1789, part of the French constitution, states that society has the right to hold any public official accountable for its administration. This principle meant that a right to access government-held data was created at a very early stage in France. The law of 17 July 1978 on Freedom of Access to Administrative Documents

<sup>(28)</sup> <https://www.boe.es/eli/es/l/2007/11/16/37>.

<sup>(29)</sup> <https://portal.mineco.gob.es/RecursosArticulo/mineco/ministerio/ficheros/National-Strategy-on-AI.pdf>.

<sup>(30)</sup> <https://www.regeringen.se/contentassets/c9bc0cd3a4374f9388e714ae7fb1ec1d/for-ett-hallbart-digitaliserat-sverige-en-digitaliseringsstrategi.pdf>.

<sup>(31)</sup> <https://www.regeringen.se/informationsmaterial/2021/10/data--en-underutnyttjad-resurs-for-sverige/>.

<sup>(32)</sup> <https://dziennikustaw.gov.pl/DU/2021/1641>.

<sup>(33)</sup> <https://dane.gov.pl/pl/knowledgebase/useful-materials/program-otwierania-danych-na-lata-2021-2027>.

<sup>(34)</sup> <https://dane.gov.pl/pl/knowledgebase/useful-materials/standardy-otwartosci-danych>.

<sup>(35)</sup> <https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legislativo:2021;200#:~:text=DECRETO%20LEGISLATIVO%208%20novembre%202021%2C%20n.%20200%20Attuazione,%2821G00213%29%20note%3A%20Entrata%20in%20vigore%20del%20provvedimento%3A%2015%2F12%2F2021>.

<sup>(36)</sup> <https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legislativo:2006-01-24;36lvig=>

<sup>(37)</sup> [https://www.agid.gov.it/sites/default/files/repository\\_files/lg-open-data\\_v.1.0\\_1.pdf](https://www.agid.gov.it/sites/default/files/repository_files/lg-open-data_v.1.0_1.pdf).

<sup>(38)</sup> <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/TAIS.94745/asr>.

<sup>(39)</sup> <https://www.finlex.fi/en/laki/kaannokset/2019/en20190906>.

<sup>(40)</sup> <https://www.finlex.fi/en/laki/kaannokset/1999/en19990621>.

established a framework for access to information and codified relations between the public and the administration. Recent laws and decrees such as the Digital Republic Law <sup>(41)</sup> and including sectoral legislation such as the Law on the Orientation of Mobility <sup>(42)</sup> – which focuses on transport data, including real-time data – form a framework of legal provisions on open data in France.

### [Open data strategies](#)

Open data strategies set out the principles and goals that countries want to implement and achieve in the field of open data. As in 2022, 26 Member States (96 %), all except **Romania**, stated that they had an open data strategy. Many of these countries have a dedicated strategy for open data. In other cases, open data principles are embedded in strategies for digital government (as in **Bulgaria** <sup>(43)</sup>) or broader data strategies (as in **Portugal** <sup>(44)</sup>).

**Spain's** national open data strategy aims to promote the opening of public information through innovative and structured actions in collaboration with public and private partners <sup>(45)</sup>. The broader mission of its strategy is to improve the standard of living of citizens, the competitiveness of companies and the efficiency of public administration through the opening of public information. The objectives of the strategy include:

- fostering relationships between actors in the national and international open data ecosystems;
- creating awareness of the value of public data and its reuse, especially in sectors where innovative use of data is crucial;
- guiding publishers and data reusers on what actions must be carried out to contribute to their success based on the data they use;
- identifying business models, reuse companies and start-up success stories in order to discover what successful practices they have implemented;
- increasing recognition of public sector efforts nationally by making the data generated from these activities available to society.

**Ireland** held a series of public consultations to determine the priorities for its 2023–2027 open data strategy. Until this strategy is formally adopted, the 2017–2022 open data strategy <sup>(46)</sup> remains operational. It sets two main objectives: (1) making open data publicly available and freely reusable and (2) engaging with a broad community of stakeholders to promote the social and economic benefits of open data. The strategy sets out actions under seven strategic themes:

- broaden the range of public bodies actively engaged in the open data initiative;
- broaden the scope of the open data initiative and improve the quality, quantity and range of datasets available on the national portal;
- continue engagement with stakeholders and encourage the use of open data;
- support and encourage various groups of open data reusers;
- provide a framework to support and train public bodies in their open data activities;
- evaluate the impacts and benefits of the open data initiative;

<sup>(41)</sup> <https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000033202746>.

<sup>(42)</sup> <https://www.ecologie.gouv.fr/loi-dorientation-des-mobilites>.

<sup>(43)</sup> <https://e-gov.bg/wps/wcm/connect/e-gov.bg-18083/1506d64e-0f16-4954-ba0b-dfd77ae58184/Стратегия+за+развитие+на+електронното+управление+2019-2025.pdf?MOD=AJPERES&CVID=nyx-ndJ&useDefaultText=0&useDefaultDesc=0>.

<sup>(44)</sup> <https://portugaldigital.gov.pt/en/accelerating-digital-transition-in-portugal/get-to-know-the-digital-transition-strategies/national-data-strategy/>.

<sup>(45)</sup> <https://datos.gob.es/es/acerca-de-la-iniciativa-aporta>.

<sup>(46)</sup> [https://data.gov.ie/uploads/page\\_images/2018-03-07-114306.063816Final-Strategy-online-version1.pdf](https://data.gov.ie/uploads/page_images/2018-03-07-114306.063816Final-Strategy-online-version1.pdf).

- ensure effective governance structures are in place to implement the strategy.

The **Netherlands** highlights the key points of its inter-administrative data strategy <sup>(47)</sup> as:

- working towards a better approach to the technical, legal and ethical aspects of data reuse;
- developing government-wide system functions, such as a federated data system;
- using specific use cases with social value.

**Slovenia's** digital strategy to 2030 <sup>(48)</sup> has a special section on the digital data economy, including open data. The strategy describes data as a strategic raw material and driver of a smart society. It also emphasises that it is essential to provide up-to-date, timely and comprehensive data. Furthermore, the strategy aims to establish a dynamic data ecosystem on the national open data portal, with data standards and tools that data providers, data analysts and developers can use to cooperate and develop data applications that offer digital services as responses to social challenges.

In addition to having an open data policy and strategy, 20 Member States (74 %) have updated their policy or strategy within the past 24 months. For example, **Cyprus** rolled out a new strategy for 2023–2027 <sup>(49)</sup>, which is based on the following four pillars:

- providing the required legal framework that promotes and encourages the supply of high-quality public sector information for reuse (i.e. for free or at marginal cost, with simple licences, dispute mechanisms, etc.);
- providing the necessary infrastructure for disseminating public sector information in the form of a national open data portal that is modern and fit for purpose;
- maintaining, expanding and supporting the existing network of public sector information liaison officers in public sector bodies (e.g. through the provision of training);
- promoting public sector information reuse in both the private and public sectors through joint events and facilitating constant dialogue between data providers and reusers.

In addition to national strategies and policies on open data, 20 Member States (74 %) stated that local and regional public entities also had an open data policy or strategy. Some countries, such as **Cyprus, Luxembourg, Malta** and **Slovenia**, stated that they did not have local or regional open data policies due to the size of their territory and the administrative structure in their country.

Interestingly, **Denmark's** national strategy for digitisation is complemented by a joint public sector strategy, which is a collaboration between its three levels of government <sup>(50)</sup>. Furthermore, the Association of Danish Municipalities published its data strategy for local governments in 2022. One of the principles of the strategy is that municipalities should make standardised data available to reusers. In **Finland**, the Association of Finnish Local and Regional Authorities has a digital roadmap for municipalities to strengthen their management and understanding of digitalisation, including with regard to interoperable digital public services. It includes measures relating to the reuse of open data <sup>(51)</sup>.

<sup>(47)</sup> <https://www.rijksoverheid.nl/documenten/rapporten/2021/10/31/nl-digitaal-interbestuurlijke-datastrategie-nederland>.

<sup>(48)</sup> [https://www.gov.si/assets/ministrstva/MDP/Dokumenti/DSI2030-potrjena-na-Vladi-RS\\_marec-2023.pdf](https://www.gov.si/assets/ministrstva/MDP/Dokumenti/DSI2030-potrjena-na-Vladi-RS_marec-2023.pdf).

<sup>(49)</sup> <https://www.data.gov.cy/sites/default/files/AΔΔ%20-%20Στρατηγική%20Ανοικτών%20Δεδομένων%202023-2027.pdf>.

<sup>(50)</sup> <https://fm.dk/nyheder/nyhedsarkiv/2022/juni/regeringen-kl-og-danske-regioner-enige-om-ny-faellesoffentlig-digitaliseringsstrategi/>.

<sup>(51)</sup> <https://www.kuntaliitto.fi/tietoyhteiskunta-ja-digitalisaatio/kuntien-digitiekartta/>.

There are also several examples of public bodies at the local level that pursue independent open data policy. For example, **Poland** highlighted the existence of several local open data portals and emphasised that entities at the local level are actively encouraged also to publish their open data on the national open data portal. In **Czechia**, regional or local open data strategies are usually part of larger development, digitalisation or smart city strategies.

### Action plans

Action plans describe the actions countries intend to perform to achieve the goals specified in their strategies. In 2023, 25 Member States (93 %), all except Croatia and Romania, indicated that they had an action plan to support the delivery of the policies and goals in their open data strategies. An example is **Greece**, whose action plan has four main objectives <sup>(52)</sup>.

- All public sector organisations should record all datasets.
- All datasets should be categorised as open, open on payment of a fee/royalty or classified (e.g. personal data, intellectual property, matters of national security). Caution should be exercised in categorising datasets as classified, but there should be clear reasoning for the decision to do so.
- The record of datasets should be signed by the head of the organisation and publicly available online.
- Datasets provided as open data should be uploaded at least to the central government’s open data portal.

As another example, **Lithuania’s** action plan on open data, which is part of the current government’s broader programme <sup>(53)</sup>, specifies aspects such as deadlines and responsible authorities. It includes, among other actions:

- creating a national data architecture (i.e. centralised descriptions of all government-held data processed in the country), establishing its governance model and ensuring its implementation;
- creating an ecosystem for assessing and promoting the quality of national public information resources, open data and digital transformation;
- integrating the data of the state information systems with registers in the state data management information system, implementing experimentation platforms, ensuring efficient exchange of data required for decision-making between institutions, and creating a mechanism for data anonymisation and aggregation;
- establishing a management mechanism for national public information resources and digital transformation, ensuring the use of basic mandatory components (e.g. rights management, interoperability, classifiers, metadata structures, functional requirements, e-services), identifying managerial responsibilities, and creating incentives and obligations for institutions to implement digitisation projects.

**Luxembourg’s** open data roadmap <sup>(54)</sup> consists of actions to ensure that more data is opened up by providing technical and legal assistance to data providers to help them publish their data. Among the actions in the roadmap are:

- promoting the publication of higher-quality and easier-to-use open data;

<sup>(52)</sup> <https://www.opengovpartnership.org/documents/greece-action-plan-2022-2024-december/>.

<sup>(53)</sup> <https://lrvt.lt/uploads/main/documents/files/PROGRAMME%20OF%20THE%20EIGHTEENTH%20GOVERNMENT%20OF%20THE%20REPUBLIC%20OF%20LITHUANIA.pdf>.

<sup>(54)</sup> <https://data.public.lu/en/pages/5yearplan/>.

- collaborating with the government’s interoperability programme to encourage data publication in standard and interoperable formats;
- collaborating with the government’s AI4Gov programme to foster the availability of open datasets that can be used for artificial intelligence;
- collaborating with the ecosystem established under the Data Governance Act on the reuse of certain categories of protected data held by public sector bodies;
- improving the quality and currency of metadata through awareness campaigns and audit procedures.

### [Access to real-time and dynamic data](#)

Real-time data is information that changes and needs to be updated frequently, such as traffic data. Dynamic data, on the other hand, changes asynchronously over time and is periodically updated as new information becomes available; an example would be data on consumer purchases. Access to real-time and dynamic data is commonly provided through APIs. Reuse cases based on this data include weather apps that use live data from weather stations to continuously improve and update weather forecasts, or public transport apps that use live data from buses to plan routes and inform passengers of estimated arrival times.

In 2023, 21 Member States (78 %) stated that their national strategies and policies outlined measures to incentivise the publication of and access to real-time or dynamic data. This is a net decrease of three countries compared with 2022. It should be noted that, in this year’s ODM assessment, the research team was strict in evaluating whether specific measures related to real-time and dynamic data were in place. Measures to incentivise open data publication in general were not accepted.

Unlike in 2022, **Luxembourg** now reports that its strategy does include measures on real-time data. These measures include identifying strategic real-time data that has not been published and supporting its publication. A complementary measure aims to promote real-time datasets and reuse cases and to increase their visibility on the national portal. On the other hand, **Bulgaria, Greece, Croatia and Sweden** no longer report having measures to incentivise the publishing of real-time or dynamic data. **Sweden** explained that, while the value of real-time and dynamic data is described in the data strategy, the Agency for Digital Government has not yet received a governmental mission to follow up on the strategy and outline specific measures.

In **Finland**, the Opening Up and Using Public Data project formulated several measures regarding open APIs, technical and semantic interoperability, and data quality to encourage and facilitate the release and accessibility of real-time and dynamic data. The project created public administration API principles<sup>(55)</sup> to provide common instructions and recommendations for API development by adapting the European Commission Joint Research Centre’s API framework<sup>(56)</sup> for use in Finnish public administration. Information policy in Finland establishes open APIs as a goal for the public sector, because they are perceived as a future-proof solution that will serve to avoid future maintenance burdens when disseminating high-quality, consistently up-to-date real-time data in a structured, machine-readable format. Moreover, the adoption of open APIs has the potential to unlock novel business models and foster collaboration among professionals from various sectors in both the public and private realms.

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<sup>(55)</sup> <https://julkaisut.valtioneuvosto.fi/handle/10024/163866>.

<sup>(56)</sup> <https://joinup.ec.europa.eu/collection/api4dt/news/api-framework-implemented-finland>.



**Denmark's** implementation of the open data directive <sup>(57)</sup> requires that, when dynamic data is made available, this is done through API access and, if relevant, as a bulk download. Furthermore, the country's digitalisation strategy <sup>(58)</sup> includes a national plan for travel that intends to increase the availability and usability of real-time traffic data. Similarly, **France** established obligations to publish data on real-time transport schedules in its 2015 Law on Growth, Activity and Equal Economic Opportunities <sup>(59)</sup>. France also has a task force on transport.data.gouv.fr that makes particular efforts to promote real-time data. Instead of creating a specialised portal, **Portugal's** data strategy includes measures to build infrastructures that support data consumption in real time on the national open data portal. One of the key goals is to create a single, integrated system that allows operational databases to be enriched with geolocation, cartographic, socioeconomic, populational and meteorological information.

### [Access to geospatial data](#)

Geospatial data pertains to locations or addresses; examples include satellite imagery, GPS coordinates and census data tied to specific geographical areas. A total of 26 Member States (96 %), all except Belgium, indicated that their national open data policy or strategy included measures to incentivise the publication of and access to geospatial data. In **Bulgaria**, for example, a national spatial data portal was established in 2021 to provide public access to interoperable spatial data in full compliance with the EU's Inspire directive <sup>(60)</sup>, which aimed to establish an infrastructure for spatial information in Europe. Developing this specialised data portal is one of the priorities of the national e-government strategy for 2019–2025 <sup>(61)</sup>.

Indeed, many countries referred to their efforts in transposing into national law the Inspire directive and the various initiatives surrounding that directive. In **Slovenia**, for instance, national Inspire group meetings occur regularly, and there is a library of legislation, instructions and recommendations regarding the publication of geospatial data <sup>(62)</sup>. Furthermore, a geospatial platform called GeoHub <sup>(63)</sup> was established in 2022. This platform enables geospatial data providers to publish geodata and create smart applications based on open data. **Croatia** has also created a geoportal, GeoHrvatska <sup>(64)</sup>, to bring the data from the national infrastructure for spatial data closer to its citizens. **Sweden** highlights that many geo-datasets in its country are currently fee-based, but this could change if these datasets are regarded as high-value ones under the implementing regulation based on the open data directive.

Finally, **Austria** listed three key measures that it implements to incentivise the publication of and access to geospatial data.

- **Public awareness.** Open data campaigns are run to increase public demand for and interest in geospatial data with the aim of motivating data holders to publish it.
- **Technical assistance.** Documentation is offered to educate public sector data owners on the benefits of publishing geospatial data and methods of doing so.

<sup>(57)</sup> <https://www.retsinformation.dk/eli/ta/2021/176>.

<sup>(58)</sup> <https://fm.dk/nyheder/nyhedsarkiv/2022/juni/regeringen-kl-og-danske-regioner-enige-om-ny-faellesoffentlig-digitaliseringsstrategi/>.

<sup>(59)</sup> <https://www.legifrance.gouv.fr/loda/id/JORFTEXT000030978561/>.

<sup>(60)</sup> <https://inspire.egov.bg/>.

<sup>(61)</sup> <https://e-gov.bg/wps/wcm/connect/e-gov.bg-18083/1506d64e-0f16-4954-ba0b-dfd77ae58184/Стратегия+за+развитие+на+електронното+управление+2019-2025.pdf?MOD=AJPERES&CVID=nyx-ndJ&useDefaultText=0&useDefaultDesc=0>.

<sup>(62)</sup> <http://www.geoportal.gov.si/eng/library/>.

<sup>(63)</sup> <https://geohub.gov.si/portal/home/>.

<sup>(64)</sup> <https://www.geohrvatska.hr/en/index.html>.

- **Open data portal.** A specialised section on the national open data portal is dedicated to geospatial data, making it easier for users to find and access these datasets.

### [Access to citizen-generated data](#)

Citizen-generated data is information that individuals produce. This includes health data collected from internet of things devices such as smartwatches, or community contributions such as adding images or correcting information using a publicly available map application. In 2023, 11 Member States (41 %) reported that their national policies or strategies included measures to incentivise the publication of and access to citizen-generated data. This is an increase of two countries, **Bulgaria** and **Hungary**, compared with 2022. A study by data.europa.eu, published in 2022, investigated citizen-generated data <sup>(65)</sup> and found that national portals tend to focus on data directly created and maintained by public administrations. Citizen-generated data sources, while valuable, may not receive the same level of attention on platforms primarily designed for official government data.

**Lithuania** highlights that, although it does not have in place measures to incentivise the publication of citizen-generated data, citizens can register and provide data on the national portal in the same way as government institutions. However, there are currently no cases of citizens having done so. Furthermore, **Lithuania** avoids adding citizen-generated or -derived data as separate datasets and instead publishes such data as data use cases <sup>(66)</sup> because of strict quality requirements for datasets; use cases are much easier to publish. However, in the future, the open data team plans to include citizen-generated data on the portal, such as data from the OpenStreetMap project, which has a very active community in Lithuania. In **France**, the national portal allows anyone to publish data but uses a badge icon to identify data from official sources. All data providers have free access to tools that help to improve the quality of data, such as schema.data.gouv.fr and publier.etalab.studio. **Bulgaria** similarly has the same guidelines, publication process and tools for all data providers, including providers of citizen-generated data.

One way in which publication of citizen-generated data is incentivised in **Denmark** is by making it easier for citizens to grant or withdraw consent or authorisation to the authorities to process or share their data. There is also a plan to develop a strategy for the handling of self-reported data in the health sector.

In **Austria**, the contributions of citizen science and citizen-generated data are stimulated by the country's open science policy. In **Ireland**, funding for citizen-generated data projects is granted through the Open Data Engagement Fund. Examples of initiatives funded include the Tough Soles project <sup>(67)</sup> and the Air Quality Data Hack event <sup>(68)</sup>. **Estonia** emphasised that it had created online courses about open data at its government's Digital Academy <sup>(69)</sup> to help boost the publication of data generated by citizens. Moreover, it actively enhances the usability of the national data portal to streamline the process of publishing open data, making it accessible and user-friendly for individuals and organisations interested in contributing to open data initiatives.

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<sup>(65)</sup> [https://data.europa.eu/sites/default/files/report/data.europa.eu\\_Report\\_Citizen-generateddataondata\\_europa.eu.pdf](https://data.europa.eu/sites/default/files/report/data.europa.eu_Report_Citizen-generateddataondata_europa.eu.pdf).

<sup>(66)</sup> <https://data.gov.lt/usecases/examples>.

<sup>(67)</sup> <https://toughsoles.ie/trail-info>.

<sup>(68)</sup> <https://airqualitydatahack.com/>.

<sup>(69)</sup> <https://digiriigiakadeemia.ee/>.

### Supporting the reuse of open data

The primary aims of the open data directive are to encourage the opening up of public sector information and stimulate its reuse. A total of 26 Member States (96 %), all except the Netherlands, stated that their open data policy or strategy required public bodies to maintain a data inventory, an increase of one country, Luxembourg, since 2022. A data inventory is a comprehensive catalogue of the datasets held by an organisation and can be used to plan the opening up of appropriate datasets. All 26 Member States with a data inventory indicated that it include data collected by public bodies that could not be published as open data.

Besides making data discoverable on their national portals, 22 Member States (81 %) stated that their policies and strategies also included publishing their country's data on data.europa.eu to foster discoverability. This included several countries, such as **Germany, Romania and Sweden**, that explained that the legal obligation to place metadata on the national portal meant that this data was automatically made available on data.europa.eu. The five Member States that answered no to this question do tend to make their data discoverable on data.europa.eu in practice, even though this is not explicitly promoted through a policy or strategy.

In addition, 26 Member States (96 %), all except Belgium, reported that their open data policies and strategies outlined measures to support the reuse of open data by the public sector. This is an increase from 24 Member States in 2022, with **Luxembourg and Malta** now indicating that their strategies include such measures.

**Croatia**, for example, organises workshops for civil servants to promote such reuse. Moreover, the government organises public events to promote open data reuse among different target groups. Several other Member States also highlighted their efforts related to data literacy and awareness raising.

As a further example of stimulating reuse, **Hungary's** artificial intelligence strategy outlines measures for the development and establishment of the country's national open data portal. Furthermore, the National Data Asset Management Agency is tasked with opening up public databases in an organised fashion to help businesses develop high-value products. **Portugal** provides free data analysis and visualisation tools on its national open data portal to support the reuse of its open data <sup>(70)</sup>. Its 2021–2023 national action plan for digital transformation <sup>(71)</sup> also presents specific measures to support the reuse of open data by the public sector.

In **Italy**, Article 50 of the Digital Administration Code states that the data of public administrations should be made accessible in a manner that allows private and public institutions to reuse it <sup>(72)</sup>. This article also proposes the establishment of a national digital data platform to enable public administrations to share their data through APIs. In addition, many regions and municipalities have their own policies that support the reuse of open data <sup>(73)</sup>. In general, these local administrations formulate dedicated policies and local guidelines on implementing the national strategy. To ensure that the process of exploiting public data at the national, regional and local levels is done consistently, local strategies must comply with the strategy set out in Italy's national 3-year plan <sup>(74)</sup>.

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<sup>(70)</sup> <https://dados.gov.pt/en/>.

<sup>(71)</sup> <https://tic.gov.pt/documentos/plano-de-acao-para-a-transformacao-digital-da-ap-2021-2023>.

<sup>(72)</sup> [http://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legislativo:2005-03-07;82!vig=.](http://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legislativo:2005-03-07;82!vig=)

<sup>(73)</sup> <https://www.dati.gov.it/riferimenti-normativi-linee-guida-regionali>.

<sup>(74)</sup> [http://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:legge:2015-12-28;208!vig=.](http://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:legge:2015-12-28;208!vig=)

Some of the measures highlighted by **Bulgaria** relate to reducing the use of unstructured data and increasing the use of machine-readable formats to facilitate the reuse of the data. **Germany** and **Estonia** also emphasised supporting improved data quality, which encourages the data's reuse. **Denmark** mentioned promulgating common architectural principles and standards for data sharing across public authorities <sup>(75)</sup>. In **Greece**, an annual competition rewards civil servants and officials who have contributed to the digital transformation of public administration and to the improvement of the provision of public services to citizens, including by supporting open data reuse <sup>(76)</sup>.

A total of 22 Member States (81 %) stated that their policies and strategies outlined measures to support the reuse of open data by the private sector. This is a net decrease of one country compared with 2022. Unlike in 2022, **Romania** now indicates that its strategy includes such measures, but **Bulgaria** and **Croatia** no longer report this to be the case. As in 2022, **Luxembourg**, the **Netherlands** and **Portugal** do not report having measures in place to support the private sector in reusing open data.

In terms of measures to support private sector reuse, **Austria** reported having funding programmes for small and medium-sized enterprises to foster data usage and data literacy. One of the main goals of **Slovakia's** open data strategy is to release the economic potential of open government data, stimulating a robust open data industry in information technologies. Therefore, Slovakia focuses on publishing the datasets most requested by the public to support the reuse of open data in commercial and non-commercial solutions, increasing the quality of open data, making open data accessible through APIs and increasing access to open data in English. In **Slovenia**, there is a collaboration with the Chamber of Commerce in the form of the Open Data Hub, which holds regular events and consultations with actors in the private sector. **Spain's** national open data strategy includes the objective of identifying business models and business success stories to share successful practices. The national open data team, therefore, regularly documents success stories of companies that base their business on the use of open data.

### [Prioritising high-value datasets](#)

A total of 25 Member States (93 %) stated that they were working towards applying Commission Implementing Regulation (EU) 2023/138 on high-value datasets. **Croatia** responded no to the question, while **Malta** did not answer. Figure 9 summarises the average progress made by Member States in terms of organisational, legal and technical requirements for the six categories of high-value datasets.

On average, progress is most advanced on geospatial and statistics datasets (both 62 %). In contrast, the high-value category of 'companies and company ownership' has the lowest average level of progress (54 %). Turning to the underlying requirements, the greatest progress can be seen on identifying and inventorying high-value datasets (technical requirement) (65 %), followed by addressing legal barriers (legal requirement) (62 %) and setting up new roles and workflows (organisational requirement) (59 %). Overall, progress on technical requirements scores the lowest, with the requirements of quality metadata (58 %), standardised structures and access (55 %) and machine-readable formats (53 %) showing the lowest average levels of progress.

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<sup>(75)</sup> <https://arkitektur.digst.dk/>.

<sup>(76)</sup> <https://www.secdigital.gov.gr/diagonismos-vraveion-psifiakis-diaky/>.

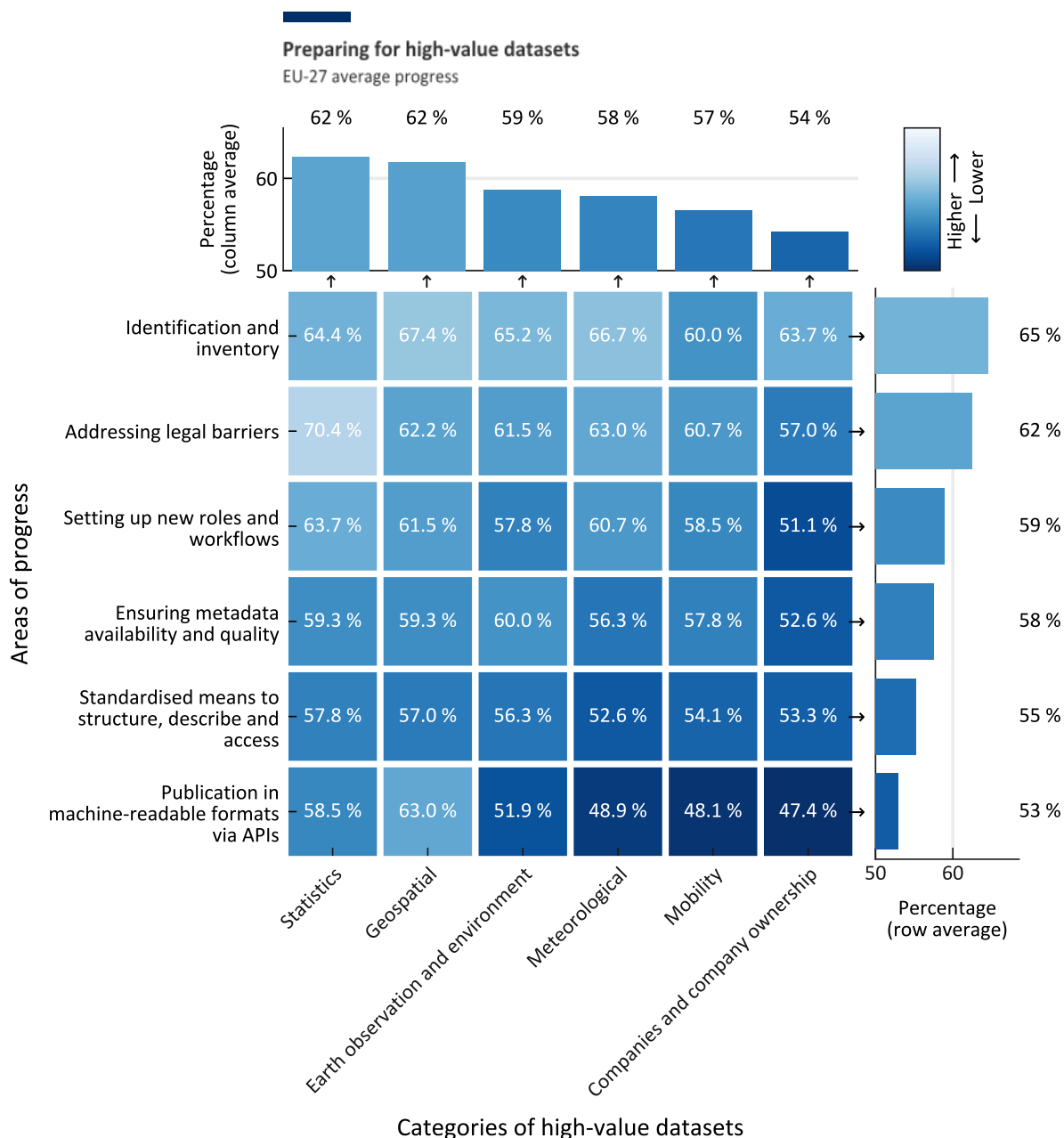


Figure 9: Average progress in several areas towards implementing the regulation on the six categories of high-value datasets

In addition to the progress made towards implementing the regulation on high-value datasets, 25 Member States (93 %), all except **Belgium** and **Ireland**, reported that they had taken measures to ensure that stakeholders, such as reusers, were involved in prioritising high-value datasets for publication. Of those, 15 Member States (56 %) indicated that the measures took the form of regular consultations and 10 Member States (37 %) stated that they had implemented other measures. This is a shift since 2022 towards other measures rather than regular consultations. In 2022, 22 Member States (81 %), including **Ireland**, reported holding regular consultations, and only four Member States (15 %) reported having taken other measures.

An example of such other measures is the questionnaire that the national open data team in **Czechia** distributed to 300 open data users as part of the analysis that it undertook for the new open data communication strategy. Some of the questions were specifically dedicated to users’ preferences with

regard to high-value datasets. Similarly, in **Germany**, various data providers and reusers were involved in identifying appropriate datasets through an online survey and workshops held as part of a study on high-value datasets commissioned by the Federal Ministry for Economic Affairs and Climate Action. **Luxembourg** emphasised its strategic collaboration with the national statistic administration to decide on the dataset structure and options for metadata harvesting. The open data team have also created scripts to harvest the entire contents of the country's national statistics database. **Slovakia** highlighted that it had created a roadmap on implementing the concept of high-value datasets, including by standardising metadata for each category. It has also developed a methodology to measure the reuse and impact of open data that includes tools for mapping and measuring the impact of high-value datasets.

Regarding metadata, 25 Member States (93 %), all except **Greece** and **Croatia**, reported that those public bodies holding high-value datasets were preparing to denote this in the dataset's metadata. As an interim measure, **Cyprus** has adopted technical guidelines on tags to indicate high-value datasets <sup>(77)</sup> until a new set of guidelines on the DCAT-AP metadata standard is adopted <sup>(78)</sup>. **Finland** stated that there had been informal discussions about denoting high-value datasets as such in metadata. However, there are open questions in Finland about whether the metadata should be aligned at the national level and, if so, who would steer the alignment and what means would be used to achieve it, since the implementing regulation does not specify such a requirement on metadata.

In **Italy**, the guidelines on implementing the country's open data policy <sup>(79)</sup> underline that the national metadata profile will be updated to set out specific requirements for and recommendations on denoting high-value datasets as such in metadata. **Slovakia** is also implementing a new DCAT standard that contains an attribute for high-value datasets.

As further examples, the **Netherlands** is working with relevant data holders to determine how to denote high-value datasets. They will probably be denoted through an additional entry in the same register used for Inspire data holders <sup>(80)</sup>. **Poland** stated that high-value datasets were already marked as such on its national portal. Its main challenge is API development. **Romania** faces the challenge that some high-value datasets are currently behind a paywall, so alternative funding sources will need to be identified when these datasets become free of charge. Investments are also needed to improve the national infrastructure to meet the technical demands of dynamic data, such as the frequency of updates. In general, the national team notes a lack of understanding of the broader benefits of open data in Romania, which leads to a reluctance to open up all datasets.

Finally, **Austria** highlighted four specific aspects of its planning for and progress on the denotation of high-value datasets.

- **Initial assessment.** An audit has been conducted to identify datasets that fall into the high-value category.
- **Internal guidelines.** Public bodies have been issued guidelines detailing how to denote these datasets as high-value ones in metadata.
- **Responsible entities.** A designated data steward for each public body will be appointed to ensure that datasets are correctly denoted.

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<sup>(77)</sup> <https://www.data.gov.cy/technical-guidelines>.

<sup>(78)</sup> For interest, these guidelines were published after the 2023 ODM data collection (<https://semiceu.github.io/DCAT-AP/releases/2.2.0-hvd/>).

<sup>(79)</sup> <https://docs.italia.it/AgID/documenti-in-consultazione/ig-opendata-docs/it/bozza/principi-general/serie-di-dati-di-elevato-valore.html>.

<sup>(80)</sup> <https://www.inspireaanmerking.nl/aanmerkingsregister>.

- **Monitoring.** Quarterly reviews are planned to assess the progress of this denotation process.

### [Alignment between open data policies and other political priorities](#)

The EU sets a strategic agenda of priorities for each 5-year legislative term. The six priorities for 2019–2024 <sup>(81)</sup> are as follows.

- **The European Green Deal.** Europe aims to be the first climate-neutral continent by becoming a modern, resource-efficient economy.
- **A Europe fit for the digital age.** The EU’s digital strategy will empower people with a new generation of technologies.
- **An economy that works for people.** The EU must create a more attractive investment environment, and growth that creates quality jobs, especially for young people and small businesses.
- **A stronger Europe in the world.** The EU will strengthen its voice in the world by championing multilateralism and a rules-based global order.
- **Promoting our European way of life.** Europe must protect the rule of law if it is to stand up for justice and the EU’s core values.
- **A new push for European democracy.** We need to give Europeans a bigger say and protect our democracy from external interference such as disinformation and online hate messages.

In 2023, 25 Member States (93 %), all except Croatia and Romania, indicated that the objectives and actions of their national open data policies or strategies aligned with one or more of the European Commission’s priorities for 2019–2024 (Figure 10). Unsurprisingly, national open data policies most often align with the priority ‘A Europe fit for the digital age’. A total of 23 Member States (85 %) reported an action in their open data policy or strategy that aligns with this priority. Several countries mentioned their initiatives to boost digital skills or highlighted that releasing public data enables the development of innovative digital services and applications and strengthens the digital economy.

‘A new push for European democracy’ is also frequently aligned with open data policies. A total of 21 Member States (78 %) reported that an action in their open data policy or strategy addressed this priority. Several countries referred to use cases of open data increasing transparency, for example by enabling citizens to monitor the administrative and legislative processes. ‘An economy that works for people’ ranked third among the priorities most frequently aligned with open data policy, with actions in 20 Member States (74 %) aligning with it. These actions typically relate to ways in which the availability of open data and its reuse can foster innovative business models, create jobs and strengthen the economy.

The priority least frequently aligned with open data policies and strategies is ‘A stronger Europe in the world’ (12 Member States; 44 %). Initiatives in this area, mentioned by countries including **Denmark** and **Estonia**, relate to making cyberspace resilient to cyber threats and increasing digital trust.

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<sup>(81)</sup> [https://commission.europa.eu/strategy-and-policy/priorities-2019-2024\\_en](https://commission.europa.eu/strategy-and-policy/priorities-2019-2024_en).

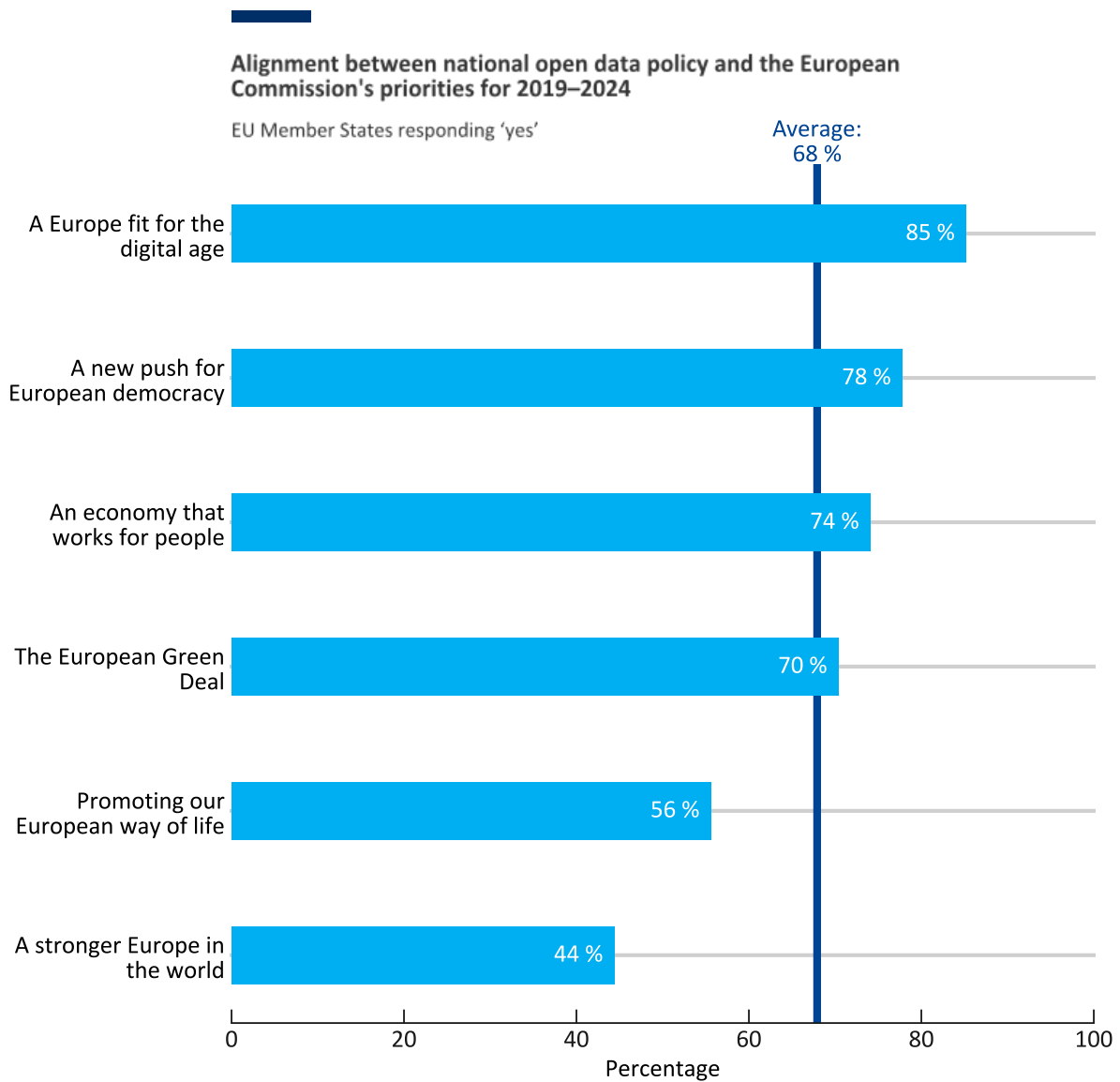


Figure 10: Alignment between open data policy and the European Commission's priorities for 2019–2024

### 3.2. Governance of open data

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

#### Governance structures

All 27 Member States (100 %) indicated that their governance structures enabled the participation and inclusion of various stakeholders in open data policies. In some cases, a ministry takes a leading role in governance. For example, in **Austria** the national open data portal is a project on which the Ministry of Finance and the nine federal states cooperate. Furthermore, the Federal Ministry of Labour and Economy is responsible for implementing the Federal Law on the Reuse of Information, which includes provisions transposing the implementing regulation on high-value datasets. In **Bulgaria**, the Ministry of Electronic Government takes the leading role, supported by data officers in every public sector body,



by working groups and by other structures. Similarly, in **Estonia** the Ministry of Economic Affairs and Communications is responsible for leading open data policy. It has established an interdepartmental open data working group, which has members from various interested ministries and other public sector organisations.

Instead of having a primary ministry leading open data policy, **Finland** has several models and processes available for public sector bodies to use to ensure the participation of stakeholders. Responsibilities are also distributed among several public administrations in **Italy**, where the Agency for Digital Italy is responsible for executing legislative provisions on open data. In addition, Italy's Department for Digital Transformation is the support structure within the Ministry for Technological Innovation and Digital Transition that promotes and coordinates the government's actions aimed at developing a unitary strategy in the field of digital transformation and modernisation of the country through digital technologies. The Agency for Digital Italy and the Department for Digital Transformation jointly pursue strategic objectives relating to open data. Other responsibilities lie with other public administrations, including at the regional and local levels. In **Sweden**, the Agency for Digital Government is responsible for the open data portal and the national guidelines. However, all data owners are responsible for their open data quality and compliance, and for how they include reusers and other stakeholders in the publishing process.

The governance structure for open data can follow different models. For example, there could be strong central coordination (a top-down approach) or a more decentralised structure in which initiatives are developed and pursued from the bottom-up. A total of 19 Member States (70 %) reported using a hybrid model, combining elements of a top-down and a bottom-up approach, to govern open data. The remaining eight Member States (30 %) stated that they implemented a top-down approach.

A top-down approach is generally chosen when a country wants the central government to lead the implementation of open data policy. A hybrid approach is usually chosen to complement top-down steering with bottom-up participation that amplifies activities. In federal systems and systems where municipalities have a right to self-government, a hybrid approach ensures alignment between the national strategy and initiatives at the local and regional levels.

In addition to open data initiatives at the national level, 25 Member States (93 %) indicated that some local and regional public bodies in their country conducted open data initiatives. **Cyprus** and **Malta** noted that they have limited regional governance due to their small size. In 23 Member States (85 %), the governance structure ensures that local and regional open data initiatives are facilitated and supported nationally. More specifically, 14 Member States (52 %) reported that this was done for all local and regional open data initiatives, 5 Member States (19 %) indicated that this was done for most such initiatives and 4 Member States (15 %) indicated that it was done for some such initiatives. **Belgium** and **Austria** highlighted that their federal systems do not grant authority over open data projects to regional bodies; however, there is typically cooperation on open data initiatives. **Malta** again pointed out that regional governance is limited due to the small size of the country. In **Portugal**, there are measures to promote contact with city councils, local associations, non-governmental organisations and so on, but these are not formally mentioned in a national policy.

With regard to national support for local and regional open data initiatives, **Slovenia** stated that it funded IT projects supporting open data publication in its regions and municipalities. In **Sweden**, a shared metadata catalogue was launched to further support public organisations, particularly those with fewer resources, in developing and holding a data catalogue of their own. **Hungary** also mentioned that one of the national team's tasks was to make public databases available under a

regulated framework so that public administrations, including at the regional and local levels, can make more effective use of open data. In **Italy**, there is a regional digital agenda, and the national team provides technical and operational support to facilitate the agenda's objectives. In answering this question, **Cyprus** highlighted that the national open data team supports several open data initiatives undertaken by semi-governmental organisations and municipalities, and even private initiatives.

In 2023, 25 Member States (93 %) reported that their governance structures and operating models were published online and publicly accessible. This is a substantial increase from 19 Member States in 2022, suggesting that transparency is becoming a priority for Member States. Furthermore, 22 Member States (81 %) reported that information was available online describing the responsibilities and working approach of the national open data team.

### [Network of open data officers and reusers](#)

Having civil servants across public sector bodies with an official remit on open data can facilitate the process of making data open. A total of 26 Member States (96 %), all except Denmark, responded that their governance models included such roles. This is an increase of three countries – **Latvia, Malta and Portugal** – compared with 2022. In **Malta**, there is a proposal for data protection officers to take on additional responsibilities regarding open data. In **Poland**, four official civil service roles are appointed as part of open data governance and policy implementation<sup>(82)</sup>, with roles and responsibilities allocated as follows.

- At the policy level, there is a task force for the 2021–2027 open data programme. A member of the management team in each ministry is assigned to the task force.
- At the operational level, there are programme implementers and a network of open data officers. The programme implementers are members of the Council of Ministers and the President of Statistics Poland. Each ministry (and Statistics Poland) appoints civil servants to implement the programme. These officers monitor the timely publication and quality of public data on the national portal in accordance with a roadmap and guidelines. Every year, the programme implementers are obliged to file a report to the Council of Ministers on the implementation process and undertakings realised in the area of open data.
- There is a programme coordinator from the Ministry of Digital Affairs.
- An open data team from the Ministry of Digital Affairs offers legal and technical support to open data officers.

**France** specifies three types of actors that are appointed within ministries to work on open data.

- **Chief data officers.** These data officers are in charge of the data policy within their ministries. Etalab, a department of the interministerial digital directorate, leads this network of chief data officers and supports each officer in implementing data policy, including opening up and disseminating data.
- **Open data officers.** Some ministries and interministerial services choose to appoint open data officers alongside the chief data officer, with the specific role of managing the open data policy within their organisation. The open data officer's missions are to prioritise which datasets to open, to act as an intermediary between Etalab and the divisions of their ministry and to report needs and feedback to the chief data officer.

<sup>(82)</sup> <https://dane.gov.pl/pl/knowledgebase/useful-materials/program-otwierania-danych-na-lata-2021-2027>.

- **Data stewards.** These are appointed by some ministries, depending on the strategy in place to reinforce the publication of open data by public administrations and support its reuse by services of the ministry.

In several countries, the appointment of data officers is a legal requirement. For example, in **Romania** Law No 179/2022 states that each public entity should have an appointed data officer. Each ministry has appointed a data steward, and there is an ongoing process of extending this role to all agencies of the central government. As another example, Resolution No 346/2017 in **Slovakia** introduced an obligation for ministries to appoint data stewards in public organisations<sup>(83)</sup>. The data stewards meet regularly in a dedicated working group and are in touch with the national open data team to resolve ad hoc issues<sup>(84)</sup>. In contrast, **Finland's** national governance model does not include the regular appointment of civil servants dedicated to open data. Instead, such appointments are organised at the regional and city levels. In **Sweden**, the National Agency for Digital Government recommends the appointment of a person in every organisation who is responsible for the coordination and organisational aspects of strategies related to open data. However, there is no official requirement at the national level for the appointment of open data officers.

In addition, 26 Member States (96 %), all except Croatia, indicated that the national open data team and the wider network of open data officers regularly exchange knowledge and experiences. For example, in the **Netherlands** every 3 months there is a meeting about the national data strategy and various topics surrounding open data<sup>(85)</sup>. In **France**, the network of chief data officers enables all central government stakeholders to be included in open data awareness and training programmes. It also means that the needs of ministries to be tracked and that Etalab can take appropriate action to meet them. The network of chief data officers formally gathers every 4 months to share information about progress, difficulties and best practices in data strategy. Moreover, one-on-one exchanges between Etalab and the ministerial chief data officers take place regularly.

Furthermore, all Member States (100 %) have regular exchanges between public sector bodies (i.e. data providers) and open data reusers. For instance, in **Austria** regular meet-ups, conferences and other events have been organised by several federal ministries, cities and other organisations. In the **Netherlands**, relevant events and news items can be found on the national data portal<sup>(86)</sup>, and knowledge and advice are also shared online<sup>(87)</sup>. Similarly, in **Italy** various events, such as meetings, conferences and web calls, are organised to facilitate exchanges between public bodies and other stakeholders. The Agency for Digital Italy promotes the dissemination of the culture of open data, including through training sessions aimed at both public administrators and reusers. Regular exchanges are also enabled through the Forum Italia platform<sup>(88)</sup>, a space for discussions where a specific section is dedicated to data and open data.

<sup>(83)</sup> <https://data.gov.sk/dataset/datovi-kuratori-2022-11-02> and <https://datalab.digital/dq/datovi-kuratori/>.

<sup>(84)</sup> <https://wiki.vicpremier.gov.sk/pages/viewpage.action?pageId=101824264>.

<sup>(85)</sup> <https://realisatieibds.pleio.nl/events/view/f4bfbc3b-ef62-4ece-bc61-528c0b003c86/save-the-date-ibds-cafe-hoe-kunnen-data-maatschappelijke-opgaven-verder-helpen>.

<sup>(86)</sup> <https://data.overheid.nl/actueel>.

<sup>(87)</sup> <https://data.overheid.nl/ondersteuning/data-publiceren/handreiking-open-data>.

<sup>(88)</sup> <https://forum.italia.it/c/dati/33>.

### 3.3. Open data implementation

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

#### Implementation plans and monitoring processes

Data publication plans and related monitoring mechanisms are needed to enable those responsible to oversee progress towards opening up datasets and to intervene in the event of barriers. In 2023, 24 Member States (89 %), all except Luxembourg, Malta and Portugal, reported having such plans. This is an increase by one country, **Germany**, compared with 2022.

For example, in **Finland** the six largest cities have their own roadmaps and data publication plans. These are shared and discussed in regular meetings between the cities and the national open data team. Similarly, in **Germany** several ministries and regions have such plans. In **Croatia**, authorities are obliged to publish a list of registers and databases under their jurisdiction (a so-called asset list <sup>(89)</sup>), together with metadata and information on how to access them. The **Netherlands** employs a staged publication approach. The largest data-holding organisations initially release data within internal catalogues before publishing it publicly on the national data portal. The Netherlands also has standard publication plans at the national and local levels. Datasets are made available through the national data portal as well as on the data portals of the major cities.

In 2023, 26 Member States (96 %), all except Belgium, stated that they had processes to ensure that their open data policies and strategies were implemented. This is an increase from 21 Member States (78 %) in 2022, which indicates that more attention is being paid to monitoring the implementation of open data policies and strategies. Several countries mentioned using the network of open data officers to help monitor progress. Moreover, 25 Member States (93 %), all except Romania and Sweden, indicated that they implemented processes to assess if public bodies charge above the marginal cost for the data they provide, often through national laws or ad hoc authorities. In 24 Member States (89 %), at least the majority of datasets provided by public sector bodies are free of charge.

The Member States also shared the challenges they face when implementing their open data policies and strategies. Some common challenges include the following.

- **Lack of human resources and skills.** Several countries mentioned the lack of human resources allocated to open data and the absence of adequate data skills and literacy among civil servants. In some cases, public authorities still do not fully recognise the necessity of proactive data publication and are generally hesitant to make the data they produce open. In other cases, efforts are fragmented.
- **Insufficient financial capacity.** In some cases, there is a need to find a regular budget for specific datasets (e.g. high-value datasets that used to generate revenue) or a need for finances to invest in better technical infrastructure.
- **Lack of public awareness.** The public is not always aware of the concept of open data and its benefits and lacks the skills to leverage it. Evidence of the impact of open data is sometimes lacking.
- **Technical difficulties in publishing high-quality open data.** Several countries mentioned a lack of standardisation in the collection and management of data, a lack of coherent data

<sup>(89)</sup> <https://pristupinfo.hr/djelokrug/otvoreni-podaci-povjerenika-za-informiranje/>.

governance and a lack of interoperability as factors hindering the publication of high-quality open data. Issues include the need for mapping between Inspire and DCAT-AP metadata.

In addition, **Finland** shared two interesting aspects. The first relates to Russia's invasion of Ukraine and the change in the global political situation. The national team stated that Finnish municipalities' open datasets, such as data related to infrastructure, had been searched from Russia and its partner countries. This raises security concerns and may reduce the enthusiasm of municipalities and other actors for publishing open data. Second, the team noted that there was an active phase going on in terms of EU legislation regarding digitisation and data management. The amount of regulation and the difficulty of interpreting the requirements may cause challenges, especially for small actors. This may also affect the attention and resources dedicated to open data.

### [Activities to support open data publication](#)

All Member States (100 %) have activities in place to assist data providers with open data publication. Typical activities include providing training, online materials, consultations and technical support. For example, **Cyprus** has an onboarding process for public sector bodies that wish to publish their data on the national data portal. The process includes the assignment of an open data liaison officer.

In addition to general support, 24 Member States (89 %) reported that they had processes specifically to support holders of real-time, dynamic and geospatial data with their publishing. Considering real-time and dynamic data first, **Austria**, for example, offers specialised training to data providers dealing with this type of data <sup>(90)</sup>. **France** has a dedicated team to assist data providers in publishing transport data. The **Netherlands** also has a specialised data hub for holders of real-time infrastructure data. The new release of **Italy's** open data portal allows dynamic data to be denoted as such through keywords. The national open data team also prepared a frequently asked questions web page on topics related to dynamic data. Furthermore, in **Poland** the open data portal enables editors to mark dynamic data with additional metadata. Moreover, the editors of the national portal have access to a dedicated information page about dynamic data <sup>(91)</sup>. Several countries also mentioned providing technical documentation and guidelines on using APIs. Regarding geospatial data, several countries have specialised geospatial portals and have created support structures linked to the Inspire directive, which pertains to spatial information. Other countries, such as **Ireland**, also point out that they offer technical support to ensure that geospatial data is correctly represented on the national portal (they usually use ArcGIS REST services).

A total of 18 Member States (67 %) reported offering activities to assist citizens and organisations in publishing citizen-generated data. For example, since 2021 **Cyprus** has allowed private organisations to publish data on its national portal. Countries generally mention educational activities and publicly available guides as the types of support that they offer to citizens to help them to publish data. For example, the team in **Lithuania** translated a data.europa.eu e-learning programme <sup>(92)</sup> into Lithuanian to help public sector workers and citizens to access learning material on open data <sup>(93)</sup>.

### [Data literacy training and events](#)

In 2023, 25 Member States (93 %), all except Latvia and Malta, stated that they offered professional training to civil servants working with open data. Furthermore, 22 Member States (81 %) indicated that these training activities resulted in formally recognised qualifications. In **Austria**, for example, the

<sup>(90)</sup> <https://www.vab.gv.at/vab/bildungsprogramm/public-management-und-governance.html>.

<sup>(91)</sup> <https://dane.gov.pl/pl/knowledgebase/useful-materials/dane-dynamiczne>.

<sup>(92)</sup> <https://data.europa.eu/en/academy/introducing-open-data>.

<sup>(93)</sup> <http://theodi.github.io/EUeLearning/lt/#/id/co-01>.

Administrative Academy of the Federal Government offers a dedicated programme on digital governance, which includes training modules on open government data <sup>(94)</sup>. Upon completing the programme, participants gain a certification formally recognised by the federal government. This qualifies them for roles that require expertise in digital governance and data management. Another example comes from **Sweden**, where the Agency for Digital Government launched a new education programme called Data Ambassadors <sup>(95)</sup> in 2023, which aims to provide basic education on open data and the process of releasing data. The agency hosts participants from a broad range of public bodies, including municipalities, regions, public agencies and large organisations that work for the public sector.

Further to training programmes for civil servants, 19 Member States (70 %) stated that they had organised more than nine events in the past year to promote open data and data literacy among the general public. This is an 18 pp increase on 2022, when 14 Member States (52 %) indicated that they had held more than nine events. Only one Member State (4 %), **Romania**, did not report organising any such events. This demonstrates a growing interest among the general public in improving their data literacy and increased efforts on the part of various stakeholders to meet this demand. In most cases (70 %), the events were organised by several open data stakeholders, including local, regional and national public bodies, non-governmental organisations and organisations in the private sector.

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<sup>(94)</sup> <https://www.vab.gv.at/vab/bildungsprogramm/digital-government.html>.

<sup>(95)</sup> <https://www.digg.se/om-oss/nyheter/nyheter/2023-02-21-digg-lanserar-dataambassadorsprogram-for-att-stodja-arbetet-med-oppna-data>.

### 3.4. Overall EU Member State performance

In 2023, the average maturity score of EU Member States on the policy dimension was 89 % (Figure 11). This is a 3 pp increase on the 2022 score and represents the first increase in average maturity since 2020. The policy dimension remains the most mature dimension covered by the ODM assessment, scoring 4 pp higher than the second-ranked portal dimension.

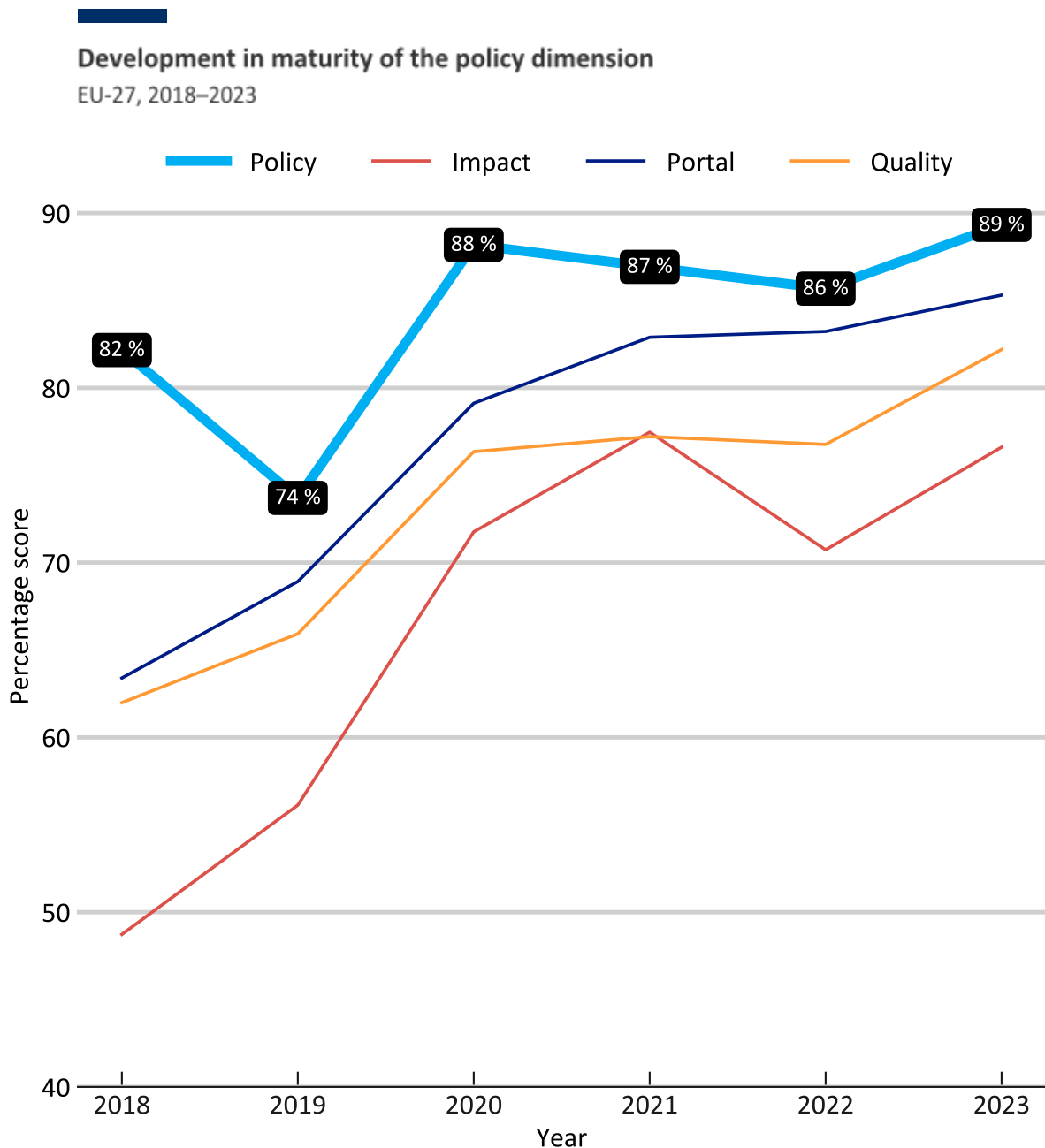


Figure 11: Average performance of the EU-27 on the policy dimension since 2018

All the indicators of the policy dimension showed improvement from the previous year, except the policy framework indicator, which remained unchanged on average (Figure 12). The governance of open data indicator score increased by 6 pp year-on-year to become the most mature policy indicator (92 %). The open data implementation indicator score also increased by 6 pp compared with 2022 and is now on par with the policy framework indicator score (88 %).

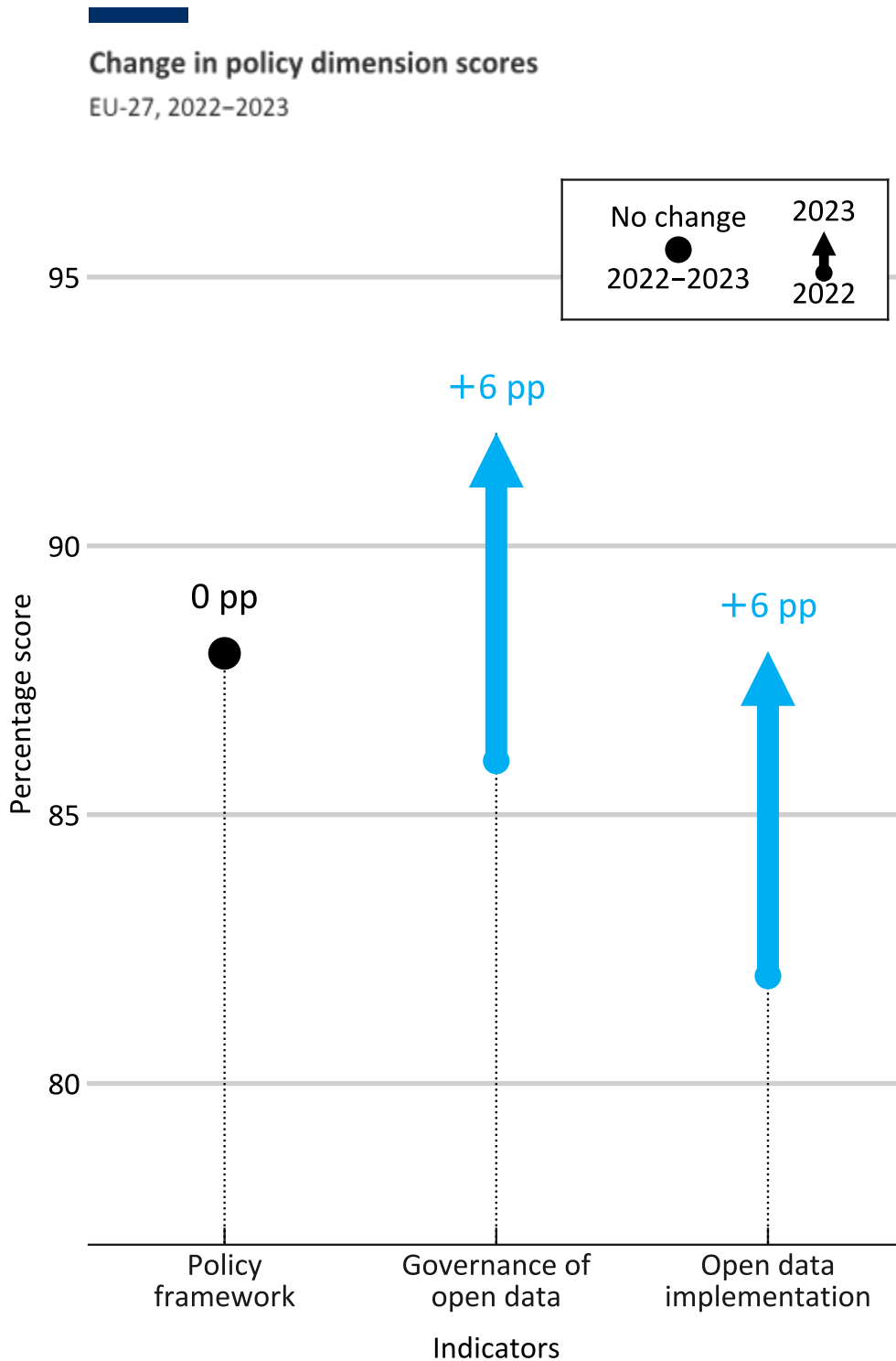


Figure 12: Average change in the policy dimension indicators for the EU-27 between 2022 and 2023



Each Member State has a unique scoring distribution on the indicators (Figure 13). Several countries that score below the EU-27 average on the dimension (see Figure 14) have broad score distributions across the indicators. This means that these countries have a mix of lower-scoring and higher-scoring indicators. For example, **Croatia** scores lowest on the policy framework indicator (43.6 %) but scores only 1 pp below the EU-27 average on the open data implementation indicator (87 %, compared with the EU-27 average of 88 %). As another example, **Romania** scores 29 pp higher on the governance of open data indicator (92 %) than the open data implementation indicator (63 %). Countries that score above the EU-27 average on this dimension tend to have narrower distributions, meaning they score relatively high on all the indicators. This makes sense considering that country scores on the policy dimension are statistically skewed, with the bulk of observations occurring at higher values (see Figure 14).

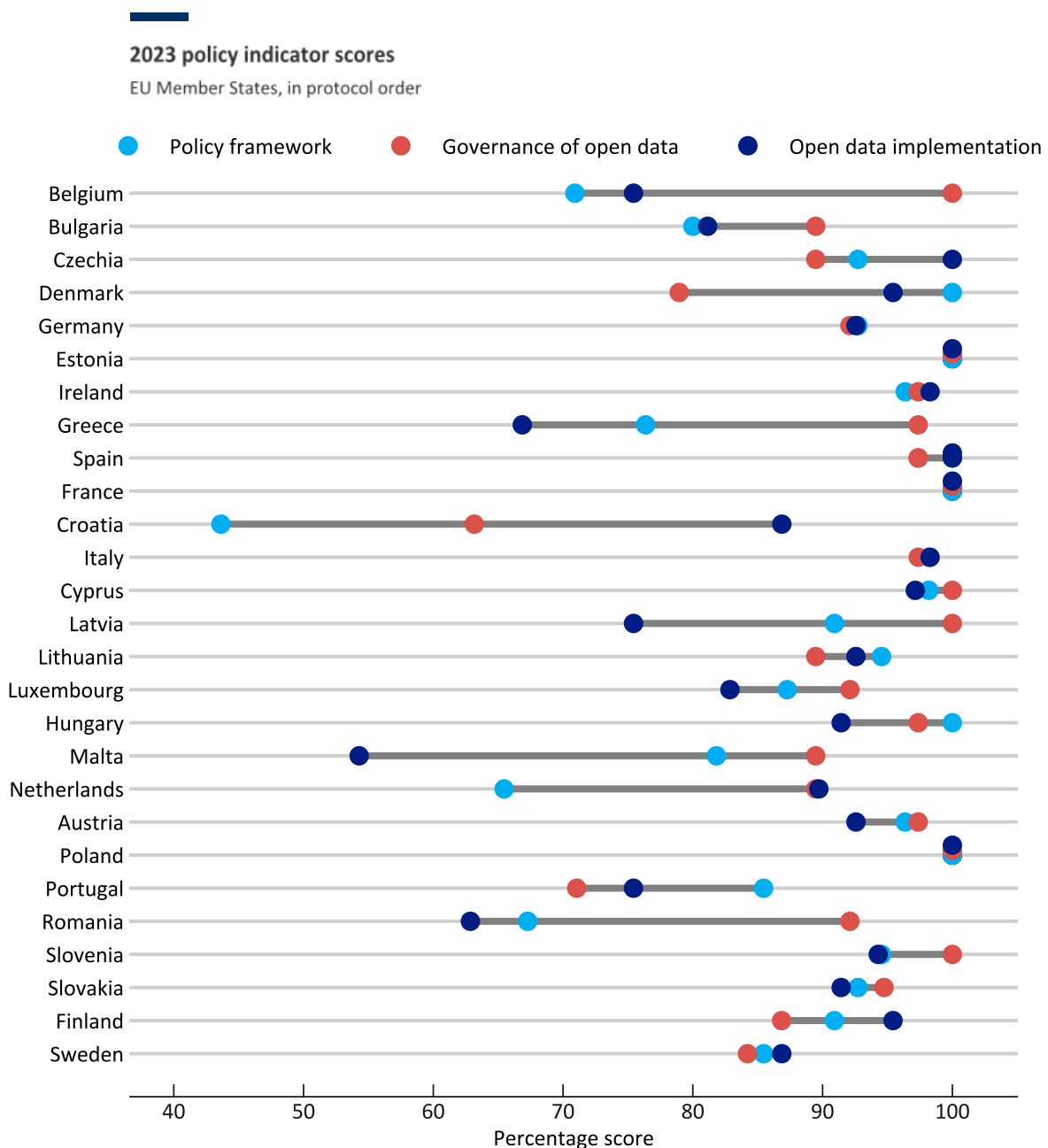


Figure 13: Policy indicator scores for each EU Member State

In terms of individual country performance, **France** (100 %), **Estonia** (100 %) and **Poland** (100 %) tie for first place on this dimension (Figure 14). **Spain** (99.2 %) follows, scoring full points on the policy framework and open data implementation indicators and 97.4 % on the governance of open data indicator. Overall, 17 Member States score above the EU-27 average of 89 %, and 10 Member States score above 95 %. **Malta** (+ 26 pp), **Luxembourg** (+ 25 pp) and **Slovakia** (+ 18 pp) showed the greatest year-on-year improvement in this dimension. Slovakia now scores above the EU-27 average. Eight Member States reduced their scores on the policy dimension year-on-year, with **Greece** (– 12 pp) and **Croatia** (– 17 pp) experiencing the largest reductions.



Figure 14: EU Member State scores on the policy dimension

## B. European Free Trade Association countries

### Policy framework

In 2023, all three participating EFTA countries stated that they had an open data policy, a strategy that included open data and an action plan to support the implementation of the policy and strategy. **Norway** highlighted that it had several strategic documents and policies covering data sharing (including open data), digitalisation and artificial intelligence. Similarly, in **Iceland** open data is mentioned in broader strategic documents such as the digital policy<sup>(96)</sup> and the upcoming open science strategy.

Moreover, the open data policy or strategy in all three countries has been updated in the past 2 years. For example, in October 2022 a data security classification was published in **Iceland**, which includes a more detailed definition of what data is open data<sup>(97)</sup>. The primary emphasis of the policy is that data should be open unless there are specific reasons for it not to be. Furthermore, all three countries report having a local or regional policy on open data. For example, in **Norway** the national strategy and accompanying action plan are created in collaboration with the local authorities.

In terms of measures to incentivise the publication of and access to real-time or dynamic data, **Iceland** and **Norway** indicated that their national policy or strategy outlined such measures. Iceland highlighted that it was implementing a secure national data exchange infrastructure called Straumurinn<sup>(98)</sup>, based on X-Road technology, making it easier for government agencies and municipalities to share real-time and dynamic data.

In addition, all three participating EFTA countries indicated that the national policy or strategy included measures incentivising the publication of geospatial data. **Iceland**<sup>(99)</sup>, **Norway**<sup>(100)</sup> and **Switzerland**<sup>(101)</sup> all have policies and strategies focused explicitly on geospatial data. Norway noted that its geospatial data will be published in accordance with the EU's high-value dataset specification. None of the three countries has such measures for citizen-generated data.

All three countries indicated that their open data policy or strategy included measures to support the reuse of open data by the public and private sectors. For example, **Norway**'s digital agenda includes the principle of 'one digital public sector', according to which data reuse within the public sector is paramount. The concept is that the public sector is to share data when it can and protect data when it must, making as much data as possible openly available for reuse for developing new services and value in the business sector<sup>(102)</sup>. In addition, **Norway** and **Switzerland** stated that their open data policy or strategy mandated public bodies to maintain a data inventory. Both countries' data inventories include data collected by public bodies that cannot be published as open data.

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<sup>(96)</sup> <https://island.is/en/o/digital-iceland/digital-strategy>.

<sup>(97)</sup> <https://island.is/frett/oeryggisflokkun-gagna-baetir-upplýsingaoeryggi>.

<sup>(98)</sup> <https://island.is/en/o/digital-iceland/island-services/straumurinn>.

<sup>(99)</sup> <https://www.althingi.is/lagas/153b/2011044.html>.

<sup>(100)</sup> <https://www.regjeringen.no/en/dokumenter/national-geospatial-strategy-towards-2025/id2617560/?ch=1>.

<sup>(101)</sup> <https://www.geo.admin.ch/en/about-swiss-geoportal/task-and-responsibilities/strategy-and-implementation.html>.

<sup>(102)</sup> <https://www.regjeringen.no/en/dokumenter/one-digital-public-sector/id2653874/?ch=4>.

## Governance of open data

**Norway** and **Switzerland** reported having a governance structure that includes various open data stakeholders. For example, Switzerland has the Open Government Data Office <sup>(103)</sup>, which encourages different open data stakeholders to be active at different levels (strategic, operational, etc.) and on different topics (e.g. data management, development of the portal, legal questions). In addition, there are specific bodies – such as the Interdepartmental Open Government Data Committee, the Public Administration and Open Government Data Forum, the Open Government Data Round Table, the Legal Working Group and the Portal Working Group – that bring together national and regional stakeholders.

In terms of governance structures, all three EFTA countries reported that they had a hybrid structure combining bottom-up and top-down governance models. This hybrid approach enables local and regional governance of open data initiatives and ensures that at least some of these initiatives are facilitated and supported nationally. The motivation for adopting this approach varies across the countries.

For example, in **Norway**, this approach is used to encourage bottom-up initiatives such as smart cities, while guidelines, governance and laws are top-down initiatives. In **Iceland**, the public sector is generally decentralised, but the Ministry of Finance and Ministry of Higher Education, Science and Innovation are responsible for open data. Therefore, the execution is bottom-up, whereas the stewardship lies with national ministries. Moreover, each of the participating EFTA countries publishes its governance structure and operating model online. **Iceland** and **Switzerland** also make available a document describing the responsibilities and working approach of the national open data team. The governance models of **Iceland** and **Switzerland** entail the appointment of civil servants who have an official remit on open data.

When it comes to local and regional initiatives, all three EFTA countries reported that such open data initiatives were supported at the national level. **Norway** highlighted that, as it is a smaller country, the national team either coordinates initiatives at the national level or advises on local initiatives. **Iceland** mentioned that the national team offers technical assistance to municipalities regarding open data initiatives. In **Switzerland**, the federal strategy encourages direct collaboration with every level of government.

All three countries reported regular exchanges between the national open data team and the wider network of open data officers, as well as between public sector data providers and open data reusers. These exchanges generally take the form of workshops and seminars. For example, **Norway** created a fixed digital meeting place to reach out to a broader network of professionals <sup>(104)</sup>. It also launched an online forum in 2021 <sup>(105)</sup>. In addition, Norway offers a service called Datajegeren (Data Hunter) that helps users find and access data <sup>(106)</sup>. This service also allows users to communicate with data providers, including open data officers. Furthermore, government agencies in Norway are building a ‘data factory’ <sup>(107)</sup> to improve the private sector’s access to data. A key feature of the data factory is communication with reusers.

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<sup>(103)</sup> <https://www.bfs.admin.ch/bfs/en/home/services/ogd/activities.html>.

<sup>(104)</sup> <https://www.digdir.no/informasjonsforvaltning/faglig-arena-datadeling-og-informasjonsforvaltning/2120>.

<sup>(105)</sup> <https://datalandsbyen.norge.no/>.

<sup>(106)</sup> <https://datafabrikken.norge.no/finn-data/datajegeren>.

<sup>(107)</sup> <https://digitalnorway.com/prosjekter/datafabrikk/>.

## Open data implementation

**Norway** and **Switzerland** indicated having data publication plans for the public sector. All three countries reported having processes to ensure that their open data policies or strategies are implemented. For example, **Iceland** <sup>(108)</sup> and **Switzerland** publish annual progress reports. In addition to producing annual reports, **Norway** is developing an overview, to be published on the national open data portal, of government bodies that have not yet opened up certain datasets.

All three participating EFTA countries reported assisting data providers with their open data publication processes, including holders of real-time, dynamic and geospatial data. Assistance typically includes handbooks, one-on-one consultations and general meetings. In terms of real-time and dynamic data, **Switzerland** highlighted that it provides infrastructures for easy aggregation and publication of near-real-time data, for example the national data infrastructure for electromobility (DIEMO) <sup>(109)</sup>. As a further example, **Norway** mentioned that its API working group for public sector providers offers support and shares knowledge that is especially relevant for holders of real-time and dynamic data. Regarding geospatial data, all three countries have established geospatial infrastructures and specific guidelines and standards.

When it comes to data literacy, all three EFTA countries stated that they offered professional development or training plans for civil servants working with data. In **Switzerland**, these training activities are provided as part of courses by universities and learners therefore receive a publicly recognised certificate after completion. Moreover, all three EFTA countries organise events to promote open data and open data literacy among the general public. These typically take the form of hackathons and conferences.

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<sup>(108)</sup> <https://www.stjornarradid.is/verkefni/efnahagsmal-og-opinber-fjarmal/opinber-fjarmal/arsskyrslur-radherra/>.

<sup>(109)</sup> <https://roadmap-elektromobilitaet.ch/fr/mesures/je-recharge-mon-autoch-linfrastucture-de-donnees-ouvertes-sur-les-stations-de-recharge-publiques-en-suisse/>.

### Overall European Free Trade Association country performance

In 2023, the EFTA average maturity score on the policy dimension was 81 % (Figure 15). **Norway** remains the most mature, with a score unchanged from 2022 (87.0 %). **Iceland** and **Switzerland** both increased their score by 7 pp compared with 2022, to 71.4 %% and 84.4 %, respectively.

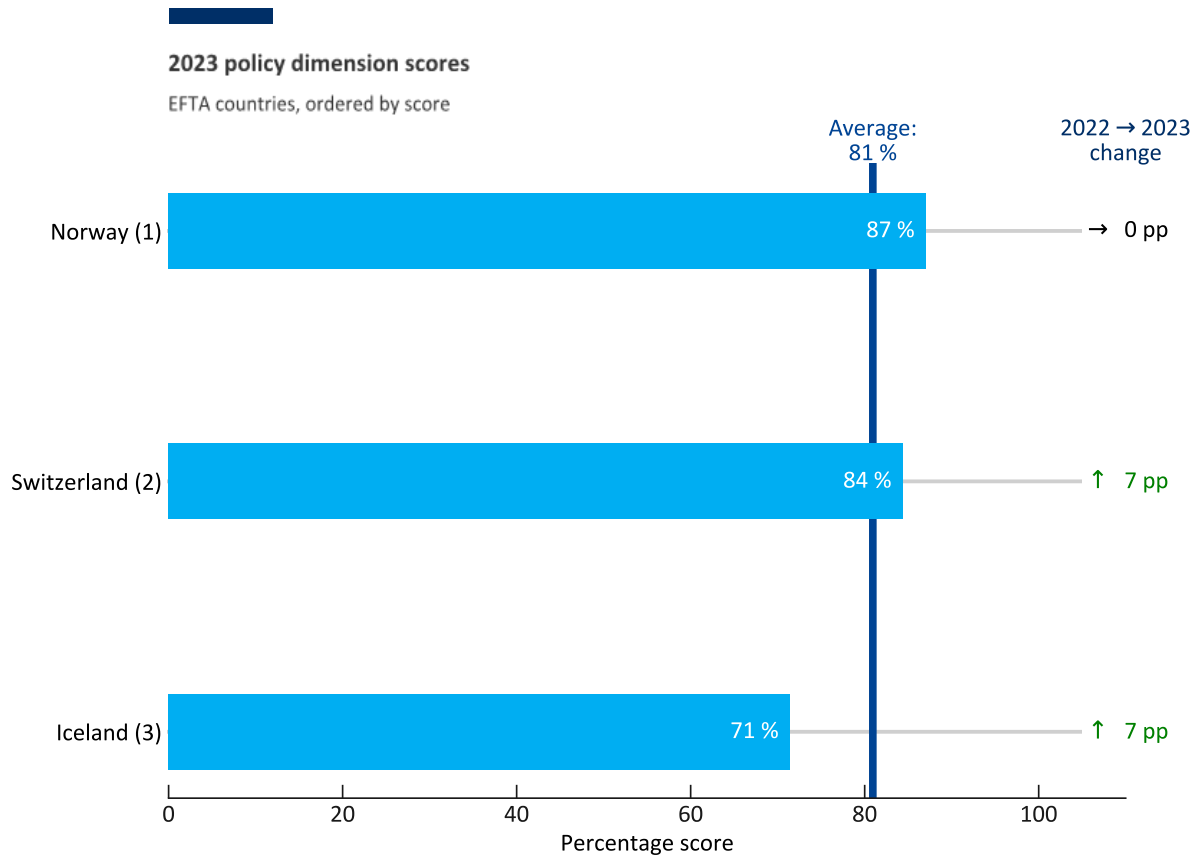


Figure 15: EFTA country scores on the policy dimension

All three participating EFTA countries have a broad scoring distribution on the indicators (Figure 16), meaning they score high on some indicators but low on others. The governance of open data indicator is **Switzerland**'s most mature indicator, whereas it is both **Iceland**'s and **Norway**'s least. **Iceland** and **Norway** score highest on the policy framework indicator. **Switzerland**'s least mature indicator is open data implementation.

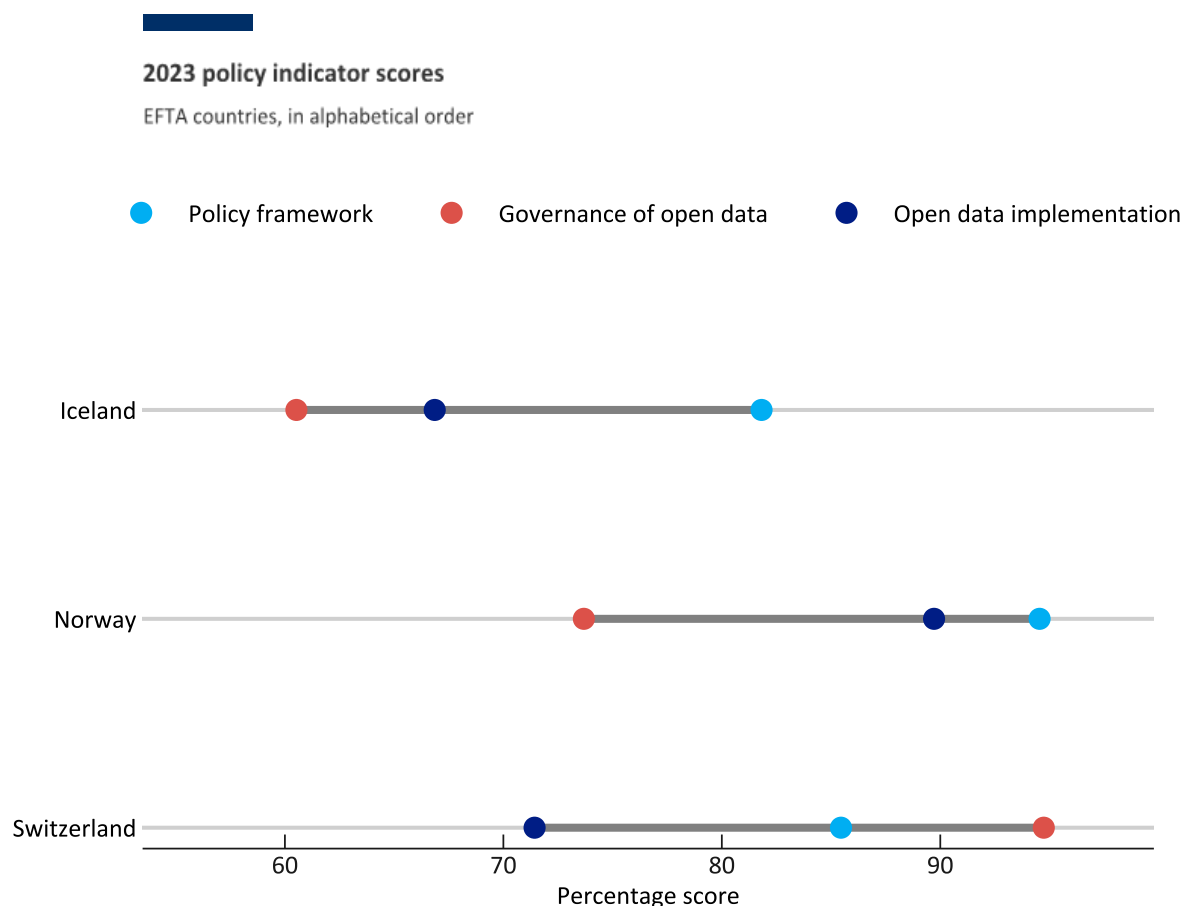


Figure 16: Policy indicator scores for each EFTA country

## C. Candidate countries

### Policy framework

All five participating candidate countries reported having an open data policy and corresponding action plan, the provisions of which are often packaged in several legislative instruments. For example, in **Bosnia and Herzegovina** provisions regarding open data are included in the Law on Freedom of Access to Information <sup>(110)</sup>. In **Serbia**, the Law on Electronic Government includes provisions regarding open data, such as a definition, provisions on the right to reuse and provisions on the regulation of the national open data portal <sup>(111)</sup>. All the candidate countries except **Bosnia and Herzegovina** reported having an open data strategy and that the strategy had been updated in the past 24 months. Sometimes, strategic measures on open data are embedded in broader documents focusing on the public sector and its digitalisation. For example, **Serbia** indicated that open data is prominently mentioned in its 2023–2025 programme for the development of electronic government <sup>(112)</sup> and its 2020–2025 strategy for the development of artificial intelligence <sup>(113)</sup>. Some of **Ukraine's** updates to its policy documents relate to the challenges posed by war. It explained that the updates were aimed primarily at striking a balance between access to public information on the one hand and ensuring the

<sup>(110)</sup> [https://www.vijeceministara.gov.ba/pdf\\_doc/Novi%20ZOSP%206-9-2023%20BOS.pdf](https://www.vijeceministara.gov.ba/pdf_doc/Novi%20ZOSP%206-9-2023%20BOS.pdf).

<sup>(111)</sup> <https://www.ite.gov.rs/tekst/130/zakon-o-elektronskoj-upravi-i-podzakonska-akta.php>.

<sup>(112)</sup> <https://mduls.gov.rs/wp-content/uploads/Program-razvoja-elektronske-uprave-za-period-od-2023.-do-2025.-godine-sa-Akcionim-planom.pdf>.

<sup>(113)</sup> <https://www.srbija.gov.rs/tekst/en/149169/strategy-for-the-development-of-artificial-intelligence-in-the-republic-of-serbia-for-the-period-2020-2025.php>.

interests of Ukraine's national security and defence on the other. **Serbia** and **Ukraine** also highlighted examples of open data policies and strategies from local or regional administrations.

Regarding measures to incentivise the publication of and access to real-time or dynamic data, **Montenegro** and **Ukraine** indicated that their national policy or strategy outlined such measures. These two countries, along with **Bosnia and Herzegovina**, also have such measures targeting holders of geospatial data. **Bosnia and Herzegovina** and **Montenegro** both referred to efforts started in response to the Inspire directive, such as the establishment of a geospatial data infrastructure that continues to serve holders of geospatial data. Only **Ukraine** reported having measures to incentivise the publication of and access to citizen-generated data.

All the participating candidate countries except **Albania** indicated that their open data policy or strategy included measures to support the reuse of open data by the public sector. However, **Albania** joins the other candidate countries in reporting such measures to support the reuse of open data by the private sector. Albania emphasised that its measures aim to promote the reuse of open data by businesses, start-ups and private academic institutions. As an example of measures taken to support the reuse of open data, Decree No 835 in **Ukraine** establishes, among other things, principles for improved governance, citizen engagement, inclusive development and innovation. Assisting data providers in creating new information resources and services based on open public information is part of achieving these principles. In addition, **Montenegro** highlighted that its 2023–2024 national action plan for open government partnership includes activities involving cooperation with the start-up community and the most frequent users of the open data portal. Furthermore, **Bosnia and Herzegovina**, **Albania** and **Ukraine** stated that their open data policy or strategy mandated public bodies to maintain a data inventory. These countries' data inventories include data collected by public bodies that cannot be published as open data.

### Governance of open data

All the participating candidate countries except **Bosnia and Herzegovina** stated that they had a governance structure that includes various open data stakeholders. However, **Serbia** noted that the mandate for its Open Data Working Group, which included stakeholders from the public sector, academia and the technology community, had formally ended. Still, the group has continued to meet informally. Sometimes, participation and inclusion of open data stakeholders form part of larger initiatives. For example, in **Albania** open data is discussed as part of a broader national plan for open government.

In terms of governance structures, all countries reported using a hybrid governance model that blends a top-down and bottom-up approach. **Montenegro**, **Albania** and **Ukraine** stated that they had published their governance structure online along with documents describing the responsibilities of the national open data team. **Bosnia and Herzegovina** pointed out that the responsibilities of the national open data team were mentioned in its Law on Freedom of Access to Information. All the candidate countries except **Bosnia and Herzegovina** reported that their governance structure included the appointment of civil servants with an official remit on open data. For example, thematic interministerial working groups have been established in **Albania** to coordinate and monitor open data reforms and related actions. In **Ukraine**, the Ministry of Digital Transformation was established in 2019. The Ministry's Chief Digital Transformation Officer oversees the coordination of open data initiatives. Furthermore, each public body must appoint persons responsible for publishing open data. All the candidate countries except **Bosnia and Herzegovina** indicated that local and regional open data initiatives were facilitated and supported nationally.



When it comes to exchanging knowledge and experiences, **Montenegro, Albania** and **Ukraine** stated that regular exchanges took place between the national open data team and the wider network of open data officers. In **Montenegro, Serbia** and **Ukraine**, such exchanges also occur between public sector bodies and open data reusers. These exchanges typically take the form of events such as webinars and workshops. Furthermore, **Montenegro** has launched a Digital Academy<sup>(114)</sup> to accelerate its digital transformation and improve the services provided by public administration bodies. This platform is intended to educate civil servants and all citizens who want to improve their professional, leadership and digital skills to be more efficient, effective and competitive in their business environment.

### Open data implementation

**Albania** and **Ukraine** indicated having data publication plans for the public sector. In **Ukraine**, several central bodies publish strategies or internal orders on publishing open data. In addition, several cities have joined an initiative called the Open Data Charter and similarly publish strategies or internal orders. Although in general publication plans exist, there is no unified approach.

In all the participating candidate countries except **Bosnia and Herzegovina**, there are processes in place to ensure that open data policies or strategies are implemented, such as quarterly or yearly reporting. In **Ukraine**, an annual assessment of open data programmes<sup>(115)</sup> focuses on the availability and quality of published data, governance structures within public bodies and efforts made to promote the reuse of open data.

All the participating candidate countries except **Bosnia and Herzegovina** reported supporting data providers to publish open data. For example, **Montenegro** provides a rulebook on how to publish information in an open format. The open data team in **Serbia** provides training on the open data portal and offers direct support to publishers. Furthermore, **Serbia** and **Ukraine** indicated that they perform specific activities to support holders of real-time or dynamic data. **Serbia** pointed to the API Guide available on the national open data portal, which is especially relevant to holders of real-time or dynamic data. **Ukraine** also offers data providers instructions on API use, as well as guidance and standards on the publication of real-time public transport data<sup>(116)</sup>. **Bosnia and Herzegovina, Serbia** and **Ukraine** also stated that they offered support for geospatial data providers, typically in the form of specific manuals, standards and technical infrastructures. Only **Serbia** and **Ukraine** indicated that they undertook activities to support the publication of citizen-generated data, often in the form of education initiatives or advice on technical aspects of uploading such data to the national portal, and sometimes in the form of direct funding<sup>(117)</sup>.

All the candidate countries except **Bosnia and Herzegovina** reported that they offered formally recognised training programmes to civil servants working with data. Moreover, **Montenegro, Serbia** and **Ukraine** organise events to promote open data and data literacy among the general public. For example, **Serbia** organises a national open data week each year in collaboration with the community of open data reusers<sup>(118)</sup>.

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<sup>(114)</sup> <https://www.gov.me/clanak/digitalna-akademija>.

<sup>(115)</sup> <https://data.gov.ua/uploads/files/2021-10-11-151345.820104--2020.pdf>.

<sup>(116)</sup> <https://data.gov.ua/pages/835-recm-transport-realtime>.

<sup>(117)</sup> An example from Serbia is the publication of data on air pollution measured using the Klimerko device (<https://klimerko.org/>).

<sup>(118)</sup> <https://hub.data.gov.rs/en/2022/03/18/open-data-week-begins/>.

Overall candidate country performance

In 2023, the average maturity score on the policy dimension for the participating candidate countries was 71 % (Figure 17). **Ukraine** remains the top performer at 97.7 %. Considerable improvements compared with last year were made by **Montenegro** (+ 20 pp) and **Albania** (+ 15 pp). **Bosnia and Herzegovina**, although still trailing the other candidate countries, also increased its score on the policy dimension by 6 pp.

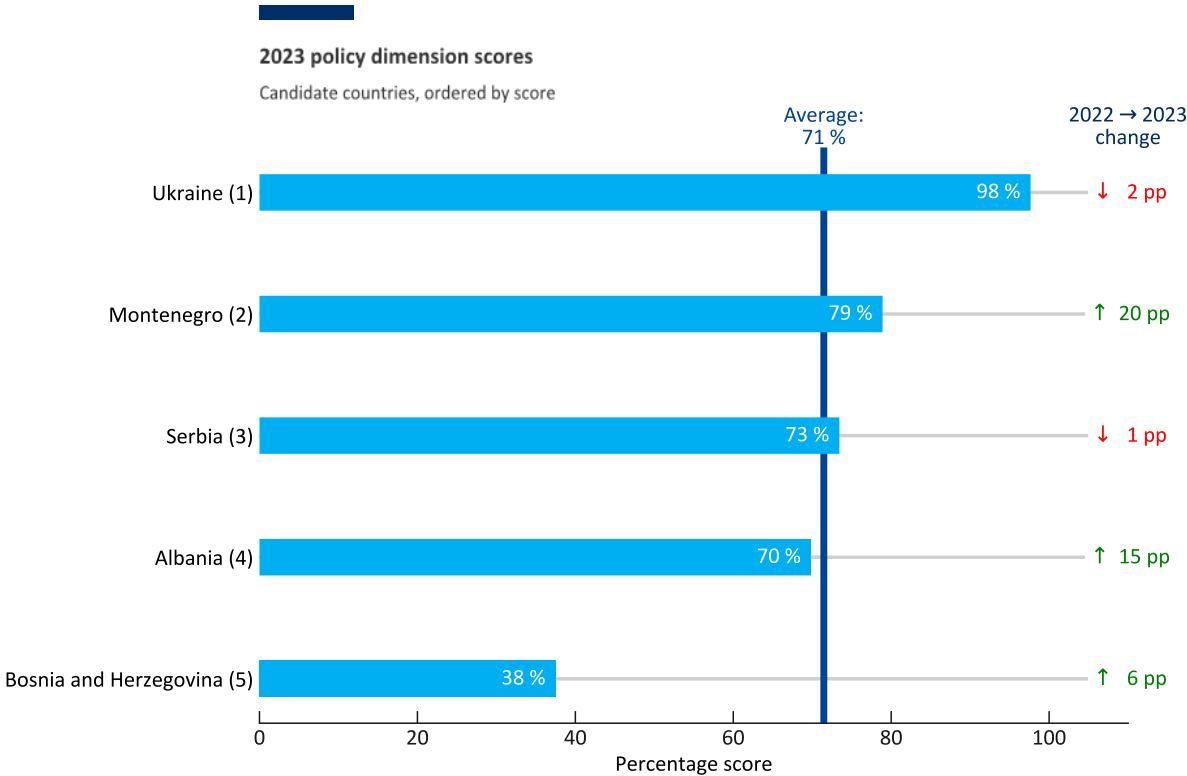


Figure 17: Candidate country scores on the policy dimension

Figure 18 shows the distribution of scores for each indicator of the policy dimension for the candidate countries. Despite being the least mature on average in this dimension, **Bosnia and Herzegovina** scored relatively high on the policy framework indicator. **Serbia** has the opposite pattern to **Montenegro** and **Albania**. While **Serbia**'s most mature indicator is open data implementation, this is the least mature indicator for **Montenegro** and **Albania**. Instead, **Montenegro** and **Albania** are most mature on the governance of open data indicator, which is **Serbia**'s least mature indicator. **Ukraine** scores high on all the indicators.

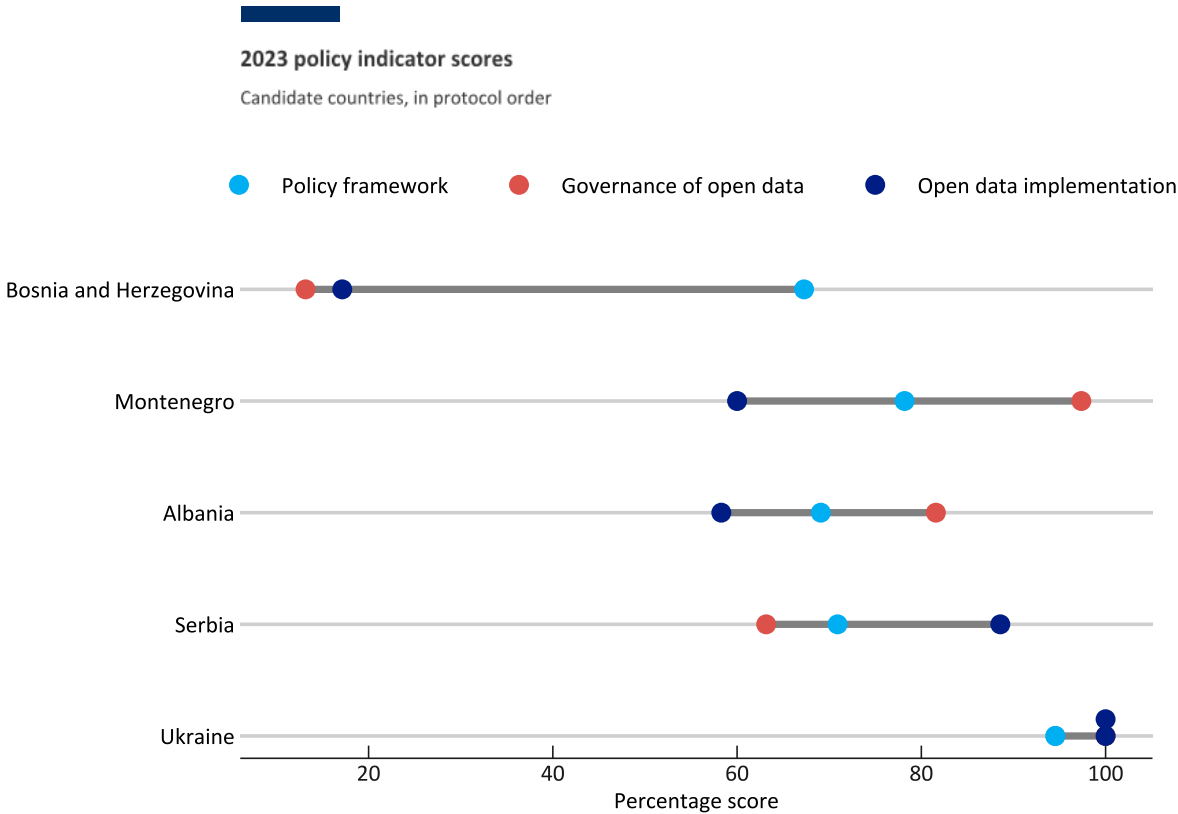


Figure 18: Policy indicator scores for each candidate country

## Chapter 4: Open data impact

The open data directive <sup>(119)</sup> encourages EU Member States to facilitate the reuse of public sector information. The primary purpose of making data openly available and stimulating its reuse is to derive economic, environmental and societal impact from the data. It was with this rationale in mind that high-value datasets were defined <sup>(120)</sup>.

Open data can be consumed as is. For example, the results of a survey might help a reuser to make a decision. More commonly, open data must be processed further, creating a new actionable insight or solution to a problem (called a reuse case). To support such reuse, the data is usually transformed or integrated with other sources to enrich the original dataset. Specialised tools and analytical methods can be used to inspect and manipulate the data to extract value. Depending on the reuse case, the solution may be adopted by a broader user base. This processed data can also be republished for further reuse, creating new open data.

In short, impact is created when open data is reused for a purpose that brings benefits in some domain. Creating impact relies on reusers finding valuable uses for data and designing processes to transform the data for an end use. Once open data is put to use, it may have an impact.

Measuring the impact of open data is challenging, given the various areas in which open data can be put to beneficial use and the difficulty of selecting general indicators to measure the impact of open data, among other reasons. The **impact** dimension of the ODM assessment is designed to encourage open data teams to implement mechanisms to monitor open data reuse in their countries and undertake efforts to better understand and cater to reusers' needs.

In brief, the **impact** dimension assesses whether countries have defined reuse and the extent to which they are prepared to measure it, the actions taken by countries to measure reuse and understand the needs of reusers, and the presence of examples of reuse cases in the domains of government, society, the environment and the economy. Table 3 summarises the key elements of the impact dimension.

Table 3: 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 high-value datasets. 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.

<sup>(119)</sup> <https://digital-strategy.ec.europa.eu/en/policies/legislation-open-data>.

<sup>(120)</sup> <https://digital-strategy.ec.europa.eu/en/news/commission-defines-high-value-datasets-be-made-available-re-use>.

**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.

The following sections discuss each group of countries separately: (A) EU Member States, (B) EFTA countries and (C) candidate countries. Further detail on the indicators is provided in the analysis of the EU-27. The sections on the EFTA and candidate countries discuss the dimension and indicator results of these two groups.

## A. EU Member States

### 4.1. Strategic awareness

This indicator evaluates whether countries have defined open data reuse and impact and the extent to which they are prepared to measure it through monitoring mechanisms and research methodologies, including with regard to high-value datasets. The indicator investigates the activities undertaken to create open data impact. In other words, strategic awareness is about putting the key building blocks in place to evaluate the impact of open data.

#### Definition of open data reuse

All Member States except **Finland** (96 %) reported having a definition of open data reuse. Some countries have explicit definitions of reuse in legislation (e.g. **Estonia** <sup>(121)</sup>), while others specify the definition in strategic documents on open data and related activities (e.g. **Slovakia** <sup>(122)</sup>). These definitions have common elements. In general, open data reuse means that public sector information is used for a purpose other than the original one for which the information was created and can be reused for any reason. This includes copying, disseminating, modifying, adapting, extracting or exploiting the data to, for example, develop new data-driven applications and services.

#### Monitoring open data reuse

A total of 21 Member States (78 %) reported that there was a strong focus at the national level on observing the level of reuse of open data. Five Member States (19 %) reported that there was a limited focus on this. Only **Finland** indicated that there was no national focus on observing the level of reuse. As an example of efforts undertaken to observe reuse, **Austria** pointed to open data activities carried out by the national parliament <sup>(123)</sup>. Furthermore, several countries referred to organising events and using analytics on their national portals to observe reuse. **Czechia** explained that public bodies organise hackathons both to support open data reuse and to investigate reuse cases. Some public bodies in Czechia also track the number of accesses and downloads of individual datasets on their portals. In addition, the country's open data providers collect feedback directly from reusers. The national open

<sup>(121)</sup> <https://www.riigiteataja.ee/en/eli/ee/510122021005/consolide/current>.

<sup>(122)</sup> [https://www.mirri.gov.sk/wp-content/uploads/2018/10/SP\\_Otvorene\\_udaje\\_schvalena-2.pdf](https://www.mirri.gov.sk/wp-content/uploads/2018/10/SP_Otvorene_udaje_schvalena-2.pdf).

<sup>(123)</sup> <https://www.parlament.gv.at/SERV/OGD>.

data team regularly monitors these data providers' activities and publishes information about them in the annual report on the state of open data <sup>(124)</sup>.

**France** listed several activities conducted by Etalab, a department of the interministerial digital directorate, to observe the level of open data reuse, including:

- measuring usage statistics <sup>(125)</sup>;
- keeping track of reuse cases referenced on the national open data portal <sup>(126)</sup>;
- interviewing data producers and reusers about their reuse cases.

In addition to those showing an interest in observing reuse, 24 Member States (89 %) responded that they had processes in place to monitor the level of reuse of their open data. This is a net increase of two countries, **Latvia** and **Malta**, since 2022. **Croatia** no longer reports having such processes in place, **Finland** still reports having no such processes and **Greece** indicated that it did not know if such processes were in place.

Most of these processes take the form of analytics on the national portal and the running of surveys. For example, the national data portal in **Malta** monitors the use of API requests that users make. Other countries, such as **Hungary**, have established new agencies <sup>(127)</sup> that focus on promoting and facilitating the reuse of open data. **Poland** mentioned that its Ministry of Digital Affairs monitors open data reuse by public administration bodies through open data officers, who are civil servants with a remit on open data appointed in each ministry.

In 21 Member States (78 %), incentives are in place to encourage public bodies to monitor the reuse of their own published data. This is an increase of three countries, **Latvia**, **Luxembourg** and **Slovakia**, compared with 2022. For example, in **Luxembourg**, the open data team actively searches for visible reuse cases of open data and encourages their description in a dedicated section of the national portal <sup>(128)</sup>. To stimulate data producers' interest in monitoring the potential reuse of their data, the team promotes interesting reuse cases through articles in the open data news section of the portal. It also promotes these news articles on social media to give the data producers more visibility.

In **Sweden**, the Agency for Digital Governance has a guide to publishing open data with sections on facilitating user dialogue, monitoring reuse and continuously improving the released datasets <sup>(129)</sup>. Moreover, the agency finances training projects such as Nationell dataverkstad (National Data Workshop) <sup>(130)</sup>, which aims to support Sweden's regions and municipalities in sharing data. Participants in the workshop are continually reminded that it is important to monitor open data reuse to improve their data publication and sharing. As a further example, **Estonia** runs an annual competition encouraging public bodies to reuse open data. Prizes are awarded for the best data publishers, reuse cases and open data visualisation.

<sup>(124)</sup> <https://data.gov.cz/výroční-zprávy/>.

<sup>(125)</sup> <https://stats.data.gouv.fr/>.

<sup>(126)</sup> <https://www.data.gouv.fr/fr/reuses/>.

<sup>(127)</sup> <https://navu.hu/en>.

<sup>(128)</sup> <https://data.public.lu/fr/reuses/>.

<sup>(129)</sup> <https://www.digg.se/kunskap-och-stod/oppna-och-delade-data/offentliga-aktorer/vagledning-for-att-tillgangliggora-information#h-Framjaanvandarialogochforvaltning>.

<sup>(130)</sup> <https://www.vgregion.se/ov/dataverkstad/>.

### High-value datasets

Over the past few years, Member States have begun preparing to monitor and measure the reuse of high-value datasets. A total of 25 Member States (93 %), all except Finland and the Netherlands, reported that they were preparing to monitor and measure the level of reuse of high-value datasets, an increase of two countries, **Belgium** and **Germany**, since 2022. Several countries stated that they intended to integrate functionalities into their national open data portals to track the reuse of high-value datasets. In general, standard monitoring mechanisms for open data reuse will also be extended to high-value datasets.

**Sweden** is evaluating DCAT for high-value datasets as a means of distinguishing these datasets from others on the national data portal, specifically in the search function. Some other countries, such as **Denmark**, explained that they were awaiting a European consensus on implementing DCAT for high-value datasets, which would help with monitoring and measuring their reuse.

Elsewhere, the national open data team in **Austria** is in the process of developing a monitoring and measuring system with several key features.

- **Usage metrics.** Tracking API calls, downloads and other interactions with the datasets to gauge their utility.
- **User surveys.** Regularly conducting surveys among developers, businesses and other stakeholders who might be using these datasets to gather qualitative data on their impact.
- **Case studies.** Periodically identifying and publishing case studies that demonstrate how these high-value datasets have been effectively reused in various sectors.
- **Economic impact analysis.** Using metrics such as additional revenue generated, jobs created and efficiencies gained to measure the economic impact of data reuse.

### Definitions of and methodologies for measuring open data impact

In 2023, 24 Member States (89 %) reported that they had a definition of open data impact, an increase from 20 Member States (74 %) in 2022. Moreover, 21 Member States (78 %) stated that there were methodologies in place to measure the impact of open data in their country and 17 Member States (68 %) had conducted an impact study on open data in the past year. Open data impact definitions and assessment methodologies across Europe are summarised in a recent study by data.europa.eu <sup>(131)</sup>.

A consistent element in most definitions of open data impact can be summarised as reusing the data for beneficial purposes. For example, the definition of open data impact in **Cyprus** refers to changes, improvements and opportunities created by reusing open data.

The impact of open data is typically evaluated in several domains. In **France**, for example, four impact areas for open data have been identified, namely:

- scientific, as a vector of knowledge;
- economic, as a driver of innovation;
- democratic, to improve public services;
- political, to restore people's confidence in government action.

These four impact domains in **France** align with the ministerial strategy on open data, which focuses on openness, specifying that more government open data should be published and reused to foster innovation and transparency, enhance the external evaluation of governmental policy and facilitate

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<sup>(131)</sup> <https://data.europa.eu/sites/default/files/report/Rethinking%20impact%20of%20open%20data.pdf>.

the democratic debate <sup>(132)</sup>. More commonly, countries categorise impact as governmental/political, social, environmental and economic, as in the ODM methodology.

All Member States (100 %) reported having established collaborations between government and civil society or academia to create open data impact, for example through joint projects, co-hosting conferences or funding open data research or competitions. **Cyprus** pointed out that its national open data portal is the product of a collaboration between the Ministry of Finance and the Open University of Cyprus, which hosts and provides technical support for the portal. An example of a joint project in **Lithuania** is a collaboration between the parliament and Transparency International Lithuania to create a political integrity monitoring tool called Manoseimas.lt. The tool make available the agendas of members of parliament, including their meetings with interest groups and registered lobbyists. This allows users to compare the activities of individual members of parliament and those of different political groups. Recently, the tool was updated with data on long-term permits enabling holders to access parliament.

#### 4.2. Measuring reuse

This indicator assesses the actions taken to map reuse, the methodologies used to collect and classify reuse cases and the activities performed to understand the requirements of reusers.

##### The reuse of datasets and reusers' needs

A total of 23 Member States (85 %) reported that public bodies had conducted activities in the past year to document which open datasets were reused and how. Figure 19 summarises changes in the most common activities undertaken to map the reuse of open datasets between 2022 and 2023. The most common types of activity in 2023 were conducting interviews/workshops with reusers (81 %) and analysing log files to understand reusers' online behaviour (70 %). Automated feedback mechanisms (59 %) and surveys (44 %) were used significantly less in 2023 than in 2022. An example of a Member State conducting other activities (as 37 % of Member States did in 2023) is **Ireland**, which organises events that bring publishers and reusers together to share their views and plans for the future <sup>(133)</sup>.

In addition, 24 Member States (89 %) reported that public bodies in their country had conducted activities in the past year to better understand reusers' needs. More specifically, 17 Member States (71 % of those that conducted such activities) held regular feedback sessions with portal users and 11 Member States (46 % of those that conducted such activities) used social media analytics. Moreover, 15 Member States (63 % of those that conducted such activities) mentioned other types of activities undertaken to gain a better understanding of reusers' needs, such as analysing data requests (e.g. **Czechia**, the **Netherlands**, **Finland** and **Sweden** <sup>(134)</sup>), conducting surveys (e.g. **Germany**, **Estonia** and **Slovakia**) or gathering feedback on the national portal (e.g. the **Netherlands**).

<sup>(132)</sup> [https://www.gouvernement.fr/upload/media/default/0001/01/2020\\_12\\_rapport\\_-\\_pour\\_une\\_politique\\_publique\\_de\\_la\\_donnee\\_-\\_23.12.2020\\_.pdf](https://www.gouvernement.fr/upload/media/default/0001/01/2020_12_rapport_-_pour_une_politique_publique_de_la_donnee_-_23.12.2020_.pdf).

<sup>(133)</sup> <https://derilinx.com/webinar-open-data-impact-series-vii-sports-recreation-2022>.

<sup>(134)</sup> <https://community.dataportal.se/category/1/efterfr%C3%A5ga-data-och-api-er>.



### Change in the types of activities performed to map the reuse of open datasets

EU-27, 2022–2023

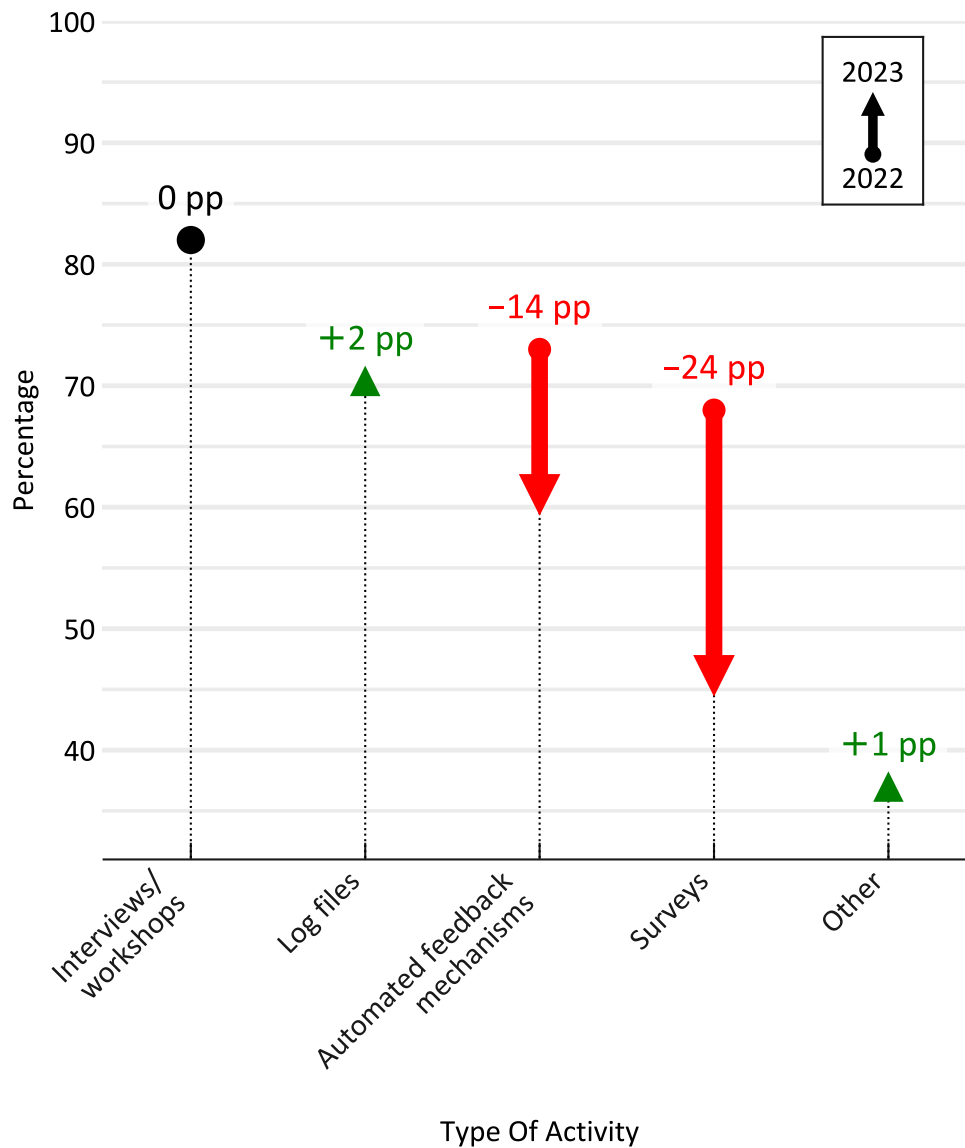


Figure 19: Activities performed by the EU Member States to map which datasets are reused, change between 2022 and 2023

#### Gathering and classifying reuse cases

In 21 Member States (78%), public bodies have developed systematic methods of gathering reuse cases. This is an increase of two countries, **Austria** and **Slovakia**, since 2022. Several countries noted that the systematic gathering of reuse cases was part of their impact assessment methodology. For example, **Czechia** surveys open data providers annually. Other common approaches include using the national portal to appeal for reuse examples, conducting interviews with reusers (e.g. the impact stories published in the **Netherlands** <sup>(135)</sup>) and using other sessions with reusers, such as workshops,

<sup>(135)</sup> <https://data.overheid.nl/actueel/impact-story>.

conferences and other events, to gather reuse cases. For example, in **Hungary** the National Data Asset Management Agency collects reuse cases from public authorities through cooperation agreements and the national portal<sup>(136)</sup>. The open data team in **Ireland** emphasised that a significant part of the research for its strategy involved examining reuse cases and analysing what they revealed about the priorities and needs of reusers. The approach taken in **Cyprus** includes the following elements:

- annual desk research to identify reuse cases,
- a form on the national data portal that can be used to submit reuse cases to be showcased,
- interviews with major reusers,
- social media groups that encourage showcasing of reuse cases.

Further to systematically collecting reuse cases, 15 Member States (56 %) reported having a systematic method of classifying reuse cases, an increase from 10 Member States (37 %) in 2022. Typically, countries use thematic categories to classify reuse cases (e.g. agriculture, economy and finance, and environment and climate), or they classify them based on what the data was used for (e.g. applications, web services and others).

### 4.3. Created impact

The created impact indicator builds on the other two indicators of the impact dimension. It assesses the presence of data that evidences 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). Created impact is evaluated in four impact domains: government, society, the environment and the economy.

#### 4.3.1. 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.

A total of 14 Member States (52 %) have gathered data on the impact created by open data on government and related challenges, an increase from 11 Member States (41 %) in 2022. Figure 20 summarises the presence of reuse cases that address governmental challenges in the EU Member States.

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<sup>(136)</sup> <https://kozadatportal.hu/showcase/>.

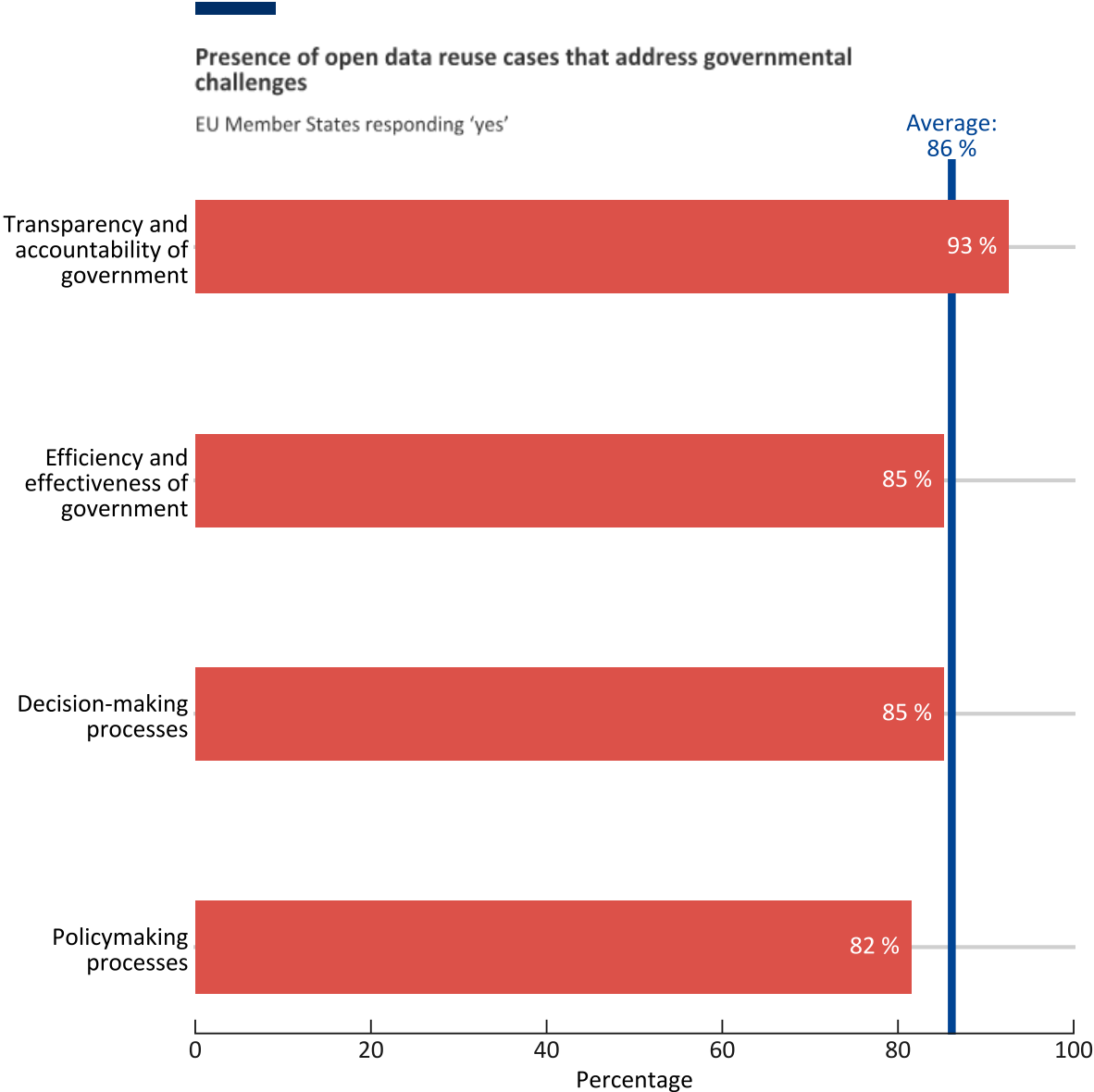


Figure 20: EU Member States reporting open data reuse cases that address governmental challenges

Efficiency and effectiveness of the government in delivering public services

A total of 23 Member States (85 %) have gathered reuse cases seeking to impact the government’s efficiency and effectiveness in delivering public services. For example, **Croatia’s** Central State Office for the Development of Digital Society is responsible for releasing statistical data about the e-Citizens system, a bundle of electronic services for citizens. Previously, journalists often asked for information about the e-Citizens system, such as which services were most frequently used. Now, the Central State Office publishes this data openly, which has increased efficiency, contributed to transparency and enhanced public understanding of the e-Citizens system.

Transparency and accountability of public administrations

A total of 25 Member States (93 %) are aware of reuse cases seeking to impact the transparency and accountability of public administrations. For example, in **Romania** open data is particularly frequently used by non-governmental organisations focusing on anti-corruption, public procurement, public

expenditure and election data. Examples include projects investigating election funding <sup>(137)</sup> and public procurement <sup>(138)</sup>. A dashboard tracking public finances is also available in the **Netherlands** <sup>(139)</sup>. In **Poland**, a mobile application, MobiBIP <sup>(140)</sup>, offers advanced search functionality for information published in the public information bulletins of local government units. The data is usually unstructured textual data and is therefore difficult to search, and it is also important information that should be made public knowledge (e.g. financial data, local legal acts, information on administrative proceedings and decisions issued). The application increases access to and reuse of the data.

### Policymaking process

A total of 22 Member States (82 %) reported that they knew of reuse cases seeking to impact the policymaking process. An example of citizen-led impact through open data can be found in **Estonia**, where the Citizen Initiative Portal, Rahvaalgatus.ee, enables individuals to write proposals, engage in discussions, and sign and send digitally endorsed petitions to the Estonian parliament and local government. These proposals should be aimed at enhancing society or amending existing regulations. The Citizen Initiative Portal leverages open data from the parliament’s document register to publish procedural information relating to each proposal the moment it is recorded in the register. When this happens, subscribers are informed by email. In addition to using open data, Rahvaalgatus.ee has its own open data API that enables activists to monitor the progress of initiatives in their specific areas of interest. In **Sweden**, the national team highlighted that open data is commonly used to monitor indicators and as a foundation for further analyses within various policy areas. For example, the news outlet iSkogen compared data from the Swedish Forest Agency with satellite data used in a research article in *Nature* to investigate a widely criticised research result with the potential to influence policies on deforestation <sup>(141)</sup>.

### Decision-making processes in public administrations

A total of 23 Member States (85 %) reported the presence of reuse cases seeking to impact decision-making processes. For example, open data on **French** companies has been used to design Signaux Faibles, a digital service that helps public officials target companies in difficulty for state support measures. The tool relies on the infrastructure of the Sirene database of companies <sup>(142)</sup>. This reuse case enables companies in difficulty to be identified early, making it possible to support them. As a further example, the Provinces in Figures initiative in **Belgium** combines various open data sources to enable citizens and local politicians to compare local statistics on, for example, demographics, housing, poverty, vacant real estate and energy use with those of other provinces <sup>(143)</sup>. This helps users to propose plans to improve the local economy and society.

#### 4.3.2. 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. A total of 10 Member States (37 %) have gathered data on the impact created by open data on society and related challenges, an increase from 7 Member States

<sup>(137)</sup> <https://www.banipartide.ro/>.

<sup>(138)</sup> <https://expertforum.ro/harta-proiecte-saligny/>.

<sup>(139)</sup> <https://data.overheid.nl/community/application/dashboard-overheidsfinancin>.

<sup>(140)</sup> <https://dane.gov.pl/pl/showcase/1277,mobibip>.

<sup>(141)</sup> <https://iskogen.se/skogsbruk/avverkningsniva-jrc-svensk-laserdata/>.

<sup>(142)</sup> [https://www.sirene.fr/sirene/public/accueil?sirene\\_locale=en](https://www.sirene.fr/sirene/public/accueil?sirene_locale=en).

<sup>(143)</sup> <https://provincies.incijfers.be/dashboard>.

(26 %) in 2022. Figure 21 summarises the presence of reuse cases that address social challenges in the EU Member States.

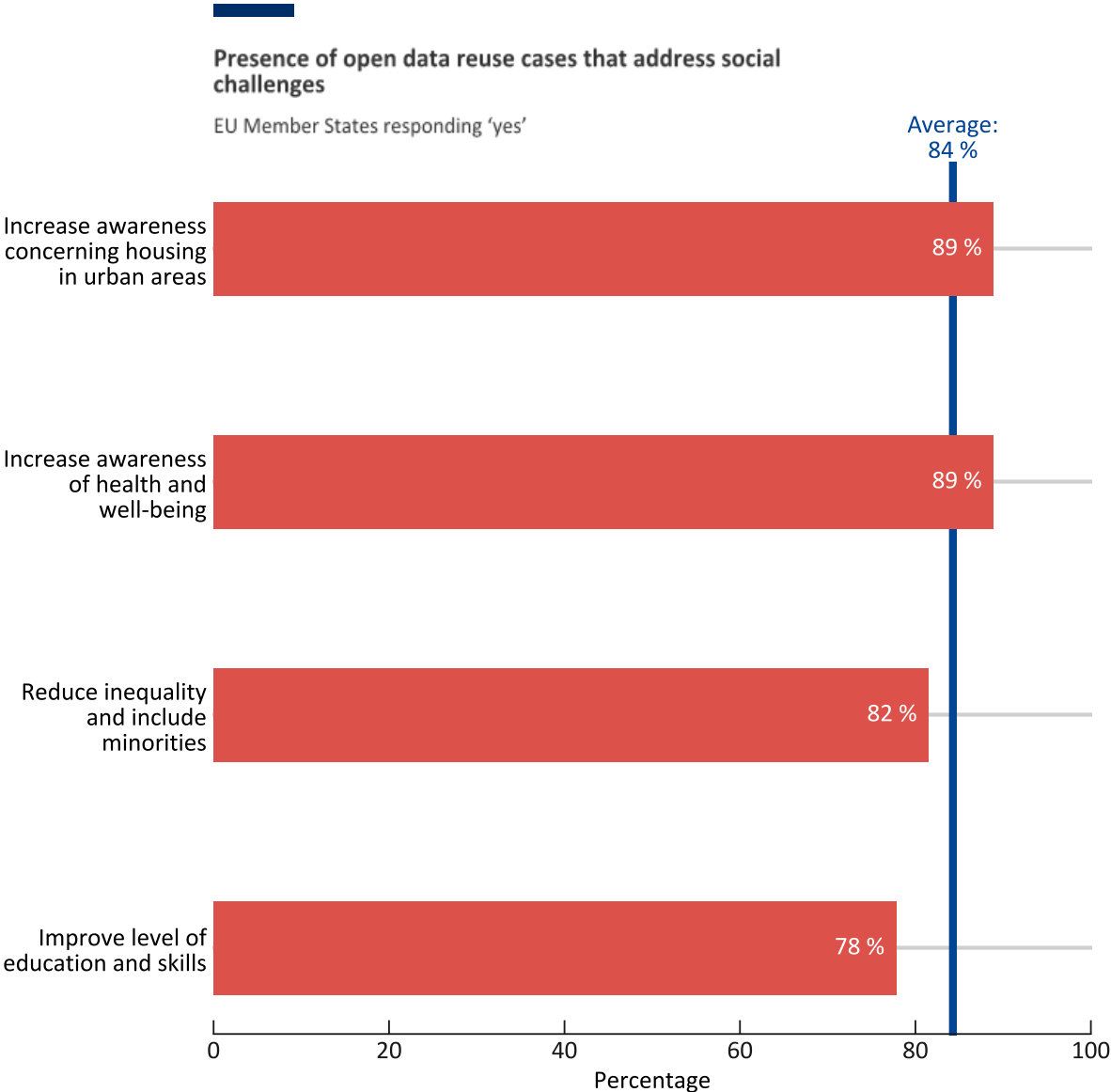


Figure 21: EU Member States reporting open data reuse cases that address social challenges

Marginalised groups and inequality

A total of 22 Member States (82 %) reported that they knew of reuse cases seeking to positively impact marginalised groups and inequality. In **Germany**, for example, HeimFinder NRW <sup>(144)</sup>, uses open data to help users to find nursing homes. Another application, Wheelmap <sup>(145)</sup>, based on OpenStreetMap, enables users to search for locations with wheelchair access. In **Cyprus**, the miHub app <sup>(146)</sup> aims to support the integration of non-nationals living in the country. The application enables users to access services and resources. It is tailored to meet migrants’ needs and emphasises the importance of building new skills to adjust to the Cypriot culture and social environment.

<sup>(144)</sup> <https://www.heimfinder.nrw.de/>.

<sup>(145)</sup> <https://news.wheelmap.org/>.

<sup>(146)</sup> <https://play.google.com/store/apps/details?id=org.cardet.mihub>.

### Urban housing

A total of 24 Member States (89 %) have gathered reuse cases seeking to impact housing in urban areas. For example, in **Spain** the service Barcelona Real Estate Market <sup>(147)</sup> visualises the current situation in the real estate market through various dashboards and provides information on aspects such as the price per square metre in each neighbourhood, trends in real estate sales, the average price of a home and the distribution of tourist apartments throughout the city. Another example from **Spain** is CoHispania <sup>(148)</sup>, an interactive map of house prices that uses open data from the National Institute of Statistics and the Ministry of Finance to analyse trends in the real estate market over time. The open data team in **Bulgaria** points out that almost every citizen in the country who carries out real estate transactions consults open data portals such as Imot.bg <sup>(149)</sup>, Alo.bg <sup>(150)</sup> and Homes.bg <sup>(151)</sup>.

### Health and well-being

A total of 24 Member States (89 %) reported being aware of reuse cases seeking to impact health and well-being. For example, in **Italy** a scientific project <sup>(152)</sup> used data from the Italian open data portal to investigate ways to accelerate preparedness for, responsiveness to and burden reduction in future public health emergencies by bridging crucial data collection gaps during the early stages of an outbreak. Several countries provided examples that had proved critical during the COVID-19 pandemic. For example, in **Hungary** the government established a pandemic decision-making support system based on open data and an official coronavirus site that operated using open data.

### Education and skills

A total of 21 Member States (78 %) reported the presence of reuse cases seeking to impact the level of education and skills in society. For example, in **Finland** materials are available to support the use of open data at different levels of education <sup>(153)</sup>. In addition, an information literacy and evidence-informed decision-making strategy research programme <sup>(154)</sup> was launched to discover ways of using information critically and constructively to support individual and societal decision-making and actions. Academic research has also been conducted in Finland on how open data challenges the school curriculum <sup>(155)</sup>. An example from **Poland** is the Online Teacher's Assistant. This web application uses open databases from the Institute of National Remembrance to enable the easy and quick generation of quizzes for students in schools, for use as knowledge tests or in lessons <sup>(156)</sup>.

#### 4.3.3. 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

<sup>(147)</sup>

<https://public.tableau.com/app/profile/sergio1295/viz/MercadoInmobiliarioBarcelona/Iniciarunabsqueda>.

<sup>(148)</sup> <https://www.cohispania.com/mapa-interactivo-de-precios-de-la-vivienda-en-espana>.

<sup>(149)</sup> <https://www.imot.bg>.

<sup>(150)</sup> <https://www.alo.bg/>.

<sup>(151)</sup> <https://www.homes.bg/>.

<sup>(152)</sup> <https://www.scienzainrete.it/articolo/mentalita%C3%A0-data-driven-rispondere-alle-pandemie/francesco-branda/2023-04-29>.

<sup>(153)</sup> <https://finna.fi/Record/aoe.1952>.

<sup>(154)</sup> <https://www.aka.fi/en/strategic-research/strategic-research/strategic-research-in-a-nutshell/programmes-and-projects/literacy/>.

<sup>(155)</sup> [https://finna.fi/Record/theseus\\_laurea.10024\\_702839](https://finna.fi/Record/theseus_laurea.10024_702839).

<sup>(156)</sup> <https://2022.hackyeah.pl/winners-2022/>.

and connected disasters and (4) energy consumption and the switch to renewables. A total of 10 Member States (37 %) have gathered data on the impact created by open data on the environment and related challenges, an increase from 8 Member States (30 %) in 2022. Figure 22 summarises the presence of reuse cases that address environmental challenges in the EU Member States.

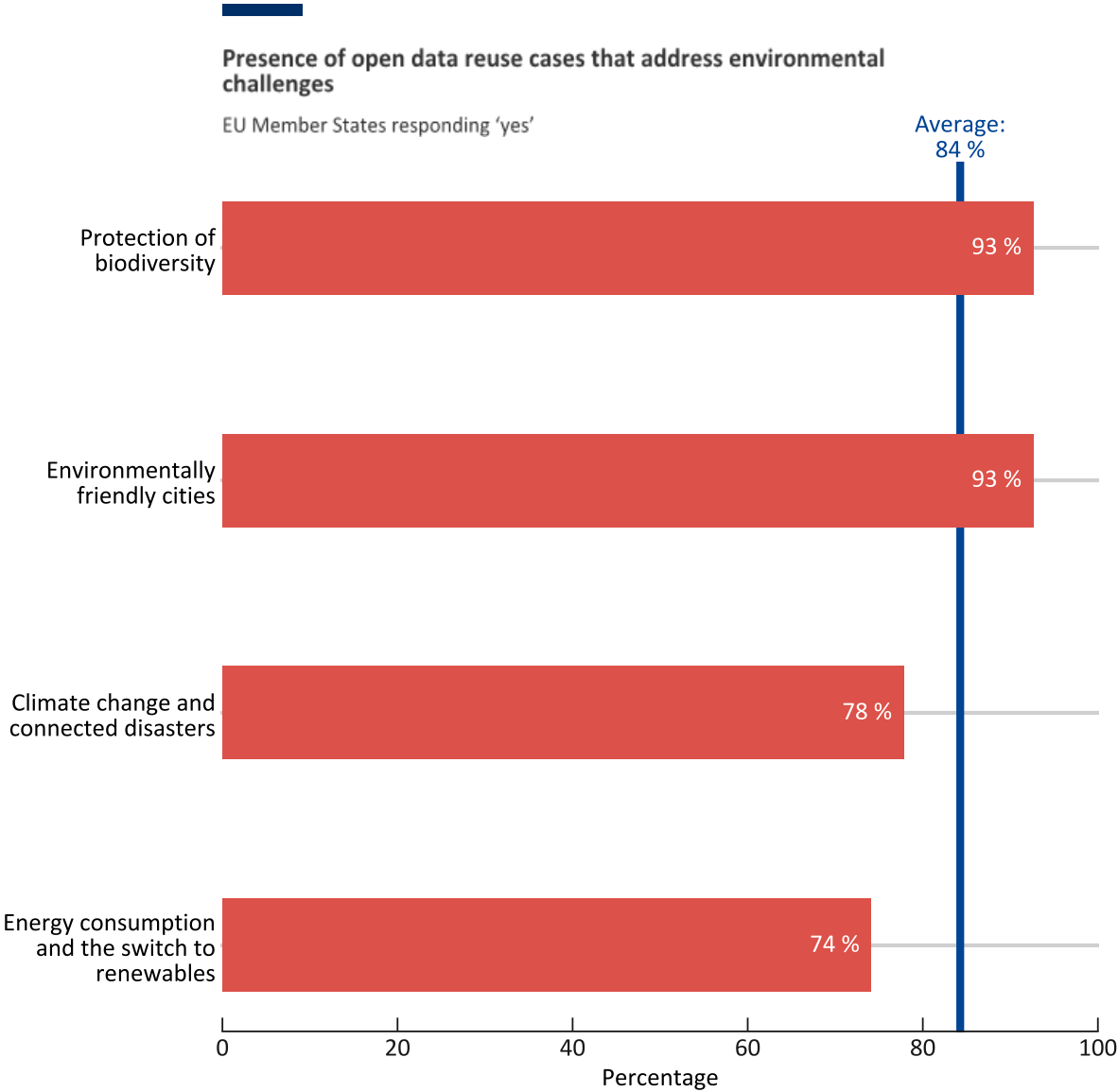


Figure 22: EU Member States reporting open data reuse cases that address environmental challenges

Biodiversity

A total of 25 Member States (93 %) reported being aware of reuse cases seeking to impact biodiversity. For example, in **Slovenia** research reports that use open data are produced regularly in accordance with the Act on Environmental Protection and the Act on Nature Conservation; they are intended to raise public awareness of the state of the environment. These reports also act as starting points for planning environmental activities and other related policies<sup>(157)</sup>. In the **Netherlands**, an open data application helps provinces and water boards to monitor and model water use and drought by

<sup>(157)</sup> [https://www.gov.si/assets/ministrstva/MOP/Dokumenti/porocilo\\_o\\_okolju\\_2022.pdf](https://www.gov.si/assets/ministrstva/MOP/Dokumenti/porocilo_o_okolju_2022.pdf).

combining data sources and creating a digital twin of the physical environment <sup>(158)</sup>. Another Dutch application provides data on emissions and is used for monitoring and policy <sup>(159)</sup>.

### Environmentally friendly cities

A total of 25 Member States (93 %) reported the presence of reuse cases seeking to impact environmentally friendly cities. For example, in **Estonia** health board inspectors measure drinking water quality annually in more than a thousand water stations. The data from this investigation is published as open data and is used to create a predictive water quality model, which enables the health board to prioritise tests and react proactively to any deterioration in water quality. Moreover, almost half of the local governments across Estonia use open data on the climate and the environment to prepare climate and energy plans and assess achievement rates against set indicators. Another example comes from **Poland**, where the city of Wrocław has implemented an IT system named the SmartFlow platform. The system uses open data and data collected from measuring devices installed in the water supply network to reduce water consumption. A case study on the system was published in a report by the Polish Institute for the Development of Cities and Regions <sup>(160)</sup>.

### Climate change and connected disasters

A total of 21 Member States (78 %) reported that they knew of reuse cases seeking to impact the fight against climate change and connected disasters. For example, in **France** several initiatives use open data to fight against climate change. One is the Géorisques platform <sup>(161)</sup>, which is based on many open datasets from the French Geological Survey, the public reference institution for earth science. The platform aims to provide better information on major risks, such as earthquakes or floods, by local area. Géorisques helps to identify the level of natural risks based on type of territory, thus helping with prevention and preparedness. Another example is InfoClimat <sup>(162)</sup>, a platform that focuses on weather and climate data. The platform offers unique infographic tools to visualise climate change at the local level. Similarly, in **Slovakia** the Košice self-governing region uses open data to create interactive maps on climate change and its consequences, showing data on the vulnerability of municipalities to climate change, changes in temperature, adaptive capacity and other indicators <sup>(163)</sup>.

### Energy consumption and the switch to renewables

A total of 20 Member States (74 %) reported having gathered reuse cases seeking to impact energy consumption and the transition towards renewable energy sources. For example, the Lisbon Solar Potential Map in **Portugal** allows users to find information on the solar potential of all buildings in Lisbon. The application's source data comes from the Solis project, which focuses on solar energy potential across Lisbon <sup>(164)</sup>. A reuse case from **Spain** is EnEKO <sup>(165)</sup>, a virtual assistant that provides information through the messenger platform Telegram on the price of electricity and fuels, so that citizens can make better use of energy resources. Another reuse case from Spain is Idealista Energy <sup>(166)</sup>, a tool offered by the real estate website Idealista that allows citizens to calculate if they

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<sup>(158)</sup> [https://data.overheid.nl/community/application/nexus\\_2](https://data.overheid.nl/community/application/nexus_2).

<sup>(159)</sup> <https://data.overheid.nl/community/application/4273/datasets>.

<sup>(160)</sup> <https://obserwatorium.miasta.pl/wp-content/uploads/2022/10/Zarzadzanie-miastem-z-wykorzystaniem-danych.pdf>.

<sup>(161)</sup> <https://www.georisques.gouv.fr/>.

<sup>(162)</sup> <https://www.infoclimat.fr/>.

<sup>(163)</sup> <https://www.geoportalsk.sk/geonetwork/srv/eng/catalog.search#/home>.

<sup>(164)</sup> <https://www.solis-lisboa.pt/>.

<sup>(165)</sup> <https://t.me/+lOnnZQmPtu40ZjNk>.

<sup>(166)</sup> <https://www.idealista.com/energy/>.



could save money by installing solar panels on their homes. The tool offers information on, for example, how much solar energy municipalities in Spain could generate, subsidies for installing solar panels in each region and the environmental impact of installing them.

4.3.4. 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 and (3) entrepreneurship and business creation. A total of 14 Member States (52 %) have gathered data on the impact created by open data on economic and related challenges, an increase from 13 Member States (48 %) in 2022. Figure 23 summarises the presence of reuse cases that address economic challenges in the EU Member States.

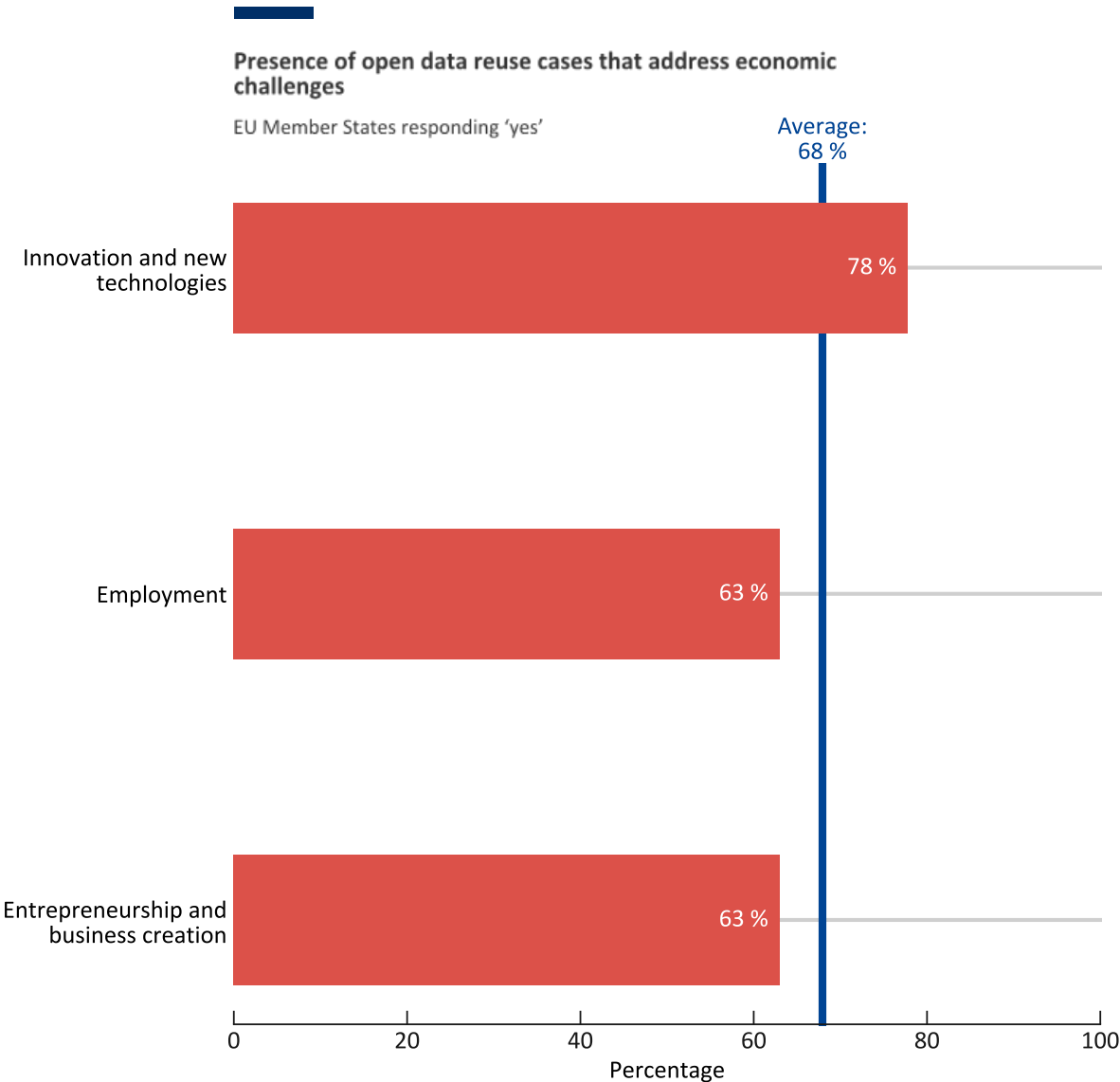


Figure 23: EU Member States reporting open data reuse cases that address economic challenges

## Employment

A total of 17 Member States (63 %) reported the presence of reuse cases seeking to impact the level of employment. An example from **Luxembourg** is detailed dashboards created by the public sector using data on unemployment <sup>(167)</sup>. These dashboards provide insights into the most sought-after jobs and have helped the Ministry of Education to develop new concepts for vocational training. For instance, the ministry created a vocational training programme on software development to assist jobseekers in their professional transition to the technology sector. As another example, the Castilla y León Regional Government in **Spain** has developed an application using open data that allows users to see the various training courses aimed at employed and unemployed individuals on a map <sup>(168)</sup>. The map enables users to select the type of training they are looking for (in person or online) and filter by location, date, duration, subject and eligible recipients.

## Innovation and adoption of new technologies

A total of 21 Member States (78 %) reported that they knew of reuse cases seeking to impact the level of innovation and the adoption of new technologies. In **Latvia**, for example, open data is impacting innovation and technology through digital twins (3D models) for cities <sup>(169)</sup>. A digital twin project is also under way in **Cyprus** for the city of Nicosia <sup>(170)</sup>. It will include representations of actual buildings and monuments, the road network and parking places, and will incorporate metadata on the environment, possibly traffic lights and their condition, streetlights, the power grid, the water network, vegetation, etc. The model has minimum usability without the inclusion of real-world data. Therefore, rich time-series data is being collected by various sensors (camera feeds, thermal/humidity/motion sensors, etc.) and data from the national open data portal, as well as other private and public initiatives, is being incorporated into the model.

## Entrepreneurship and business creation

A total of 17 Member States (63 %) have gathered reuse cases seeking to impact entrepreneurship and business creation. For instance, an application created in **Czechia** uses open data to search for registered trademarks and warns users of intellectual property violations <sup>(171)</sup>. Another example from Czechia is the organisation Czechitas, which teaches women IT skills, including data analysis using open data <sup>(172)</sup>. In **Poland**, the Investment Attractiveness Platform <sup>(173)</sup> combines data from multiple sources to help users make informed investment decisions. The platform aims to increase the digital availability and usefulness of public sector information by creating a new e-service that helps users to determine the attractiveness of investment locations. The project is a response to the identified needs of citizens and entrepreneurs to streamline the process of searching for and analysing suitable locations for investments.

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<sup>(167)</sup> <https://data.public.lu/fr/reuses/tableaux-interactifs-sur-les-demandeurs-demploi-inscrits-a-ladem/>.

<sup>(168)</sup> <https:// analisis.datosabiertos.jcyl.es/explore/dataset/formacion-del-ecyl/map/>.

<sup>(169)</sup> <https://replay.lsm.lv/lv/ieraksts/ltv/270751/top-galvaspilsetas-digitalais-dvinis>.

<sup>(170)</sup> <https://inicosia.cyens.org.cy/#services>.

<sup>(171)</sup> <https://hlidacoz.cz/>.

<sup>(172)</sup> <https://www.czechitas.cz/o-czechitas>.

<sup>(173)</sup> <https://mapadotacji.gov.pl/projekty/1242776/> and <https://dane.gov.pl/pl/showcase/1278,platforma-atrakcyjnosci-inwestycyjnej>

4.4. Overall EU Member State performance

In 2023, the average maturity score of the EU Member States on the impact dimension is 77 %, a 6 pp increase compared with 2022 (Figure 24). This marks a rebound in average performance after a sharp decrease in 2022 that coincided with the restructuring of the methodology for this dimension. However, the impact dimension remains the least mature dimension of ODM. This has been true since the dimension was first included in the assessment in 2018 (except in 2021, when the impact and quality dimensions scored the same).

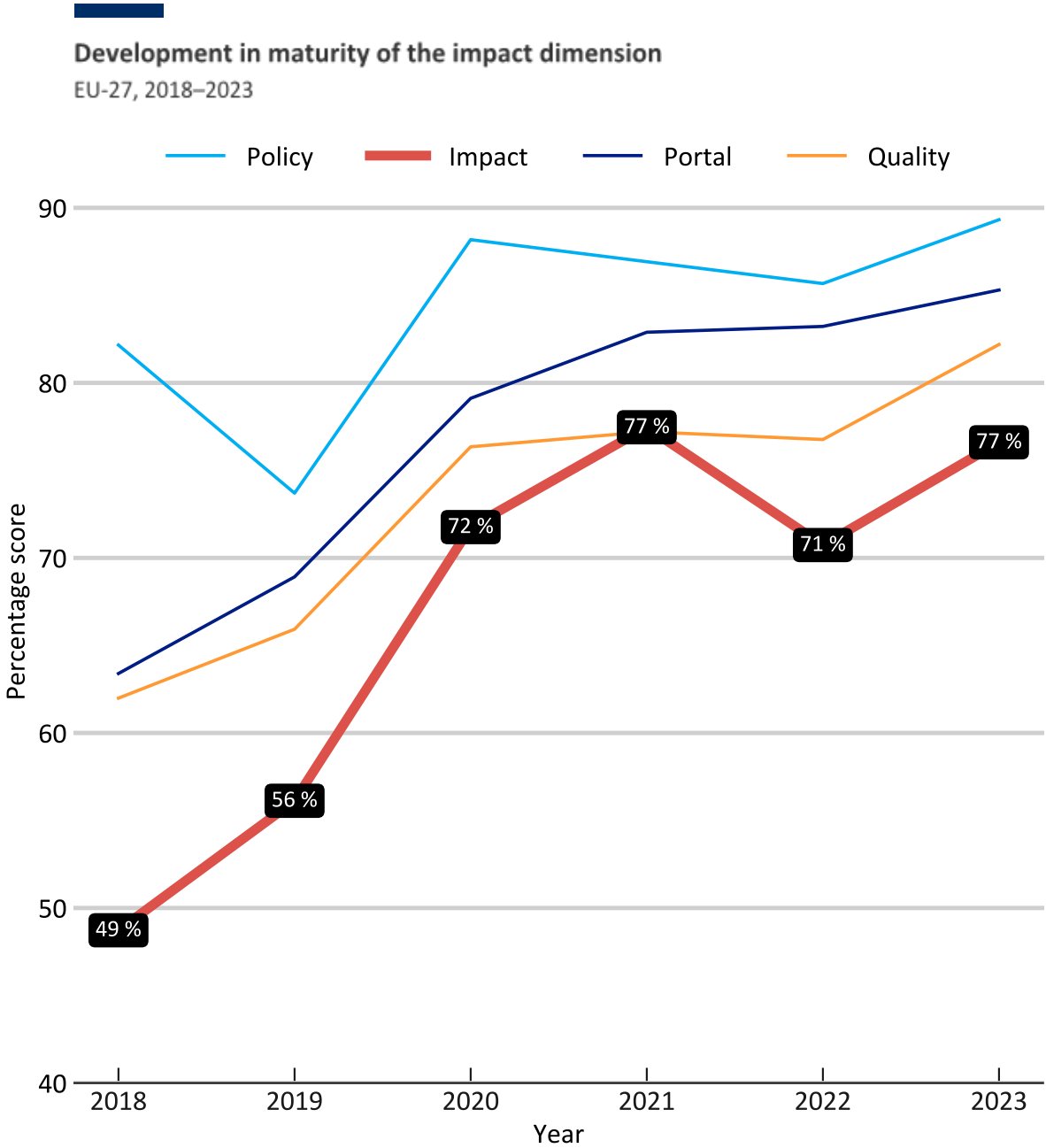


Figure 24: Average performance of the EU-27 on the impact dimension since 2018

The increase in the average impact dimension score was driven by increased scores across all three indicators (Figure 25). Created impact remains the least mature indicator. This indicator reflects the extent to which examples of reuse cases are available. The presence of reuse cases increased, as did efforts to monitor and measure reuse, which are captured by the other two indicators. Within the created impact indicator, most countries can point to examples of open data reuse with applications in the governmental domain. National open data teams are least aware of reuse cases that address themes in the economic domain. The presence of reuse cases documented by national open data teams has increased the most for applications in the environmental domain.

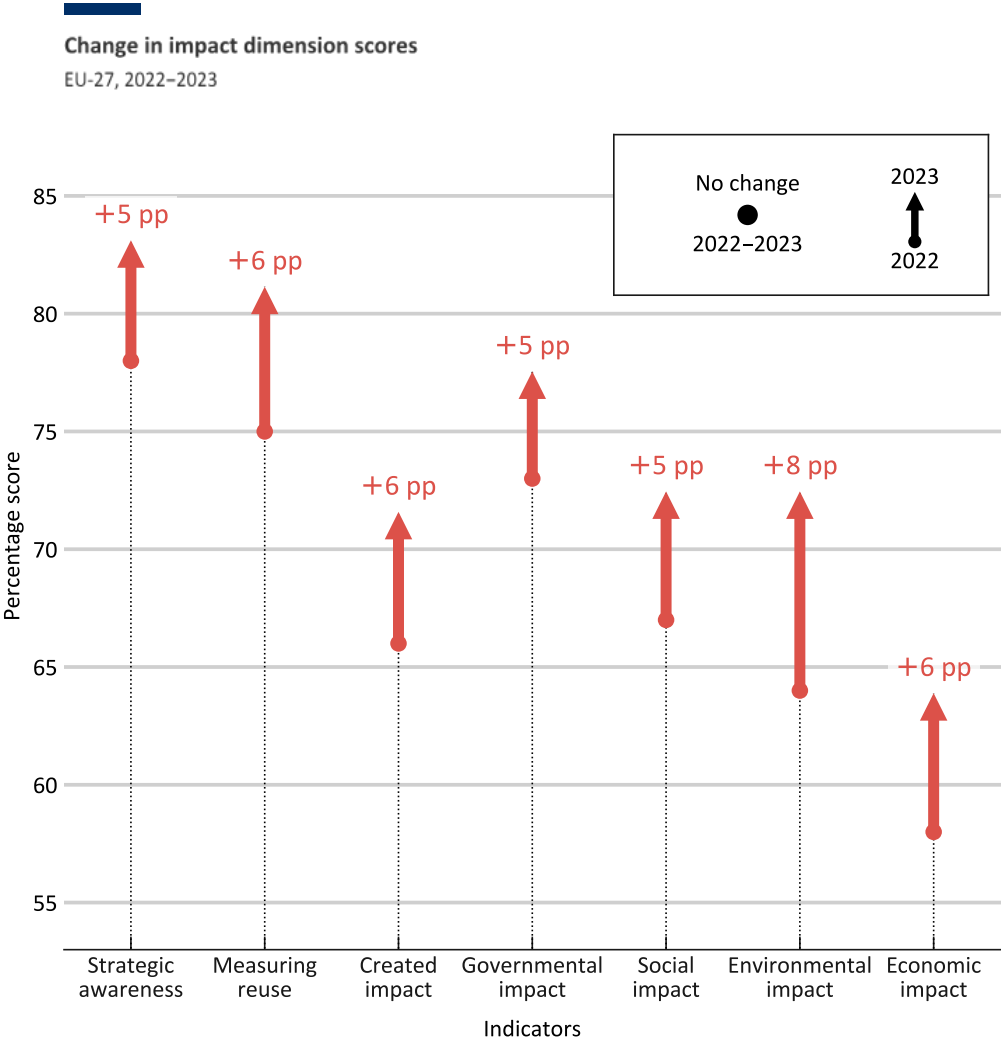


Figure 25: Average change in the impact dimension indicators for the EU-27 between 2022 and 2023

Each Member State has a unique scoring distribution on the indicators (Figure 26). **Greece, Croatia, Malta** and **Romania** have lower average scores on this dimension due to the absence of activities and methods for measuring reuse (they score 0 % on this indicator). However, they have broad scoring distributions and score comparatively high on the strategic awareness indicator. Most other countries score lowest on the created impact indicator and highest on measuring reuse.

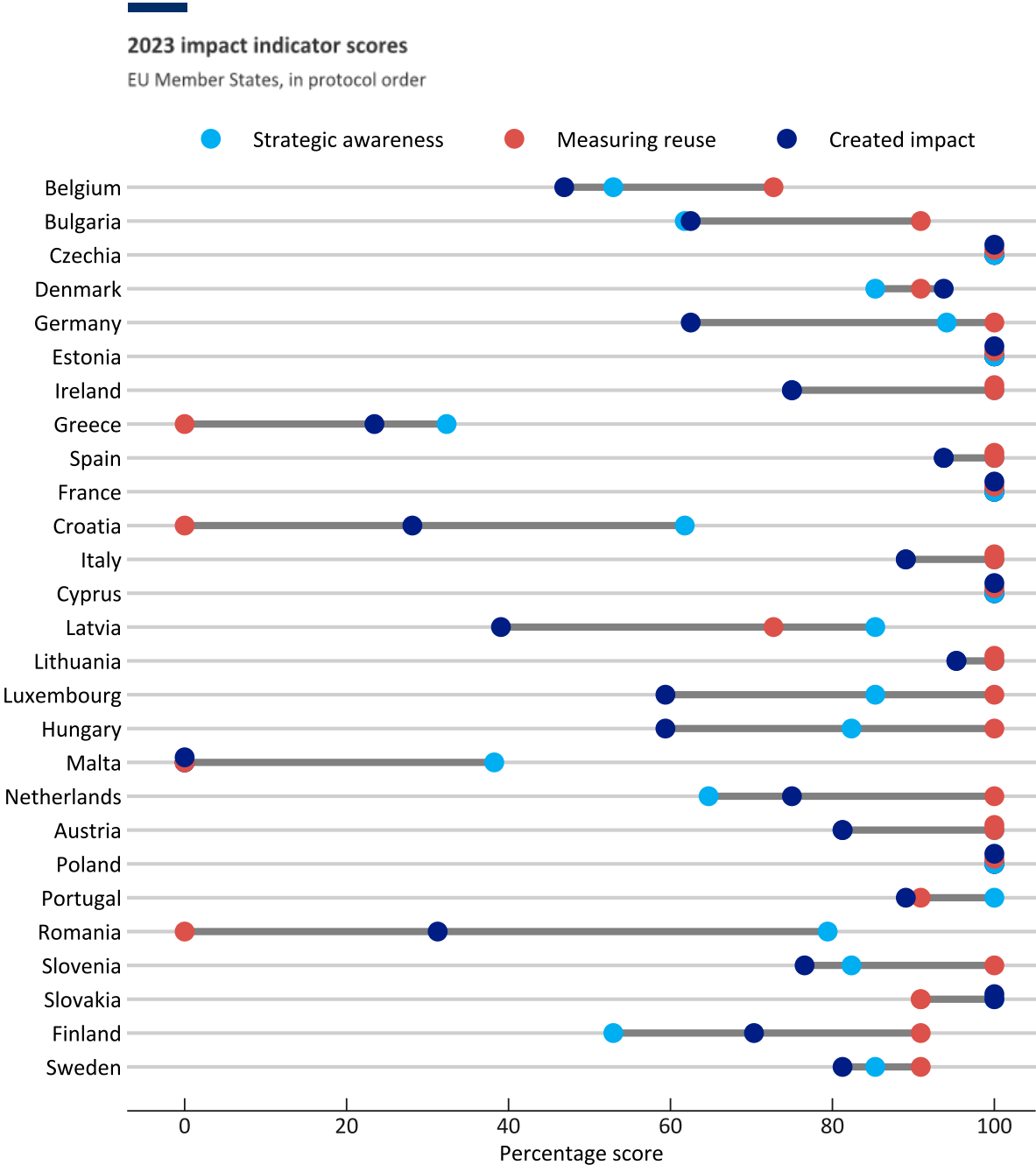


Figure 26: Impact indicator scores for each EU Member State

In terms of individual country performance, five countries scored 100 % on this dimension in 2023: **Poland, Estonia, Czechia, Cyprus** and **France** (Figure 27). They are followed by **Slovakia** (98.3 %) and **Lithuania** (97.5 %). The main differentiator among the most mature countries in this dimension is the extent to which they can provide examples of reuse cases within each impact domain. Overall, 16 Member States (59 %) score above the EU-27 average of 77 %, of which 12 score 90 % or higher. Despite the large number of above-average performers, this dimension remains the lowest scoring on average due to a wide range of scores below the EU-27 average, with countries scoring between 10.8 % and 74.2 %. The biggest climbers in the impact dimension year-on-year are **Slovakia** (+ 52 pp), **Latvia** (+ 34 pp) and **Austria** (+ 31 pp). Eight Member States decreased in maturity in this dimension compared with 2022, with **Ireland** (– 13 pp) and **Croatia** (– 20 pp) declining the most.

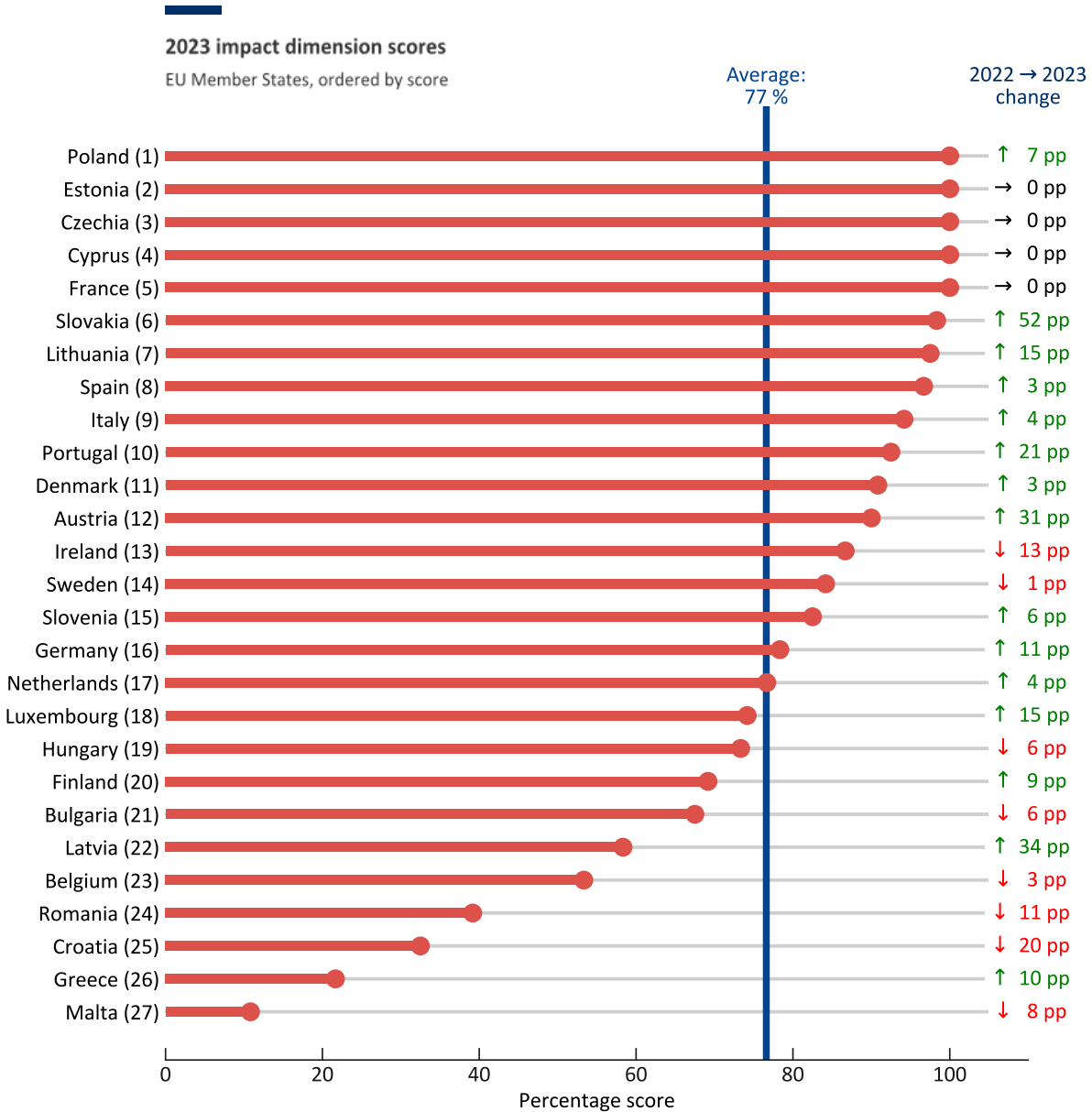


Figure 27: EU Member State scores on the impact dimension

## B. European Free Trade Association countries

### Strategic awareness

**Iceland** and **Norway** stated that they had a definition of open data reuse. In Iceland, for example, open data reuse refers to private parties using public sector information for a different purpose from that for which it was intended when it was originally collected by a public party. In this definition, sharing of information between public bodies in the interests of their work is not considered open data reuse.

**Norway** reported a strong interest nationally in observing the level of open data reuse. As one example, the government has investigated the data economy, including the level of open data reuse and measures to increase it <sup>(174)</sup>. On the other hand, **Iceland** and **Switzerland** reported that there was a focus on observing reuse but that it was limited.

**Iceland** and **Switzerland** reported that they carried out activities encouraging public bodies to monitor the reuse of their published data. In both countries, this is done through training. **Iceland** and **Norway** use their national open data portals to monitor open data reuse. Norway noted that the national portal provides crowdsourced examples of reuse, which are linked to the datasets used and integrated with the dataset catalogue.

In addition, all three EFTA countries have a national definition of the impact of open data. **Switzerland**'s definition takes economic impact into account <sup>(175)</sup>. **Norway** is testing a new framework in which impact is defined in terms of socioeconomic and private economic value <sup>(176)</sup>. **Iceland** focuses on the number of high-value datasets available <sup>(177)</sup>. **Norway** and **Switzerland** <sup>(178)</sup> reported having established methodologies to measure the impact of open data. Furthermore, **Norway** and **Switzerland** indicated that there were collaborations between government and civil society or academia in their countries to create open data impact. For example, Norway highlighted that it has a national centre for artificial intelligence consisting of eight Norwegian companies with broad expertise in the field <sup>(179)</sup>.

### Measuring reuse

All three participating EFTA countries indicated that they performed activities to map which open datasets are reused and how. **Iceland** and **Switzerland** analyse log files. **Norway** regularly conducts a survey developed by the Norwegian Digitalisation Agency and Statistics Norway. **Norway** also mentioned that its national data portal has a new beta version for services <sup>(180)</sup> and events, which helps measure how datasets are reused. **Switzerland** also mentioned using events to engage with reusers to understand how datasets are reused. Moreover, **Norway** and **Switzerland** reported performing activities to understand reusers' needs better. Regarding having systematic methods of gathering and classifying reuse cases, **Norway** and **Switzerland** reported using their national portals to collect reuse cases from the community.

<sup>(174)</sup> <https://www.regjeringen.no/no/aktuelt/rapport-om-dataokonomien-i-offentlig-sektor/id2918649/>.

<sup>(175)</sup> <https://www.bfs.admin.ch/bfs/de/home/dienstleistungen/ogd/dokumentation.assetdetail.11147089.html>.

<sup>(176)</sup> <https://www.digdir.no/media/3339/download>.

<sup>(177)</sup> <https://island.is/s/stafrant-island/stafrant-stefna>.

<sup>(178)</sup> <https://boris.unibe.ch/75031/1/CeDEM2016%20-%20Impact%20Monitoring%20Framework%20V06.pdf>.

<sup>(179)</sup> <https://www.nemonor.no/>.

<sup>(180)</sup> <https://data.norge.no/public-services/d5d0c07c-c14f-3741-9aa3-126960958cf0>.

### Created governmental impact

Only **Norway** reported that it had gathered data on the impact created by open data on governmental challenges. Table 4 summarises the presence of reuse cases that address governmental challenges in the three participating EFTA countries.

Table 4: EFTA countries reporting open data reuse cases that address governmental challenges

Categories	Iceland	Norway	Switzerland
Efficiency and effectiveness of government	✓	✓	✓
Transparency and accountability of government		✓	✓
Policymaking process	✓	✓	✓
Decision-making processes	✓	✓	✓

An example of a reuse case that impacts decision-making processes is the use by the Basel public administration in **Switzerland** of open data on air quality to monitor pollutants during the demolition of a former chemical facility. An example of a reuse case that impacts the policymaking process can be found in **Norway**, where open data contributes to policy on where to drill for oil <sup>(181)</sup>.

### Created social impact

**Norway** is the only participating EFTA country that reports having gathered data on the impact created by open data on social challenges. An example is a report that has been published which found that healthcare data positively impacts citizens' healthcare, efficiency within the healthcare sector and businesses reliant on such data <sup>(182)</sup>. Table 5 summarises the presence of reuse cases that address social challenges in the three participating EFTA countries.

Table 5: EFTA countries reporting open data reuse cases that address social challenges

Categories	Iceland	Norway	Switzerland
Reduce inequality and include minorities		✓	✓
Increase awareness concerning housing in urban areas		✓	✓
Increase awareness of health and well-being	✓	✓	✓
Improve level of education and skills			✓

A relevant reuse case from **Switzerland** is the digital twin of Zurich <sup>(183)</sup>. Using a 3D model of the city, users can, for example, measure the height of buildings or call up further information about them. In addition, the model can display the shadows cast at different times of day and of the year. Both applications are primarily aimed at stakeholders in the building industry, such as planners, architects and engineers. The numerous visualisation and analysis options allow work at different scales, from an overall view of the city to detailed building models. The underlying technology is already being used in

<sup>(181)</sup> <https://www.npolar.no/en/themes/the-marginal-ice-zone/>.

<sup>(182)</sup> <https://www.menon.no/wp-content/uploads/2018-69-Helsedata-store-verdier-p%C3%A5-spill.pdf>.

<sup>(183)</sup> <https://innovators-guide.ch/2022/02/digital-die-stadt-zuerich-erkunden-in-bis-zu-vier-dimensionen/>.



public administration to visualise noise simulations in the context of architectural competitions or for the integral representation of civil engineering and building construction projects.

### Created environmental impact

**Norway** is the only participating EFTA country that gathers data on the impact of open data on environmental challenges. For example, the Norwegian Environmental Agency conducted a systematic review of opportunities and challenges relating to increased use of environmental data, which resulted in descriptions of how data, and open data in particular, can contribute to new environmental solutions <sup>(184)</sup>. Table 6 summarises the presence of reuse cases that address environmental challenges in the three participating EFTA countries.

Table 6: EFTA countries reporting open data reuse cases that address environmental challenges

Categories	Iceland	Norway	Switzerland
Protection of biodiversity	✓	✓	✓
Environmentally friendly cities	✓	✓	✓
Climate change and connected disasters	✓	✓	✓
Energy consumption and the switch to renewables	✓	✓	✓

As an example of a reuse case, municipalities in **Iceland** use open data on air quality to make decisions on incentivising citizens to using less polluting modes of transport by, for example, offering free fares on buses. In **Norway**, a calculator has been created to test the effects of measures to reduce air pollution, and cities have been using it to help them become more environmentally friendly <sup>(185)</sup>.

### Created economic impact

**Norway** is the only participating EFTA country to report that it gathers data on the economic impact of open data. Table 7 summarises the presence of reuse cases that address economic challenges in the three participating EFTA countries.

Table 7: EFTA countries reporting open data reuse cases that address economic challenges

Categories	Iceland	Norway	Switzerland
Employment			
Innovation and new technologies	✓		✓
Entrepreneurship and business creation		✓	✓

As an example of business creation related to open data, Fiskher (Fish Here) in **Norway** used open geodata to create an app for anglers and has expanded to several countries <sup>(186)</sup>. In **Switzerland**, LIIP AG has had a business model based on open data services for the past 10 years <sup>(187)</sup>.

<sup>(184)</sup> <https://www.menon.no/wp-content/uploads/2021-153-Hovedrapport-KVU-Fremtidens-miljodata.pdf>.

<sup>(185)</sup> <https://www.miljodirektoratet.no/tjenester/tiltakskalkulator-for-luftkvalitet/>.

<sup>(186)</sup> <https://digitalnorway.com/slik-skapte-fiskher-en-app-suksess-av-apne-data-fra-kartverket/>.

<sup>(187)</sup> <https://www.liip.ch/en/blog/beginning-a-new-chapter-for-open-data>.

Overall European Free Trade Association country performance

In 2023, the EFTA average maturity score on the impact dimension was 68 % (Figure 28). All three participating EFTA countries experienced a year-on-year increase in scores, with **Iceland** (+ 35 pp) and **Switzerland** (+ 19 pp) showing significant improvement. **Norway** remains the most mature (87.5 %).

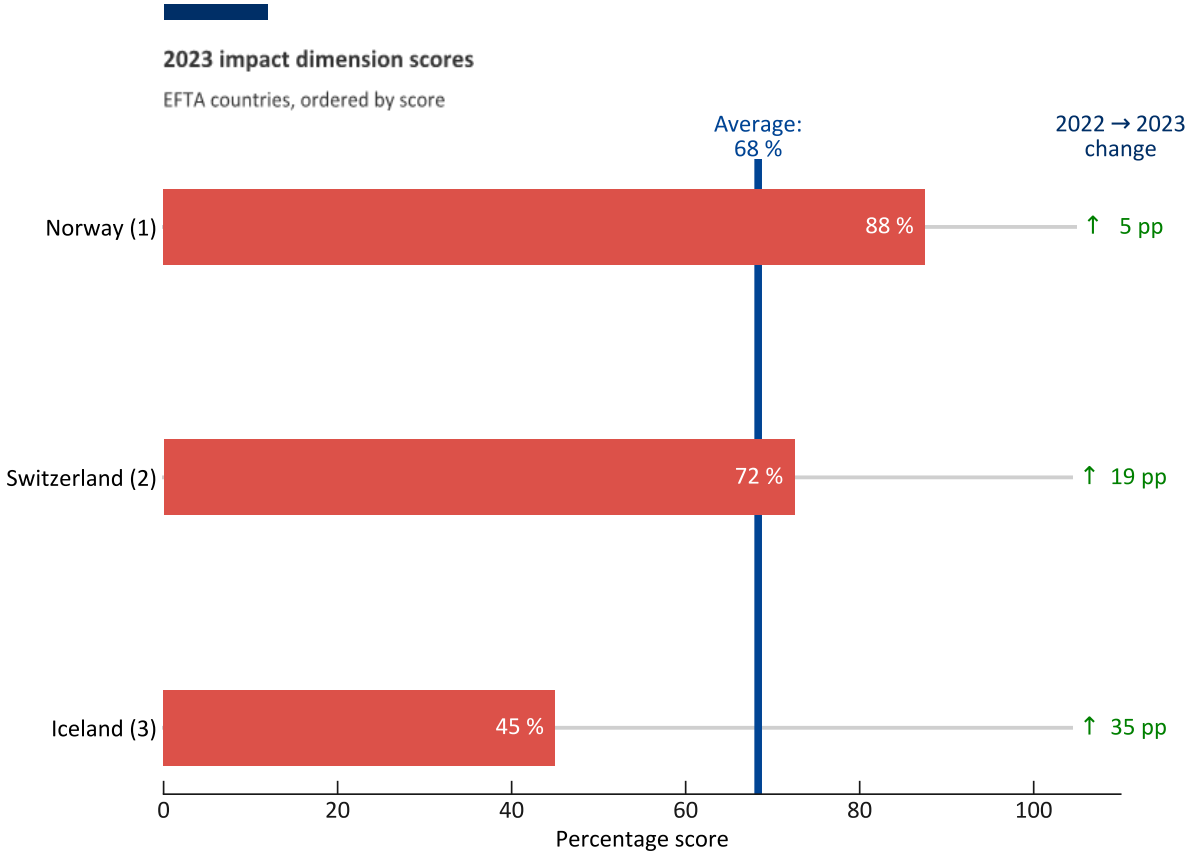


Figure 28: EFTA country scores on the impact dimension

Regarding scoring distribution on the indicators (Figure 29), **Switzerland** has the widest range of indicator scores, scoring 61 % on strategic awareness and 100 % on measuring reuse. **Norway** also achieves 100 % on measuring reuse. Each of the three countries scores lowest on a different indicator.

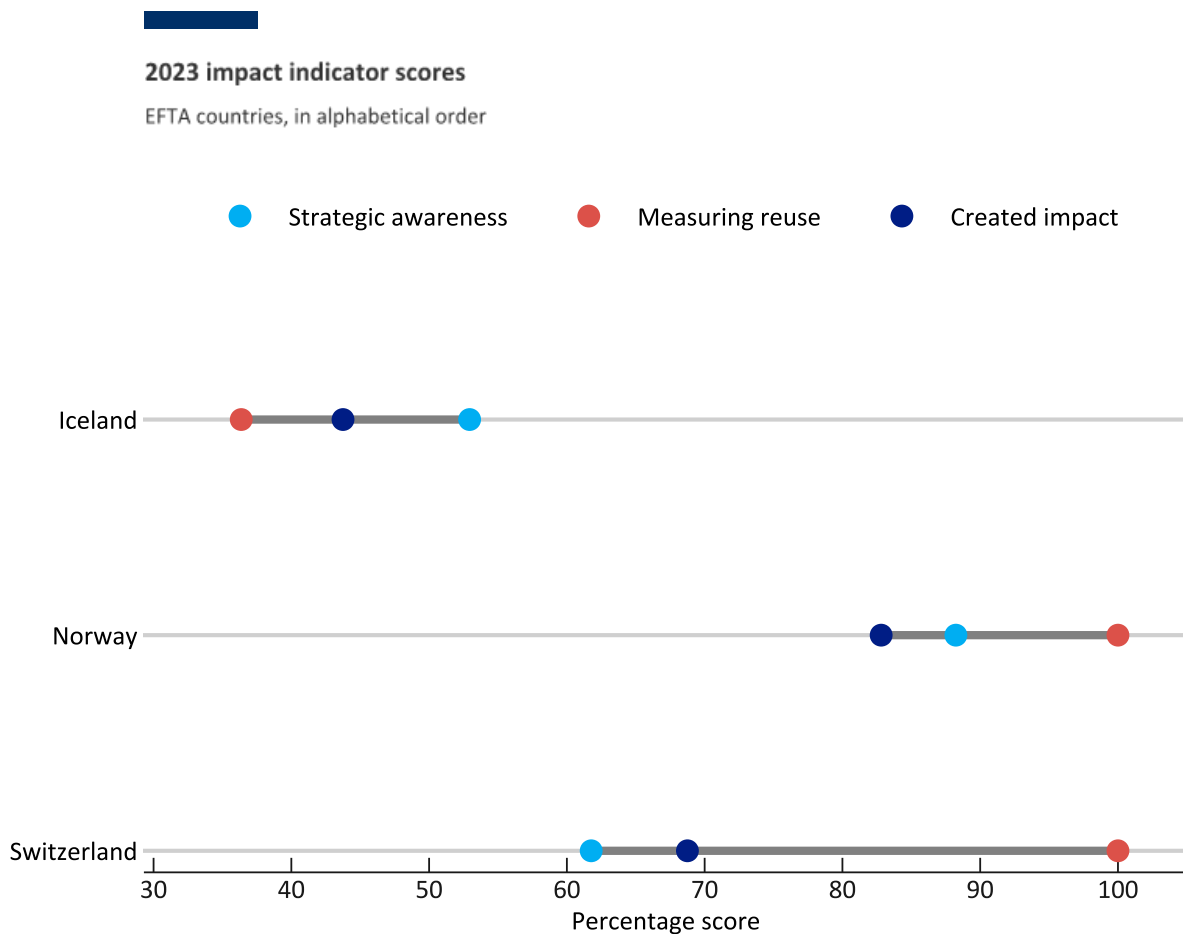


Figure 29: Impact indicator scores for each EFTA country

### C. Candidate countries

#### Strategic awareness

All the participating candidate countries except **Bosnia and Herzegovina** reported having a national definition of open data reuse. The definitions in **Montenegro** and **Serbia** emphasise that open data reuse refers to using open data from the public sector for a purpose other than that for which it was originally created. **Ukraine**'s definition also includes the criterion that the data must be in a format that allows its automated electronic processing and provides free access and use. All the candidate countries except **Bosnia and Herzegovina** reported an interest at the national level in observing the level of open data reuse.

More specifically, **Montenegro**, **Serbia** and **Ukraine** stated that there was a strong focus on observing open data reuse and that they had processes in place to monitor reuse. **Ukraine** stated that determining the level of open data reuse and measuring its impact was one of the goals of its open data policy. Its national portal has a dedicated section on the impact of open data where research and

analysis on the impact of open data in various domains are collected <sup>(188)</sup>. **Montenegro** <sup>(189)</sup> and **Serbia** <sup>(190)</sup> also highlighted that they used their national portals as tools to monitor reuse. Furthermore, **Serbia** and **Ukraine** reported arranging activities to encourage public bodies to monitor the reuse of their own published data. For example, public sector bodies in Serbia are regularly invited to be partners in hackathons such as the Data Innovation Challenge. At this event in 2022, datasets from the Ministry of Health were used in a challenge relating to diabetes <sup>(191)</sup>.

**Bosnia and Herzegovina** pointed out that it had monitored reuse during the pilot phase of its open data portal. However, such monitoring is not currently in place, since the portal has not been deployed. **Albania**, which indicated a limited focus on observing the level of reuse, is developing an open data readiness assessment that aims to identify a better means of monitoring reuse. Currently, a lack of feedback hinders the team's understanding of whether there is a demand for certain datasets.

Furthermore, **Montenegro**, **Albania** and **Ukraine** reported having a national definition of the impact of open data. The definition often reflects the domains in which the country would like to create impact from open data reuse; for example, a country's definition might state that the aim of open data reuse is to provide a transparent and accountable foundation to improve decision-making and enhance the provision of public services. **Serbia** <sup>(192)</sup> and **Ukraine** have developed national methodologies to measure the impact of open data, and impact studies have been conducted in **Montenegro** <sup>(193)</sup> and **Ukraine** <sup>(194)</sup> in the past year. In terms of collaboration between government and civil society or academia to create open data impact, **Bosnia and Herzegovina**, **Albania** and **Ukraine** reported undertaking such activities. An example of such a collaboration in **Serbia** is the Open Budget Platform, which was implemented through a partnership between the government and the Observatory of Social Innovations <sup>(195)</sup>.

### Measuring reuse

Apart from **Bosnia and Herzegovina**, all the participating candidate countries reported conducting activities to map which open data is reused and how. For example, **Ukraine** analyses statistical information about datasets published on its national portal and has organised a competition to support projects based on open data <sup>(196)</sup>. In **Albania**, the National Agency for Information Society created and manages TechSpace, an initiative tasked with establishing creative environments and supporting entrepreneurship programmes to develop start-ups that can drive innovation and societal progress. TechSpace actively promotes the national open data portal and advocates for the use of open data. Furthermore, **Montenegro**, **Serbia** and **Ukraine** reported conducting activities to understand reusers' needs better. For example, Serbia sought to gain insights into reusers' needs by examining freedom of

<sup>(188)</sup> <https://diia.data.gov.ua/value>.

<sup>(189)</sup> <https://data.gov.me/analytics>.

<sup>(190)</sup> <https://data.gov.rs/sr/reuses/>.

<sup>(191)</sup> <https://hub.data.gov.rs/2022/02/02/odgovori-na-izazov-otvorenih-podataka-i-obezbedi-budzet-za-razvoj-svoje-ideje/>.

<sup>(192)</sup> <https://www.undp.org/sr/serbia/publications/potencijalni-uticaj-otvaranja-podataka-u-srbiji>.

<sup>(193)</sup> <https://www.undp.org/cnr/montenegro/publications/procjena-setova-otvorenih-podataka-visoke-vrijednosti-u-javnoj-upravi-crne-gore> and <https://www.gov.me/dokumenta/7a211a06-401c-426c-9d98-85b8f1ae9d88>.

<sup>(194)</sup> [https://tapas.org.ua/wp-content/uploads/2022/07/OD\\_municipalities\\_part-2.pdf](https://tapas.org.ua/wp-content/uploads/2022/07/OD_municipalities_part-2.pdf) and [https://tapas.org.ua/wp-content/uploads/2022/07/Report\\_Municipalities-OD\\_part-3.pdf](https://tapas.org.ua/wp-content/uploads/2022/07/Report_Municipalities-OD_part-3.pdf).

<sup>(195)</sup> <https://budzeti.data.gov.rs/>.

<sup>(196)</sup> <https://odss.data.gov.ua/>.

information requests. It now plans to open up some of the requested datasets, which include budget data, geodata and data on grants to sporting associations and cultural organisations.

Regarding having systematic methods of gathering reuse cases, **Montenegro**, **Serbia** and **Ukraine** report having such methods, which involve reusers submitting their reuse cases to the national portal. Moreover, **Serbia** and **Ukraine** reported having developed systematic methods of classifying the gathered reuse cases. These methods involve a two-tier classification system, with one tier based on the type of reuse case (e.g. visualisation, application) and one based on the domain of the reuse case (e.g. health, travel).

### Created governmental impact

In **Ukraine**, public bodies have launched activities to assess the impact of open data in the domain of government. For example, a study was conducted on open data's impact on local communities' anti-corruption measures <sup>(197)</sup>. Table 8 summarises the presence of reuse cases that address governmental challenges in the five participating candidate countries.

Table 8: Candidate countries reporting open data reuse cases that address governmental challenges

Categories	Bosnia and Herzegovina	Montenegro	Albania	Serbia	Ukraine
Efficiency and effectiveness of government			✓	✓	✓
Transparency and accountability of government				✓	✓
Policymaking process				✓	✓
Decision-making processes					✓

As an example of a reuse case, **Serbia** standardised and visualised local data on financial support to non-governmental organisations and sporting associations, which improved budget planning for this kind of support. A project in **Ukraine** called Open Data Watchdog <sup>(198)</sup> provides a service that tracks changes in datasets on the national open data portal. The service is designed to increase transparency among managers and administrators responsible for the release of data.

### Created social impact

**Ukraine** is the only candidate country that reports gathering data on the impact created by open data on social challenges, such as healthcare <sup>(199)</sup>. Table 9 summarises the presence of reuse cases that address social challenges in the five participating candidate countries.

<sup>(197)</sup> [https://tapas.org.ua/wp-content/uploads/2022/07/OD\\_municipalities\\_part-2.pdf](https://tapas.org.ua/wp-content/uploads/2022/07/OD_municipalities_part-2.pdf).

<sup>(198)</sup> <https://wd.clarity-project.info/>.

<sup>(199)</sup> <https://data.gov.ua/uploads/files/2022-10-03-123908.651661Healthcare-OD-impact-study.pdf>.

Table 9: Candidate countries reporting open data reuse cases that address social challenges

Categories	Bosnia and Herzegovina	Montenegro	Albania	Serbia	Ukraine
Reduce inequality and include minorities				✓	✓
Increase awareness concerning housing in urban areas		✓		✓	✓
Increase awareness of health and well-being				✓	✓
Improve level of education and skills		✓		✓	✓

As an example of such reuse, **Serbia** has developed several applications in healthcare. One of them is a diabetes app, a PowerBI dashboard offering analysis on diabetes in Serbia, which contributes to better policy planning in this area <sup>(200)</sup>. Another example from Serbia, focused on equality, crowdsources data on accessibility in the city of Bor and raises awareness of the need for changes to the infrastructure in the city <sup>(201)</sup>.

#### Created environmental impact

**Ukraine** is the only candidate country that reports gathering data on the impact created by open data on environmental challenges <sup>(202)</sup>. Table 10 summarises the presence of reuse cases that address environmental challenges in the five participating candidate countries.

Table 10: Candidate countries reporting open data reuse cases that address environmental challenges

Categories	Bosnia and Herzegovina	Montenegro	Albania	Serbia	Ukraine
Protection of biodiversity		✓		✓	✓
Environmentally friendly cities		✓		✓	✓
Climate change and connected disasters		✓		✓	✓
Energy consumption and the switch to renewables				✓	✓

<sup>(200)</sup> [www.open-dijabetes.rs](http://www.open-dijabetes.rs).

<sup>(201)</sup> <https://data.gov.rs/sr/reuses/mapa-pristupachnosti-za-osobe-sa-invaliditetom-grad-a-bora/>.

<sup>(202)</sup> <https://data.gov.ua/uploads/files/2022-10-03-123559.380394Ecology-OD-Impact-Study-1.pdf>.

Some interesting projects in **Ukraine** that use open data in the field of energy include the Low Carbon Ukraine project <sup>(203)</sup> and the non-governmental organisation Save Dnipro <sup>(204)</sup>, which are creating analytical materials on electricity production based on open data. In particular, these projects monitor the market, identify problems and prepare recommendations on solutions, as well as on the further development and reform of the industry. Furthermore, Kosatka.Media <sup>(205)</sup> and ExPro Electricity <sup>(206)</sup> use open and other data in the energy sector to create infographics and analytics.

### Created economic impact

**Ukraine** is the only country reporting that it gathers data on the impact created by open data on economic challenges <sup>(207)</sup>. Table 11 summarises the presence of reuse cases that address economic challenges in the five participating candidate countries.

Table 11: Candidate countries reporting open data reuse cases that address economic challenges

Categories	Bosnia and Herzegovina	Montenegro	Albania	Serbia	Ukraine
Employment					✓
Innovation and new technologies				✓	✓
Entrepreneurship and business creation		✓		✓	✓

As an example of reuse, OpenDataBot in **Ukraine** has created a tool that helps users to monitor the impact of the war on Ukrainian businesses. The tool is updated monthly and provides up-to-date information using government open data and shared commercial data <sup>(208)</sup>. In terms of impact on innovation, **Serbia** highlighted that Google Transit was not previously available in its country, but now five cities are sharing their data about public transport, which is feeding into Google Transit and other mobility apps.

<sup>(203)</sup> <https://www.lowcarbonukraine.com/uk/frontpage-uk/>.

<sup>(204)</sup> <https://www.savednipro.org/>.

<sup>(205)</sup> <https://kosatka.media/>.

<sup>(206)</sup> <https://expro.com.ua/vydannya>.

<sup>(207)</sup> [https://tapas.org.ua/wp-content/uploads/2022/08/Economic-impact\\_report.pdf](https://tapas.org.ua/wp-content/uploads/2022/08/Economic-impact_report.pdf).

<sup>(208)</sup> <https://opendatabot.ua/analytics/business-growth-in-war>.

Overall candidate country performance

In 2023, the average maturity score on the impact dimension for the participating candidate countries was 49 % (Figure 30). **Ukraine** remains the most mature candidate country in this dimension (100 %). Most countries improved their score year-on-year. The biggest increase in score was achieved by **Montenegro** (+ 17 pp).

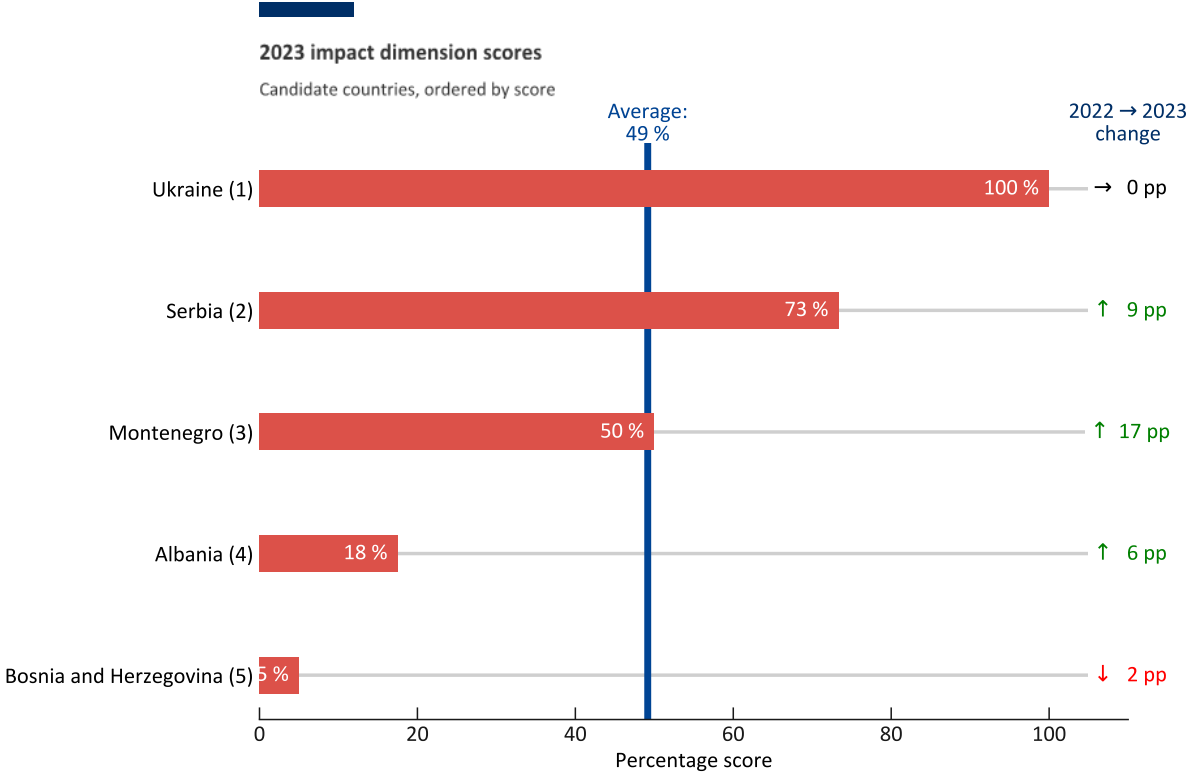


Figure 30: Candidate country scores on the impact dimension



Figure 31 shows the distribution of scores for each indicator of the impact dimension for the candidate countries. The typical order of the indicators, from least to most mature, is created impact, strategic awareness and measuring reuse. Activities are performed to measure reuse, but more awareness of the importance of reuse needs to be created, which must then be translated into impact.

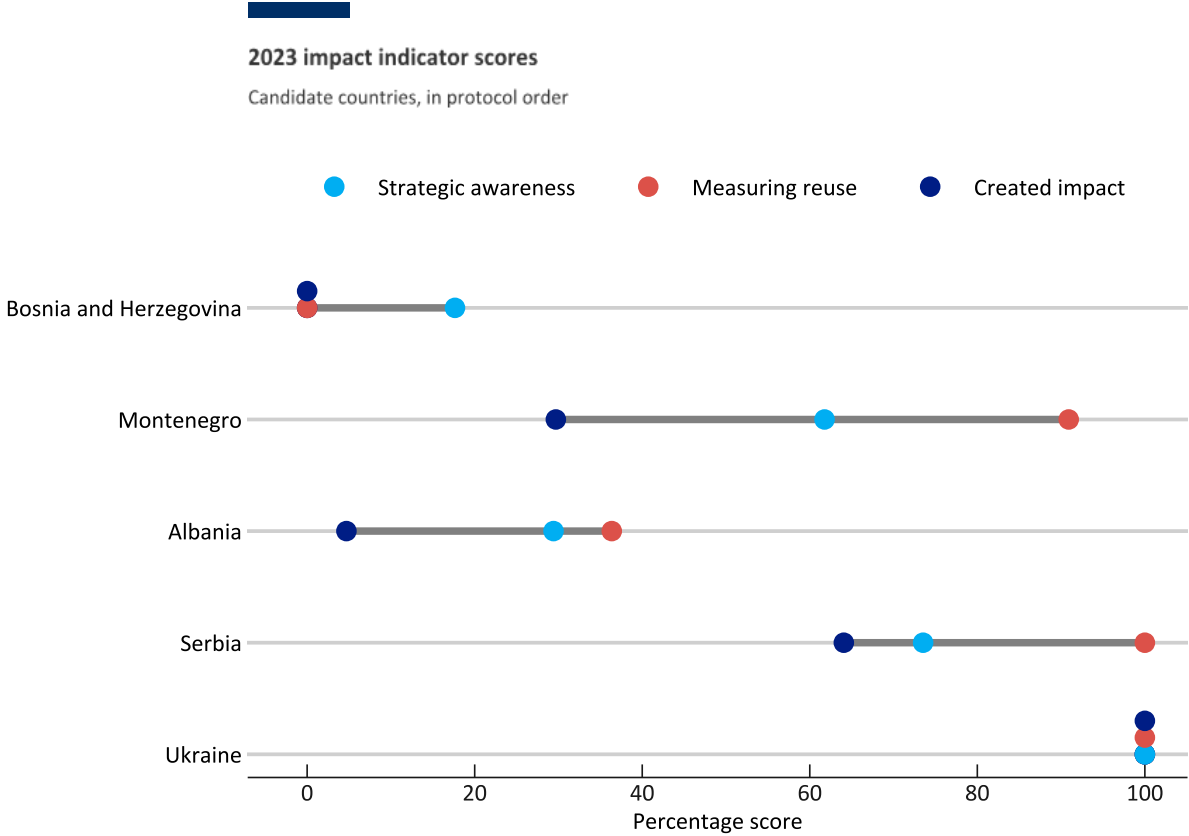


Figure 31: Impact indicator scores for each candidate country

## Chapter 5: Open data portal

Open data made available by governments for reuse must be published and accessible to reusers. In this regard, open data portals are websites set up by public sector bodies that serve as catalogues to support the discoverability of public data resources. Here, ‘discoverable’ refers to functionalities that enable portal users to find datasets that best fit their needs. Open data portals often act as meta-catalogues, meaning that they aim to ensure that data published elsewhere can be discovered, rather than serving as storage venues for open data. The metadata that accompanies datasets enables datasets to be found and searched. Open data portals, therefore, rely on data providers to supply high-quality and well-described data.

Narrowly defined, data portals are technical solutions that facilitate datasets’ discoverability, publication or storage. However, providers of data portals typically run a portfolio of initiatives to promote the supply and reuse of public sector information. In this sense, open data portals and the teams that manage them also serve as channels to create awareness about open data and encourage portal users to reuse open data.

Therefore, the **portal** dimension of the ODM assessment encourages national portals to provide users with features and functionalities that meet their needs and offer a good user experience. A user-friendly portal can encourage the uptake of open data and convert portal users to reusers of open data. For example, portal features that preview tabular and geospatial data can help users to quickly understand datasets and reduce friction in using the data.

In brief, the **portal** dimension investigates the functionality of national open data portals, the extent to which users’ needs and behaviour are used to improve the portal, the availability of open data across different domains and the approach to ensuring the portal’s sustainability. Table 12 summarises the indicators of the portal dimension.

Table 12: Indicators of the portal dimension

Indicator	Key elements
<b>Portal features</b>	Portal features ensure access to datasets and relevant content, and include more advanced features such as SPARQL search, discussion forums, rating of datasets, requesting datasets and providing transparency on the progress status of requested datasets. Activities to promote the visibility and reuse of high-value datasets through the portal are planned.
<b>Portal usage</b>	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 APIs through which advanced users can access the metadata programmatically.
<b>Data provision</b>	Most data providers contribute data to the national portal, and actions are taken to enable publication by data providers. In addition, access to real-time data is provided through the portal, and data that does not stem from official sources can be uploaded. Furthermore, data from regional or local sources is discoverable on the national portal.
<b>Portal sustainability</b>	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.

The following sections discuss each group of countries separately: (A) EU Member States, (B) EFTA countries and (C) candidate countries. Further detail on the indicators is provided in the analysis of the EU-27. The sections on the EFTA and candidate countries discuss the dimension and indicator results of these two groups.

## A. EU Member States

All EU Member States (100 %) have a national open data portal (Table 13). In addition to the national portal, some countries, such as **Denmark**, also have domain-specific portals. Where this is the case, the national data portal aims to enable users to identify and evaluate relevant datasets and guide users to domain-specific sites. In this decentralised approach, domain-specific sites often provide advanced functionalities, whereas the national portal specialises in search functionalities based on metadata harvested from domain-specific providers.

Table 13: Web addresses of the national open data portals of the EU Member States

Member State	National portal URL
Belgium	<a href="https://data.gov.be/en">https://data.gov.be/en</a>
Bulgaria	<a href="https://data.egov.bg">https://data.egov.bg</a>
Czechia	<a href="https://data.gov.cz/english">https://data.gov.cz/english</a>
Denmark	<a href="http://www.datavejviser.dk">www.datavejviser.dk</a>
Germany	<a href="https://www.govdata.de">https://www.govdata.de</a>
Estonia	<a href="https://avaandmed.eesti.ee">https://avaandmed.eesti.ee</a>
Ireland	<a href="https://data.gov.ie">https://data.gov.ie</a>
Greece	<a href="https://data.gov.gr">https://data.gov.gr</a> and <a href="http://repository.data.gov.gr">http://repository.data.gov.gr</a>
Spain	<a href="https://datos.gob.es/en">https://datos.gob.es/en</a>
France	<a href="https://www.data.gouv.fr">https://www.data.gouv.fr</a>
Croatia	<a href="https://data.gov.hr/en">https://data.gov.hr/en</a>
Italy	<a href="https://dati.gov.it">https://dati.gov.it</a>
Cyprus	<a href="https://www.data.gov.cy/?language=en">https://www.data.gov.cy/?language=en</a>
Latvia	<a href="https://data.gov.lv/eng">https://data.gov.lv/eng</a>
Lithuania	<a href="https://data.gov.lt/?lang=en">https://data.gov.lt/?lang=en</a>
Luxembourg	<a href="https://data.public.lu/en">https://data.public.lu/en</a>
Hungary	<a href="https://kozadatportal.hu">https://kozadatportal.hu</a>

Malta	<a href="https://open.data.gov.mt">https://open.data.gov.mt</a>
Netherlands	<a href="https://data.overheid.nl/en">https://data.overheid.nl/en</a>
Austria	<a href="https://www.data.gv.at/en">https://www.data.gv.at/en</a>
Poland	<a href="https://dane.gov.pl/">https://dane.gov.pl/</a>
Portugal	<a href="https://dados.gov.pt/en/">https://dados.gov.pt/en/</a>
Romania	<a href="https://data.gov.ro/en">https://data.gov.ro/en</a>
Slovenia	<a href="https://podatki.gov.si">https://podatki.gov.si</a>
Slovakia	<a href="https://data.gov.sk/en">https://data.gov.sk/en</a>
Finland	<a href="https://www.avoindata.fi/en">https://www.avoindata.fi/en</a>
Sweden	<a href="https://www.dataportal.se/en">https://www.dataportal.se/en</a> and <a href="https://beta.dataportal.se/en">https://beta.dataportal.se/en</a>

### 3.1. Portal features

This indicator evaluates the basic and advanced functionalities of national open data portals. Portal features include advanced data search functions (multiple field search, filter options, etc.), the possibility for the user to download datasets and the possibility for the user to search by file format or data domain. More advanced portals enable users to search data programmatically through APIs or SPARQL<sup>(209)</sup> queries. Furthermore, this indicator examines whether it is possible for visitors to request and rate datasets and whether portals highlight reuse cases. These reuse cases may be collected through research conducted by the national open data team or submitted by reusers through the portal. More advanced portals often offer visitors a higher degree of transparency by presenting information on the progress status of data requests. The indicator also examines whether portals have features that foster online interaction between data providers and reusers, such as discussion forums, feedback channels or the possibility for users to receive notifications when new datasets become available.

#### Searching and downloading datasets

All Member States (100 %) stated that their national portals offered users advanced data search functions (e.g. multiple field search and filter options), the ability to download datasets and the ability to search for datasets by data domain. Furthermore, all EU-27 national portals except Malta's (96 %) offer users the ability to search for datasets by file format.

To cater for more sophisticated search requirements, 25 Member States (93 %) reported having an API or SPARQL endpoint and accompanying documentation to enable programmatic queries of the portal's metadata. This is the same as in 2022, after a significant increase from 78 % in 2021. **Malta** and **Romania** still need to implement this for their national portals, with Romania currently working on an API for developers<sup>(210)</sup>.

<sup>(209)</sup> <https://www.w3.org/TR/sparql11-query/>.

<sup>(210)</sup> <https://data.gov.ro/pages/developers>.

An API <sup>(211)</sup> defines an agreement between two systems to enable them to communicate with each other using requests and responses. SPARQL <sup>(212)</sup> is a specific semantic query language designed for databases that allows users to retrieve and manipulate data stored in the Resource Description Framework <sup>(213)</sup> file format. The query language enables analytical query operations. In addition, it allows access to metadata that may not be immediately visible to users through graphical website interfaces. Users can also use SPARQL through APIs. Such programmatic querying is important because it makes efficient, flexible and reproducible data retrieval from databases possible. Programmatic querying also enables applications to access and utilise information dynamically, which is necessary for certain reuse cases.

### High-value datasets

High-value datasets are datasets whose reuse can significantly benefit society and the economy. A total of 22 Member States (81 %) indicated that they actively promoted high-value datasets on the national open data portal. Activities in this regard typically include adding filters, labels or tags to high-value datasets on the national portal. For example, **Slovakia** updated its DCAT-AT metadata specification, adding a new attribute, 'HVD', so that users could quickly identify high-value datasets on the national portal. **Hungary** is also leveraging DCAT-AP by using the 'type' property (dct:type) to mark whether or not a dataset is a high-value one. Hungary also intends to adapt its metadata related to high-value datasets when the EU guidelines on DCAT-AP for high-value datasets are published. Similarly, **Germany** is updating its national version of DCAT-AP <sup>(214)</sup> so that it can differentiate high-value datasets from others.

The team in **Luxembourg** highlighted two major projects related to high-value datasets on the national portal.

- The team is starting to test the technical, financial and practical feasibility of a central data warehouse for high-value datasets. The warehouse would be designed to hold all the non-Inspire high-value datasets (Inspire datasets relate to spatial information <sup>(215)</sup>) and be the location from where the legally required bulk download and API features would be offered for all high-value datasets.
- The team is working on an initiative to tag existing high-value open data on the portal with the 'HVD' category tag.

### Requesting datasets and providing transparency

While search features assist users in discovering available datasets, users may seek datasets that are not available on the national portal. A total of 23 Member States (85 %) offer users a functionality that enables them to request a dataset through the national portal (the provision of a general email address was not accepted when scoring this question). **Germany**, which does not currently offer this functionality, is discussing the implementation of a 'data request' button on its portal; however, the team highlights the need to examine the political and administrative processes that would lie behind it to ensure that every request would reach the relevant public body. In some countries, there are multiple ways to request datasets. For example, in **France** users can submit requests through the

<sup>(211)</sup> <https://joinup.ec.europa.eu/collection/api4dt/about>.

<sup>(212)</sup> <https://joinup.ec.europa.eu/collection/w3c-standards-and-technical-reports/solution/sparql-11-query-language>.

<sup>(213)</sup> <https://www.w3.org/RDF/>.

<sup>(214)</sup> <https://www.dcat-ap.de/def/dcatde/2.0/spec/#datensatz-referenziert>.

<sup>(215)</sup> <https://inspire.ec.europa.eu/inspire-directive/2>.

national portal or to the Commission for Access to Administrative Documents<sup>(216)</sup>. There is also heterogeneity in how national portals present this functionality. Some portals have a designated request form, others offer a specific field in the general contact form and some provide this functionality only to logged-in users.

Regarding the frequency of requests, two portals (7 %) – in **France** and the **Netherlands** – receive dataset requests almost on a daily basis; nine portals (33 %) tend to receive at least one request a week; and three portals (11 %) tend to receive at least one request a month. However, the largest number of portals (10; 37 %) receive requests for datasets less frequently than monthly, an increase from 33 % of national portals in 2022.

In 18 Member States (67 %), requests for datasets and their progress status are presented transparently on the national portal (see Figure 32 for an example from **Spain** that uses a tree diagram to display the outcome of data requests transparently). This is the same proportion as in 2022. In addition, 24 Member States (89 %) monitor the extent to which these requests ultimately result in publication.

Home | Interact | Data availability

## Data availability

In this section, you will find queries raised by other users regarding data not yet available in the [Data catalogue](#). The queries **received** are allocated to the body responsible for the matter in question **and that body will respond to the query and indicate its current status**. In order to join such a request, you need to access its details.

Important: This channel aims to communicate the data requests of re-users to the Administration in order to help advance the open data initiatives launched. In no case will it replace the procedure for processing reuse applications provided for in article 10 of Law 37/2007, which will be available to users through the electronic office of each administrative body. Nor will it replace the procedure described in article 17 of Law 19/2013, of December 9, on transparency, access to public information and good governance.

Below are all those received after January 1, 2021.

Category	Count
Public sector	21
Science and technology	20
Treasury	15
Economy	14
Demography	12
Rural environment	12
Culture and leisure	11
Environment	11

151 data availability found

Sort by: Date descending

1 requesters

Figure 32: Data request section of the Spanish open data portal (English version) (<https://datos.gob.es/en/peticiones-datos>)

In **Sweden**, requests for data are public; however, the national team does not currently have processes or tools in place to present information on the status of requests. Furthermore, there is no formal process to monitor whether requests lead to publication. Instead, the Swedish team connects the requester with the relevant data holder when it has the capacity to do so. **France** has created an open dataset on decisions to grant or reject requests by the Commission for Access to Administrative Documents<sup>(217)</sup>. **Italy** stores the requests it receives in its Open Government Partnership database<sup>(218)</sup>, which manages them. It indicates annually whether or not the datasets requested have been opened up. In **Czechia**, the national team monitors requests through the Open Data Working Group and sends its data providers an annual questionnaire about the state of open data. Its annual report on the state of open data includes an analysis of requests that led to the opening up of datasets<sup>(219)</sup>. The procedure in **Cyprus** is that the open data team forwards requests to the public

<sup>(216)</sup> <https://www.cada.fr/>.

<sup>(217)</sup> <https://www.data.gouv.fr/fr/datasets/avis-et-conseils-de-la-cada/>.

<sup>(218)</sup> <https://dati.gov.it/monitoraggio/paniere-dataset>.

<sup>(219)</sup> <https://opendata.gov.cz/dokumenty:anal%C3%BDza-opendata-wishlist>.

sector body that owns the data with guidelines on responding to such requests. The public sector body must copy the open data team when responding to the requester.

### Creating a dialogue with users

To engage with their users, national data portals often provide a functionality that enables reusers and data providers to interact. In 2023, 24 national portals (89 %) offered a general mechanism through which users can contact the portal team. The provision of a general email address was not accepted when scoring this question this year, leading to a decrease from 26 national portals (96 %) in 2022. **Greece** and **Luxembourg** offer a feedback mechanism, but using a general email address. Furthermore, 22 national portals (82 %) offer a specific feedback mechanism at the dataset level, typically in the form of a comment or discussion section under the dataset.

In addition to enabling users to leave feedback, 12 national portals (44 %) offer a functionality enabling users to rate datasets. Information on a dataset's rating can help portal users to judge the suitability of a dataset for their reuse cases, as well as helping portal administrators and data providers to identify areas that require improvements. This can be provided through a voting system (e.g. showing a number of 'likes') or through a rating system (e.g. numerical ratings). Some form of summary rating system was sought when scoring this question; the ability of users to offer qualitative descriptions in a comment section therefore was not considered to meet the requirements for this criterion.

With regard to actively connecting with the open data community and fostering interaction with portal users, 20 Member States (74 %) reported providing some form of discussion forum in which users could discuss topics or ask questions of the wider community. This is an increase from 68 % of portals in 2022, with **Italy**, **Latvia**, **Austria** and **Slovakia** now reporting that they offer this feature. **Denmark**, which has a new portal, and **Finland** no longer have portals that support this functionality. On some portals, such as in **Germany**, the discussion forum is closed and available only to registered users. In **Italy**, two relevant discussion forums are external to the national portal: one for data providers, a platform called ReTe Digitale <sup>(220)</sup> managed by the Agency for Digital Italy, and one general discussion forum on digital services for all users with sections dedicated to data and open data <sup>(221)</sup>. Interestingly, **Finland** withdrew the discussion board on its national portal due to relatively low usage and security reasons. The team reported that the forum was flooded with fake accounts that fed the platform with advertisements. Consequently, it required a lot of manual moderation to remove fake accounts and delete spam.

Another way to engage with users is by notifying them when new datasets become available, through RSS or Atom feeds or email notifications. A total of 20 national portals (74 %) offer a functionality enabling users to receive such notifications. Usually, users can follow specific datasets or data publishers and receive notifications whenever new data is published or when existing data is updated.

### Providing examples of open data reuse

One of the primary purposes of national data portals is to promote and support the reuse of open data. A total of 24 national portals (89 %) have a designated section to promote open data applications. Although **Bulgaria** does not showcase reuse cases on its national portal, it has a data visualisation section showcasing several datasets <sup>(222)</sup>. **Sweden** has a beta version of this feature <sup>(223)</sup>. As in 2022,

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<sup>(220)</sup> <https://www.retedigitale.gov.it>.

<sup>(221)</sup> <https://forum.italia.it/>.

<sup>(222)</sup> <https://data.egov.bg/dataviz>.

<sup>(223)</sup> <https://beta.dataportal.se/aktuellt>.

21 national portals (78 %) offer reusers the opportunity to submit their reuse case examples. In addition, 20 Member States (74 %) link reuse cases to datasets within the national portal to show how datasets have been reused.

### Other features

Regarding more advanced features, 19 national portals (70 %) have a preview feature for tabular data, one fewer than in 2022 and down from 22 national portals in 2021. In addition, 12 portals (44 %) have a preview function for geospatial data, typically in the form of an interactive map. This is a decrease of three countries compared with 2022, and down from 19 national portals in 2021. Features to preview datasets help portal users gain an initial understanding of them. Through previews and visualisations, portal users can experience and explore data interactively, and this may encourage uptake of the data, since the user can determine more easily if the dataset is suitable for their reuse case.

Datasets can also be made more informative and valuable for reuse if they are accompanied by supporting material such as explanations of how the data was collected. In 2023, 24 national portals (89 %) allowed users to link documentation and supporting materials to a given dataset, an increase from 19 portals in 2022. Typically, this refers to the ability of data providers to supply additional material at publication or include a link to external documentation and supporting materials in the metadata. However, some portals enable resources to be added by other portal users. For example, **Luxembourg's** portal allows users to add 'community resources' in a specific section below datasets. Similarly, **Lithuania's** portal allows users to provide attachments in the comment section for each dataset.

### 3.2. Portal usage

This indicator assesses whether portal administrators regularly evaluate if the portal's design, features and available data align with users' requirements. While direct user feedback is valuable, it tends to be anecdotal. Therefore, this indicator also investigates whether systematic monitoring of portal usage is used to gain a more comprehensive understanding of user behaviour. Specifically, it examines whether information on the number of unique visitors, typical user profiles, the most frequently accessed datasets, favoured data categories and the traffic generated through the portal's APIs are collected and analysed.

#### User analytics

In 2023, 26 Member States (96 %) responded that they monitored the national portal's usage through analytical tools, an increase from 89 % in 2022. **Malta** and **Sweden** now report monitoring usage characteristics such as the number of unique visitors, visitor profiles, percentage of outgoing portal traffic generated through APIs, number of downloads and so on. Popular tools used to monitor portal traffic include Matomo, used by 12 national portal teams, and Google Analytics, used by 11 national portal teams (some teams use more than one tool). **Czechia** currently does not monitor portal traffic but does use Google Search Console Insights for a general overview of the number of searches or clicks and their geographical origin. The team is now deploying Matomo.

Regarding leveraging usage statistics, 24 Member States (89 %) indicated that insights from these statistics are used to improve the portal. For example, **Denmark** mentioned that these statistics provide information about what users search for, including searches that yield no results. The team then uses this information to adjust the search mechanism, suggest changes to metadata and onboard new data-holding authorities. Moreover, **Estonia** found that users wanted a search bar function on the main page, while **Greece** found that more users were accessing the portal from mobile devices.



Elsewhere, the team in the **Netherlands** noticed that many users found datasets through search engines other than that available on the portal homepage (e.g. Google). The team therefore considers it important that users can easily navigate from these search pages to the national portal. Furthermore, in **Sweden** the usage statistics helped the team to discover that the portal had suffered a significant decrease in number of visitors. A relatively large group of users visited the data portal only once. The team wants to change this by providing more editorial content, such as news and reuse case examples, to make the portal more interesting and appealing. In the past year, the team has put most of its resources into developing beta.dataportal.se and other non-portal deliveries.

A total of 23 Member States (85 %) stated that they performed further activities to understand the behaviour and needs of national portal users. For example, **Poland** periodically runs a user survey <sup>(224)</sup>, reports the results <sup>(225)</sup> and publishes the data as an open dataset <sup>(226)</sup>. The team also analyses the popularity of previous posts (coverage) and sentiment (reactions) when planning promotional activities, such as on Facebook. **Estonia** and **Malta** indicated that the typical profile of their portal visitors reveals that they are primarily public sector workers. In contrast, **Latvia** receives many visits to the portal from users with a business profile. All other Member States (89 %) reported that no dominant group could be distinguished among their portal users. **Sweden** indicated that it would like the academic sector to be more aware of the national portal, since it considers that students, researchers and teachers could benefit from using open data.

### Portal visitors

Regarding specific user analytics, 25 national portals (93 %) reported monitoring the average number of monthly unique visitors <sup>(227)</sup>. **Greece** reported that it did not know these numbers, while **Czechia** does not use tracking analytics but can report from Google Search Console that there were 15 400 total clicks from Google Search in 2022. Figure 33 shows the number of unique portal visitors by Member State, normalised to population size <sup>(228)</sup> (the numbers of portal visitors were self-reported by the national open data teams). **Luxembourg** has the highest relative number of unique portal visitors compared with its population (35 % of the Luxembourgish population). **Hungary** has the lowest relative number of unique portal visitors. **Estonia** had the most significant year-on-year increase in portal visitors, attracting 3.7 times more visitors than in 2022. **Lithuania** had the largest year-on-year decrease in portal visitors, with 11 times fewer visitors than in 2022.

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<sup>(224)</sup> <https://dane.gov.pl/pl/forms/ankieta-o-portalu?lang=pl>.

<sup>(225)</sup> [https://cms.dane.gov.pl/documents/103/Ocena\\_portalu\\_Dane.gov.pl\\_raport\\_z\\_badania.DOCX](https://cms.dane.gov.pl/documents/103/Ocena_portalu_Dane.gov.pl_raport_z_badania.DOCX).

<sup>(226)</sup> <https://dane.gov.pl/pl/dataset/2906>.

<sup>(227)</sup> 'Unique visitors' refers to the number of distinct individuals accessing pages of a website during a given period, regardless of how often they visit that website in that period.

<sup>(228)</sup> Population data was obtained from Eurostat ([https://ec.europa.eu/eurostat/databrowser/view/DEMO\\_GIND\\_custom\\_7127262/default/table](https://ec.europa.eu/eurostat/databrowser/view/DEMO_GIND_custom_7127262/default/table)), accessed in October 2023.

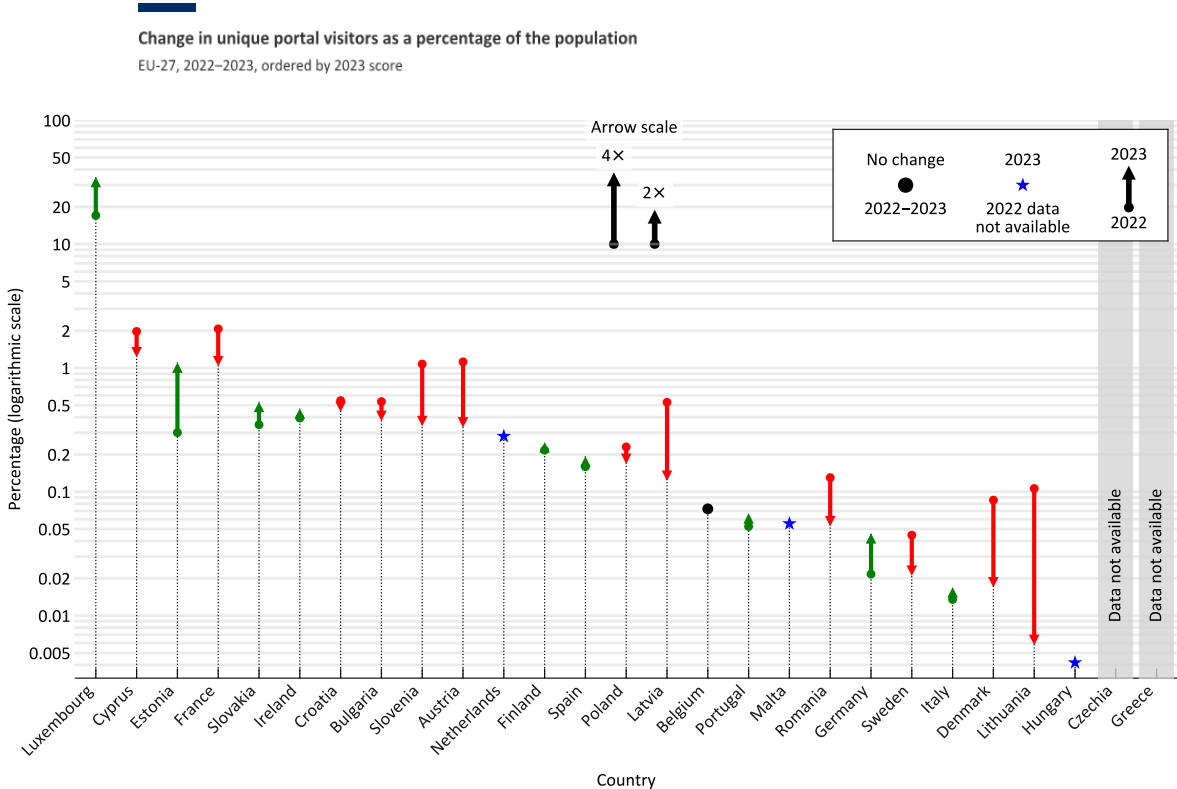


Figure 33: Change in unique visitors to national open data portals as a percentage of the total population between 2022 and 2023

With regard to foreign visitors, 22 Member States (81 %) reported the proportion of national portal visits from abroad. This is a decrease from 89 % in 2022, with **Denmark** and **Latvia** reporting that they do not know these figures for 2023. Figure 34 shows the proportion of foreign portal visitors by Member State (visitor numbers were self-reported by the national open data teams). In 2023, **Slovakia** reported the highest share of foreign visitors, at 88 %. **Bulgaria** had the lowest reported share of portal visitors from abroad, at 8 %. In **Czechia**, about 5 % of total clicks were from abroad, according to Google Search Console. The most significant increases in the proportion of foreign visitors were experienced by **Lithuania** (+ 73 percentage points) and **Portugal** (+ 46 pp). The largest decreases were seen in **Slovenia** (- 44 pp) and **Hungary** (- 30 pp).

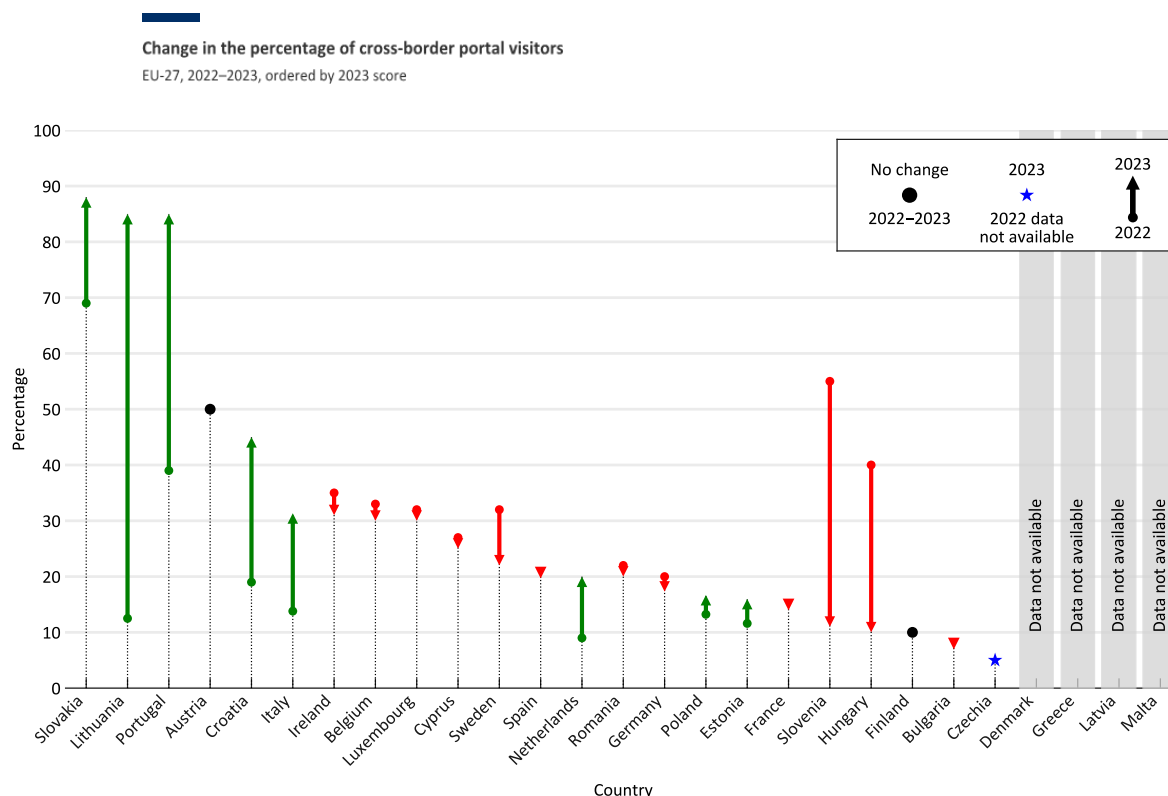


Figure 34: Change in the proportion of visitors to national open data portals from abroad between 2022 and 2023

### Most popular data domains

In 2023, 25 Member States (93 %) indicated that they tracked the most and least visited pages on their national portal, an increase of three countries – **Latvia**, **Malta** and **Slovakia** – since 2022. Furthermore, 23 Member States (85 %) reported monitoring the keywords used to search data and content. This is an increase of one country compared with 2022, with **Romania** now monitoring keywords. Furthermore, 26 Member States (96 %), all except **Croatia**, stated that they took measures to optimise the search function and the discoverability of content. For example, when approving data for publication, **Bulgaria** adds additional tags to associate the corresponding metadata with semantically close words and expressions. Another example is the **Netherlands**, which uses an advanced Apache Solar-based suggester system. The system uses taxonomies to optimise search and add editorial datasets, groups and content to make data more findable. It has also implemented Schema.org to create better findability on Google. Several countries, such as **Ireland** and **Hungary**, emphasise that their search options and filtering criteria are enabled by ensuring that the metadata is DCAT-AP compliant.

### Application programming interfaces

APIs enable reusers to programmatically access metadata, which means that they can automatically execute searches and process data. All national portals in the EU-27 (100 %) have metadata that is written in a language that is understandable to humans and machines, an increase from 26 national portals (96 %) in 2022 and 25 national portals in 2021 (93 %). Furthermore, 18 national portal teams (67 %) reported monitoring their national portal's API usage, for instance by running analytics on log files. This was a decrease from 22 Member States (81 %) in 2022. Figure 35 shows the percentage of outgoing portal traffic generated through APIs by Member State (traffic statistics were self-reported

by the national open data teams). Again, as in 2022, **Luxembourg** reported the highest outgoing portal traffic from APIs (95 %), up from 50 % in 2022. Spain still has the lowest (1 %) API usage among Member States that reported values. This year, **Ireland** reported that less than 1 % of outgoing clicks exclusively referenced APIs, a figure that does not account for API endpoints used by harvesters. Last year, **Ireland** reported that 68 % of its portal’s outgoing traffic was generated by API usage. In **Luxembourg, Greece, the Netherlands, Poland** and **Lithuania**, at least half of portal traffic results from API usage alone. However, API traffic accounts for less than 20 % of the total outgoing traffic for a larger number of portals.

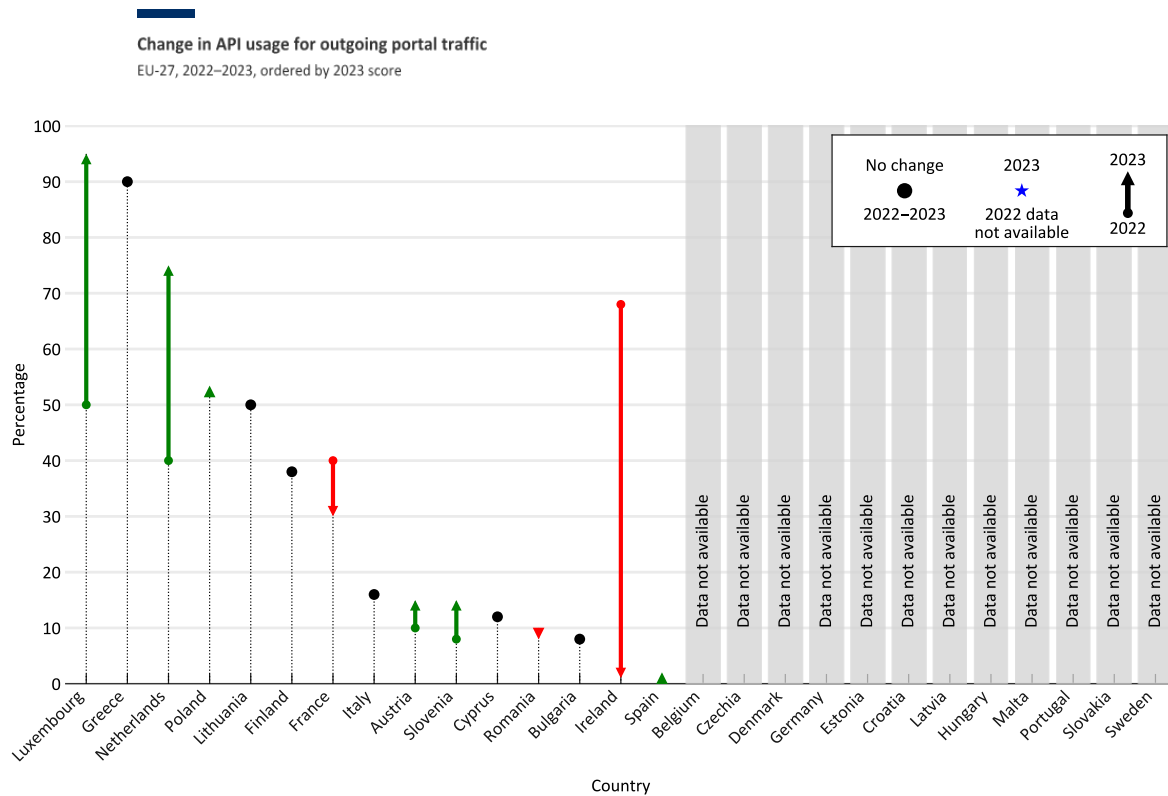


Figure 35: Change in API usage for outgoing portal traffic between 2022 and 2023

### 3.3. Data provision

This indicator assesses the extent to which data providers contribute datasets to the national portals and the measures taken to encourage their involvement, including interaction between the national portal and regional/local portals. Moreover, it also examines how open data portals make citizen-generated data and data that cannot be made open discoverable. Finally, the degree to which the national portal infrastructure offers access to real-time and dynamic data is also appraised.

#### Official data providers

Public sector bodies are the primary suppliers of open government data. In six Member States (22 %), all public sector data providers reportedly contribute data to the national portals. Furthermore, 17 Member States (63 %) indicated that the majority of public sector data providers contribute to the national portal. In **Hungary**, this is true of approximately half of public sector data providers, and in **Malta, Portugal** and **Sweden** only a few contribute to the national portal. Hungary, Malta and Sweden attribute the lower contributions, in general, to a low level of awareness among data providers and aspects of governance. In Sweden specifically, municipalities and county regions have a high degree of

self-governance, making it difficult to strongly incentivise these actors to share data that they do not have to release. The team commented that implementing EU provisions on high-value datasets in the new data law would make it easier for the national team at the Agency for Digital Government to work towards increased data sharing.

Other countries, such as **Slovakia**, also highlight that regional providers are not required to publish open data; doing so is optional. In some countries, such as **Romania**, several institutions, such as the Ministry of Finance and the National Institute of Statistics, still publish their data on their own portals designed for their specific data. However, all public sector data providers are encouraged to contribute to the national data portal.

In addition to providing access to open data, 16 national portals (59 %) allow users to see what data exists but cannot be made available as open data. A feature such as this can help to reduce freedom of information requests by being transparent about the fact that some data cannot be made available and the reasons why.

### Non-official data providers

In addition to answering questions about official data providers from the public sector, 12 Member States (44 %) stated that they offered the possibility for other providers to publish non-official data, such as crowdsourced or community-contributed data, on the national portal. Often, national portals publish non-official datasets in the same catalogue as official ones and use tags to indicate that datasets stem from non-official sources. For example, in **Luxembourg** official data providers are tagged with a 'Public Service' badge. In **Latvia**, non-official data is assigned to the 'Collections of Public Groups' category. In **Spain**, users can filter datasets by public bodies and private entities. Similarly, in **Estonia** non-official and official data is differentiated based on the organisation or person who has made the data available. By contrast, **Austria** hosts a parallel open data portal managed by the data.gv.at team for non-official data <sup>(229)</sup>.

### Assistance to data providers

All Member States (100 %) reported identifying data providers not yet publishing data on the national portal and taking practical action to assist them with their publication processes. Many national portal teams provide handbooks, training, consultations and individual support. For example, **Czechia** highlighted that it has an e-learning section on the national portal <sup>(230)</sup> and has held several live seminars and webinars in the past year. In **Germany**, through its Competence Centre for Open Data, the team has established a knowledge library that includes various guidelines, manuals and other materials gathered from all federal levels <sup>(231)</sup>. The team in **Slovakia** also provides guidelines that include lists of datasets that it considers each ministry must publish at a minimum <sup>(232)</sup>. In **France**, a team is dedicated to supporting data providers in setting up and implementing an open data strategy, including by providing help with publication on the national portal. The team routinely supports data providers and contributes to the documentation on using the platform.

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<sup>(229)</sup> [www.opendataportal.at](http://www.opendataportal.at).

<sup>(230)</sup> <https://data.gov.cz/vzdělávání/e-learning/>.

<sup>(231)</sup> [www.bva.bund.de/DE/Services/Behoerden/Beratung/Beratungszentrum/OpenData/Vorlagen-Hilfsmittel/vorlagen-hilfsmittel\\_node.html](http://www.bva.bund.de/DE/Services/Behoerden/Beratung/Beratungszentrum/OpenData/Vorlagen-Hilfsmittel/vorlagen-hilfsmittel_node.html).

<sup>(232)</sup> <https://wiki.vicpremier.gov.sk/pages/viewpage.action?pageId=67152323>.

### Regional and local data sources

The primary scope of national portals is making available data from providers at the national level. However, regional and local datasets hold granular and context-specific information on various topics. Indeed, 24 Member States (89 %) reported that regional and local portals in their countries provide open data. Regional and local datasets can be made discoverable on national portals to encourage their uptake and reuse. Note that in Member States such as **Malta**, a national portal is sufficient to make government open data discoverable due to the small size of the territory and its administrative structure. In 20 Member States (74 %), data from regional and local portals is made discoverable on the national portal. In some countries, such as **Latvia**, municipalities use the national portal directly and it is therefore not necessary to harvest metadata from other portals. On the Latvian national portal, there is a search option that visitors can use to look for a particular data publisher, including their local authority <sup>(233)</sup>. **Bulgaria** emphasised that its open data policy is centralised to encourage data publishers to adopt the national approach. Therefore, the national open data portal serves as a unified platform for publishing open data in one place. All public sector organisations (central, regional and local) within the scope of the Access to Public Information Act must create a profile on the national portal. Citizens and non-governmental organisations can also publish data on it through their personal profiles.

### Access to real-time and dynamic data

Dynamic data changes asynchronously over time and is periodically updated as new information becomes available; an example would be weekly unemployment data. Real-time data is data that changes and needs to be updated at frequent intervals. Examples of real-time data include air quality measurements, real-time weather updates, transport details and traffic statistics. Such data is essential for several reuse cases, such as applications for optimising navigation in congested traffic or economic modelling.

In 2023, 24 Member States (89 %) stated that they offered real-time or dynamic data on their portal. This is a decrease of one country compared with 2022, with **Malta** not responding to the question in 2023. Typically, 1–10 % of metadata on national portals links to real-time or dynamic datasets, as is the case in 14 Member States (52 %). In **Estonia** and **Cyprus**, 21–30 % of the national portal metadata refers to real-time or dynamic datasets. In **Greece**, **Malta** and **Slovenia**, this applies to more than 30 % of datasets on the national portal. The distribution is similar to last year.

## 3.4. Portal sustainability

This indicator examines the plans and processes in place to ensure the enduring viability of national portals. This includes the measures taken to enhance the visibility of the national portal, efforts to track user satisfaction and adapt to user feedback, and processes to monitor and improve the national portal's performance.

### Strategy and visibility

A core measure to ensure the sustainability of national portals is having in place a strategy or action plan listing the activities and mechanisms required for the long-term operation of the portal. In 2023, all Member States (100 %) reported that they had a strategy to ensure their portal's sustainability. As in 2022, 21 Member States (78 %) had included a description of the portal's target audience and measures to reach this audience in the strategy. Such plans typically include securing funding, retaining

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<sup>(233)</sup> <https://data.gov.lv/dati/lv/organization>.

essential team members, sustaining public engagement and ensuring that the portal addresses the requirements of its primary audience. In many Member States, the national portal is a pillar of the national open data policy or strategy. For example, **Sweden** highlighted that it considers the portal a practical arrangement that has helped to facilitate the transposition of the open data directive into Swedish law. Its portal is also part of the national digital infrastructure for API management, API catalogues, data access and interoperability support.

Ensuring the long-term sustainability of national portals also necessitates actively engaging with users and encouraging them to take up open data from the portal for their reuse cases. All Member States with the exception of **Malta** (96 %) indicated that they took action to enhance the visibility of the national portal by promoting the available features and data. These efforts often include events such as conferences, webinars, interviews, hackathons and collaborative working groups. In addition to these efforts, activities intended to increase engagement include creating editorial content, such as news articles, newsletters, promotional campaigns, success stories, press releases and social media initiatives.

For example, in **Lithuania** some of the team's promotional actions include:

- open data workshops (both open to the public nationwide and with targeted groups);
- press releases on the national coordinator website, social media accounts, etc.;
- communication with registered portal users (open data news, event invitations, etc.);
- creating a channel for open data enthusiasts in MS Teams;
- making announcements about newly opened datasets.

Furthermore, **France** mentioned that it highlights the key datasets published on the platform through editorial content, including:

- publishing an article every month to showcase the most important publications (datasets or reuses) of the past month;
- offering a subscription to a newsletter;
- posting other articles on the portal about new datasets;
- enabling users to receive notifications when new datasets become available on the national portal (RSS feeds, Atom feeds, email notifications, etc.);
- organising every 6 months a public demonstration of the team's current work and what to expect over the next 6 months;
- ensuring that the portal is active on social media.

Regarding social media presence, 23 national data portals (85 %) have social media accounts to communicate with the public and promote open data. X (formerly Twitter) remains the most popular platform for communication, promotions and awareness raising (17 national portals). Facebook (13 national portals) and LinkedIn (8 national portals) are runners-up as the most-used platforms. Some national portals also have YouTube accounts (5 national portals), and **Austria** and **Slovenia** have Instagram pages. Most national portals are present on more than one social media platform. In some countries, such as **Denmark** and **Portugal**, the national portal does not have a separate account but shares content through the agency that manages it. In other countries, such as **Estonia** and **Slovakia**, members of the open data team post in open data groups on Facebook, although the portal itself does not have its own social media account.

Furthermore, as in 2022, 25 national portal teams (93 %) stated that they enhanced the visibility of their work by publishing source code and other relevant documentation and artefacts. Of those, 20 national teams use sharing platforms such as GitLab or GitHub to publish the content and reach developers in the field.

## User satisfaction

A sustainable portal is one that continues to meet users' needs. A total of 11 national portal teams (41 %) indicated that, to understand these needs and gauge user satisfaction with the portal, they had conducted a satisfaction survey in the past year. This is a similar number to last year. **Ireland**, for example, has an ongoing user survey that is initiated when a person downloads a dataset. In addition, a major survey on the impact of open data in Ireland was launched last year, including a section on the effectiveness of the national portal. Another example is **Sweden**, which surveyed the national data portal's community in November 2022 after launching a beta version. The responses helped to identify areas for further improvements in editorial content and functionality. A follow-up user experience assessment was conducted in May 2023. In addition to surveys, countries also measure user satisfaction through interviews, contact forms and email correspondence.

It is essential to consider users' evolving needs by reviewing and continuously improving the portal and its functionality. In 2023, 26 Member States (96 %) indicated that they had a process for reviewing and enhancing the national portal. This is an increase from 25 Member States in 2022, with **Slovakia** now stating that it had carried out an analysis of the portal and the published datasets<sup>(234)</sup>. The Slovakian national portal team also plans to set up a portal user survey in 2023 as part of a new methodology on open data impact and reuse. While **Latvia** has previously made improvements to its portal based on suggestions from the authorities and on the initiative of the portal manager, the portal has not been upgraded for some time.

Regarding the frequency of portal reviews, 12 national portal teams (44 %) reported conducting a review quarterly. The remainder tend to review the portal biannually (6 national portals; 22 %) or annually (8 national portals; 30 %). Only **Romania** conducts a review less frequently than annually.

To review the national portal, the open data team in **Cyprus** holds biannual meetings during which development work is scheduled. The decisions made are driven by:

- improvements prioritised by the project team;
- requirements and issues raised by portal users;
- available updates for DKAN<sup>(235)</sup>, the open-source data management platform upon which the national portal is built.

In **Germany**, a strategic workshop for members of the national portal team is held annually to outline the desired development work for the portal for the coming year. The team then also has a planning meeting with its technical provider. **Ireland** also decides on a schedule of enhancements with its technical supplier at the beginning of each year. The list of possible enhancements is based on user experience and best international practices. Throughout the year, the Irish open data team meets with the technical supplier fortnightly, reviews the progress of the portal updates and agrees to any additional enhancements or changes. These changes might address feedback received through the portal or issues / potential improvements that have come to the attention of the open data team. **France** also continually develops its portal in an agile manner using 2-week sprints with transparent documentation of backlog<sup>(236)</sup>. **Belgium** conducts a full review every 6 months and may carry out minor fixes or make small enhancements in between reviews. The fixes are listed on its GitHub. **Italy** updates its portal every 2 years, with minor improvements released regularly / as needed.

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<sup>(234)</sup> [https://www.minv.sk/?ros\\_vsetky-spravy&sprava=analiza-zverejnenych-datasetov-ustrednych-organov-statnej-spravy-za-rok-2022-dostupna-na-pripomienkovanie](https://www.minv.sk/?ros_vsetky-spravy&sprava=analiza-zverejnenych-datasetov-ustrednych-organov-statnej-spravy-za-rok-2022-dostupna-na-pripomienkovanie).

<sup>(235)</sup> <https://demo.getdkan.org/>.

<sup>(236)</sup> <https://github.com/orgs/etalab/projects/6>.



Furthermore, 25 Member States (93 %) reported that they considered users' feedback on the national portal in the review process. Only **Croatia** and **Portugal** indicated that they did not incorporate user feedback into the review process. A change from last year is that **Slovakia** stated that it had considered user feedback when building a new portal. A further example is **France**, where the open data portal team routinely gathers user feedback and includes it in the portal's development process. France also routinely consults a pool of beta testers to gather feedback on new features.

The national team in **Ireland** additionally uses various events, such as the Open Data Impact Series, to gather user feedback. At these events, users often request features or make suggestions for the portal. These suggestions are collated, reviewed and, where possible, included in the work programme for portal updates.

Another example is **Luxembourg**. The national open data team collects user feedback about datasets and the national portal features in the dedicated sections of each dataset's subpage and by email. This feedback is considered when evaluating future actions to improve the portal. More specifically, the team prioritises user feedback on data availability and quality, and collaborates directly with data providers to make improvements.

### Monitoring performance

To understand how national portals are developing, national teams need to monitor characteristics such as the number of available datasets, the distribution of datasets across categories and the availability of real-time data, and how these have changed over time. Reports on the portal's performance and usage can also serve as evidence to justify ongoing initiatives and investments. To monitor performance, 22 national portals (81 %) have a monitoring tool such as a dashboard to display key performance indicators. **Lithuania** recently introduced a dashboard feature and is testing its implementation in the modernised version of the portal <sup>(237)</sup>. In addition, its portal can provide reports containing statistics on datasets and their use by thematic category. **Slovakia** planned to launch a dashboard as part of its new portal by the end of 2023. Some countries, such as **Portugal**, have internal dashboards for portal administrators.

As a further example, **Belgium** shows the distribution of datasets across categories and file formats as part of its metadata quality reports. **Cyprus**'s dashboard offers a real-time overview of the portal's traffic and the published data's characteristics, such as the distribution of datasets across themes, publishers, formats, etc. <sup>(238)</sup>. **Ireland** measures several metrics <sup>(239)</sup> and produces a number of reports, including on the portal data's characteristics, using information from its quality assurance validator <sup>(240)</sup> and KPI reports <sup>(241)</sup>. **Slovenia** communicates similar information through annual reports <sup>(242)</sup>, although certain information is available only internally to the open data team. This is true also in **Croatia**, which monitors the number of visitors, how this number changes over time and which datasets are most frequently accessed using Google Analytics. This information is available only to the portal administrators. However, information on the number of datasets published, distribution across categories, number of datasets per institution and number of datasets meeting the criteria for Tim Berners-Lee's 5-star model of openness is made public.

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<sup>(237)</sup> <https://test.data.gov.lt/datasets/stats/category/>, <https://test.data.gov.lt/datasets/stats/frequency/> and <https://test.data.gov.lt/datasets/stats/format/>.

<sup>(238)</sup> [https://www.data.gov.cy/dashboard\\_EL](https://www.data.gov.cy/dashboard_EL).

<sup>(239)</sup> <https://data.gov.ie/stats>.

<sup>(240)</sup> <https://data.gov.ie/qa-report>.

<sup>(241)</sup> <https://data.gov.ie/kpi-report>.

<sup>(242)</sup> <https://podatki.gov.si/sites/default/files/reports/poro%C4%8Dilo%202022.pdf>.

In addition to the portal's general performance, monitoring the performance of data providers can help to improve the amount and quality of data offered through national portals. Such monitoring tools have the potential to foster constructive competition among data providers, motivating those with poorer performance to improve the quantity and quality of their data. The information gathered can also help in identifying top-performing data providers and facilitate the establishment of knowledge-sharing avenues between them and other publishers. In certain instances, these features can also enable data providers to gauge their datasets' popularity and gain insights into the type of reuse cases for which their data is used.

In 2023, 26 Member States (96 %), all except **Hungary**, reported that their national portals offered features enabling data publishers to monitor their performance. This is an increase from 22 national portals (81 %) in 2022. For example, **Germany** uses a Shapes Constraint Language validator <sup>(243)</sup> and offers data providers links to web pages that can help them to improve their metadata quality and performance on the national portal <sup>(244)</sup>. Similarly, **Croatia** uses a metadata quality assurance tool that shows statistics about each publisher, and every publisher can view statistics on their general performance and compare them with those of their peers or other institutions. **Spain** notes that its portal has a back office allowing publishers to act on the feedback that they receive <sup>(245)</sup>. The most relevant functionalities available are:

- a federation management console through which publishers manage and schedule automatic data federation (harvesting) tasks;
- a tool that enables publishers to see the results of the periodic broken link checks that the platform performs on the published distributions;
- an overview of data availability, which makes it possible to manage data requests received by publishers, provide feedback to users and change the status of each request based on the availability of new datasets;
- a comment management functionality that can be used to respond to user comments on datasets;
- a user management tool, which helps publishers to manage user accounts authorised to interact with the portal.

Detailed information on the performance of the portal and publishers can also aid the national portal teams in their activities. For example, **Estonia** mentions that its monitoring in this regard is an excellent tool for the portal team to use to observe how often datasets are being published and which datasets are being published, which helps the team to see which categories may need more attention, as fewer publications may indicate a problem. The **Netherlands** uses these statistics to steer its production of content such as impact stories and its social media activities, and to assess the need for support pages. From the Dutch team's perspective, the statistics should indicate that users are successfully able to find data without seeking help.

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<sup>(243)</sup> <https://www.w3.org/TR/shacl/>.

<sup>(244)</sup> <https://www.itb.ec.europa.eu/shacl/dcat-ap.de/upload>.

<sup>(245)</sup> <https://www.youtube.com/watch?v=5v3oHbwrL8I&t>.

### 3.5. Overall EU Member State performance

On average, the EU Member States scored 85 % on the portal dimension in 2023 (Figure 36). This is a 2 pp increase on the average score in both 2022 and 2021. Average performance in the portal dimension has grown steadily from 63 % in 2018. This dimension has consistently been the second-highest scoring among the four dimensions included in the ODM assessment, and this year it is 4 pp lower than the first-ranking policy dimension.

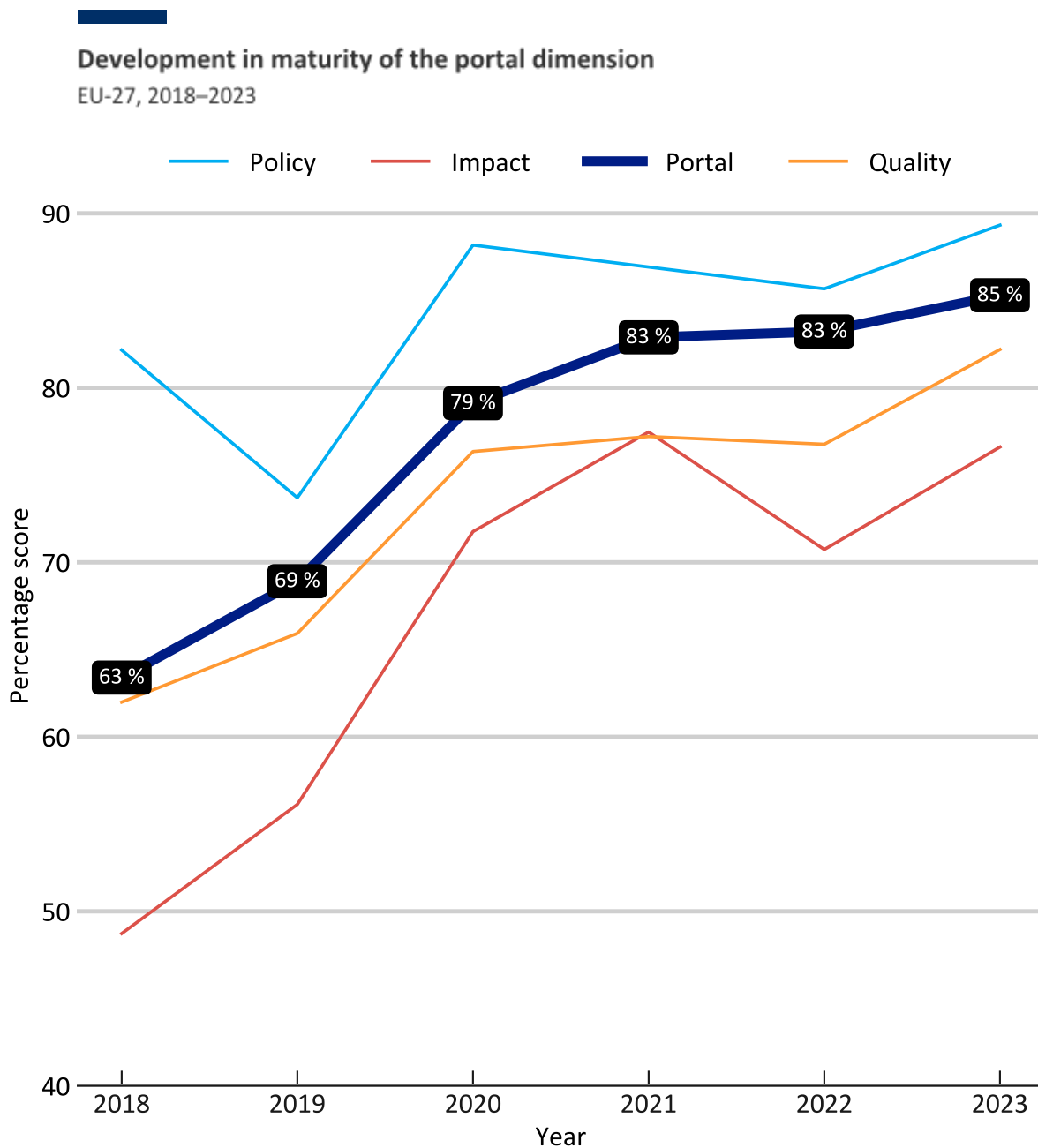


Figure 36: Average performance of the EU-27 on the portal dimension since 2018

All the indicators of the portal dimension, except portal features, showed improvement from the previous year (Figure 37). Portal usage is the highest-scoring indicator and had the second-largest year-on-year improvement, reflecting that the national portal teams are putting efforts into understanding who their users are and why they are visiting the portal. The data provision indicator increased the most compared with 2022 (+ 6 pp), indicating that even more data is being made available to reusers on open data portals. However, the data provision indicator is still the lowest-scoring indicator of the portal dimension. Renewed efforts are needed to encourage public sector data providers at all levels of government to contribute their data to national portals. Continued efforts are also required to handle other data sources, such as citizen-generated data and data held by local and regional public bodies.

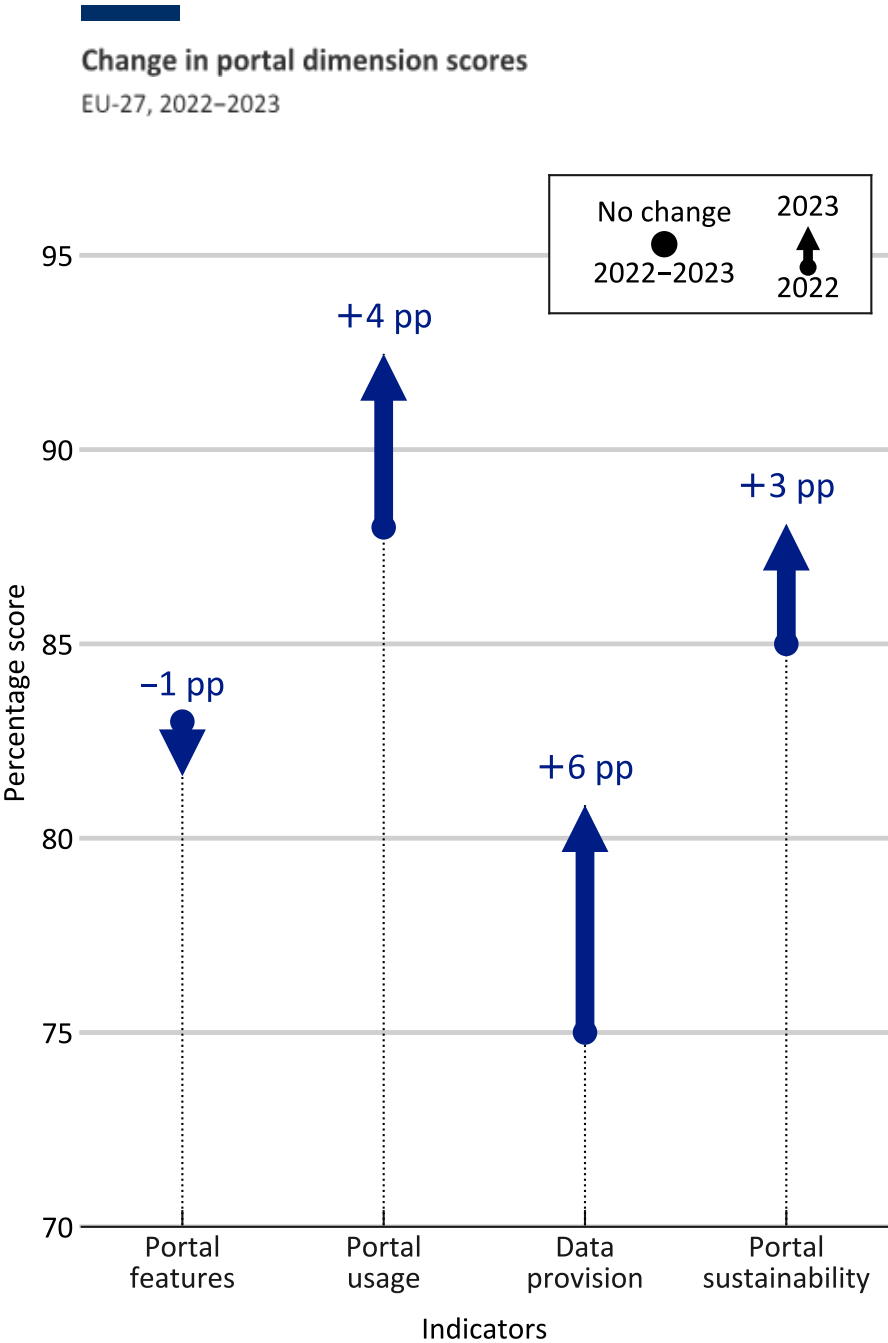


Figure 37: Average change in the portal dimension indicators for the EU-27 between 2022 and 2023

Each Member State has a unique scoring distribution on the indicators (Figure 38). Overall, improvement efforts should be directed towards the data provision and portal features indicators, as these tend to be the lowest-ranking indicators for most countries. In addition, countries that score less than 85 % on the portal usage and portal sustainability indicators should accelerate their efforts to move closer to the EU-27 average, which shows a significant degree of maturity in relation to these indicators.

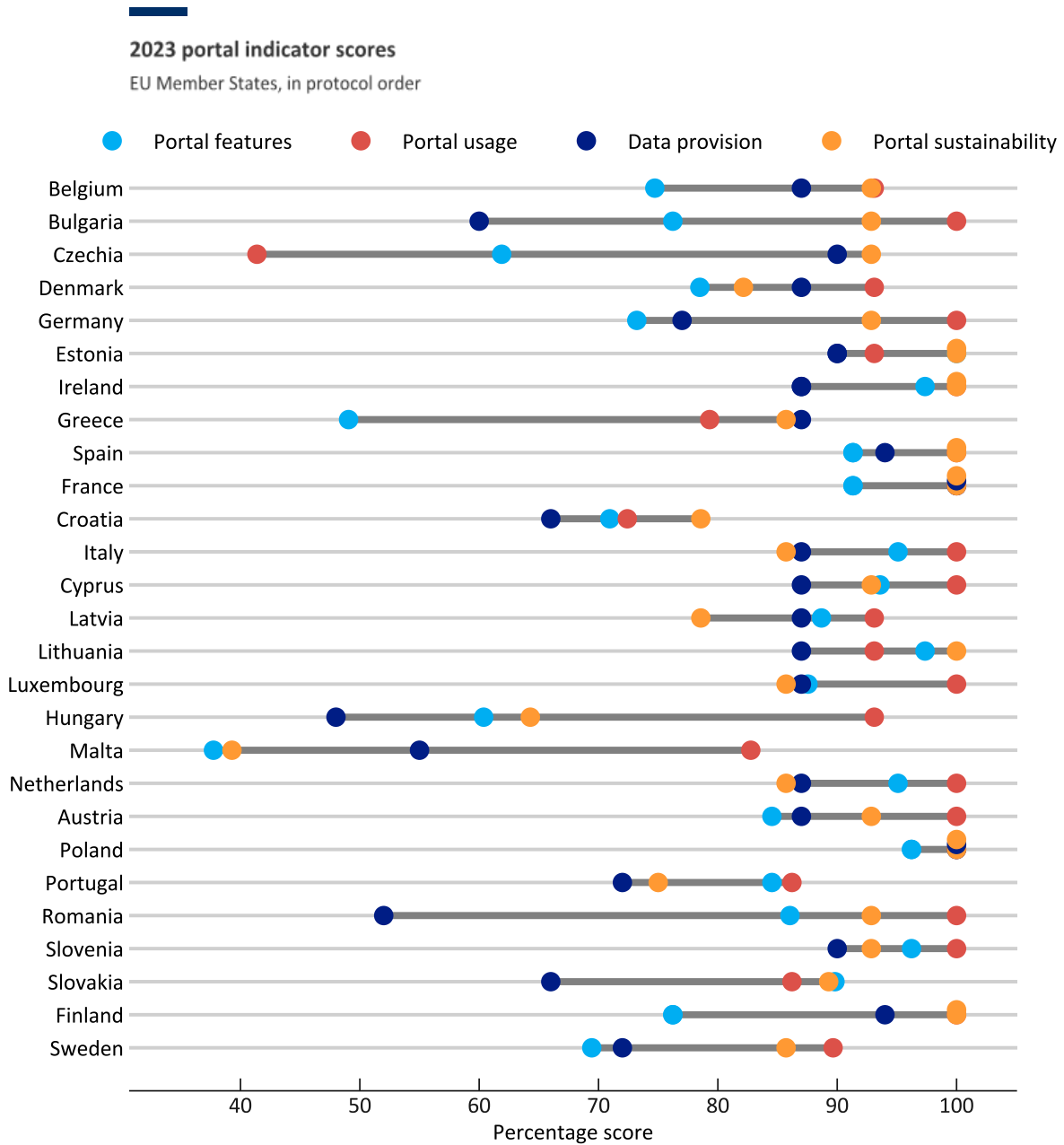


Figure 38: Portal indicator scores for each EU Member State

In terms of individual country performance, **Poland** (98.5 %), **Estonia** (96.9 %) and **Ireland** (96.9 %) rank in the top three in this dimension (Figure 39). **Slovakia** (+ 39 pp) and **Latvia** (+ 26 pp) had the most significant increases in the rankings compared with 2022. **Malta** showed a 4 pp improvement on the previous year but still falls behind the other Member States. Overall, 12 Member States decreased in score on this dimension, typically by only a few percentage points, compared with 2022. This finding should be a reminder that continued efforts are needed to deliver an excellent portal to citizens so that users can find what they need and ultimately create impactful reuse cases.

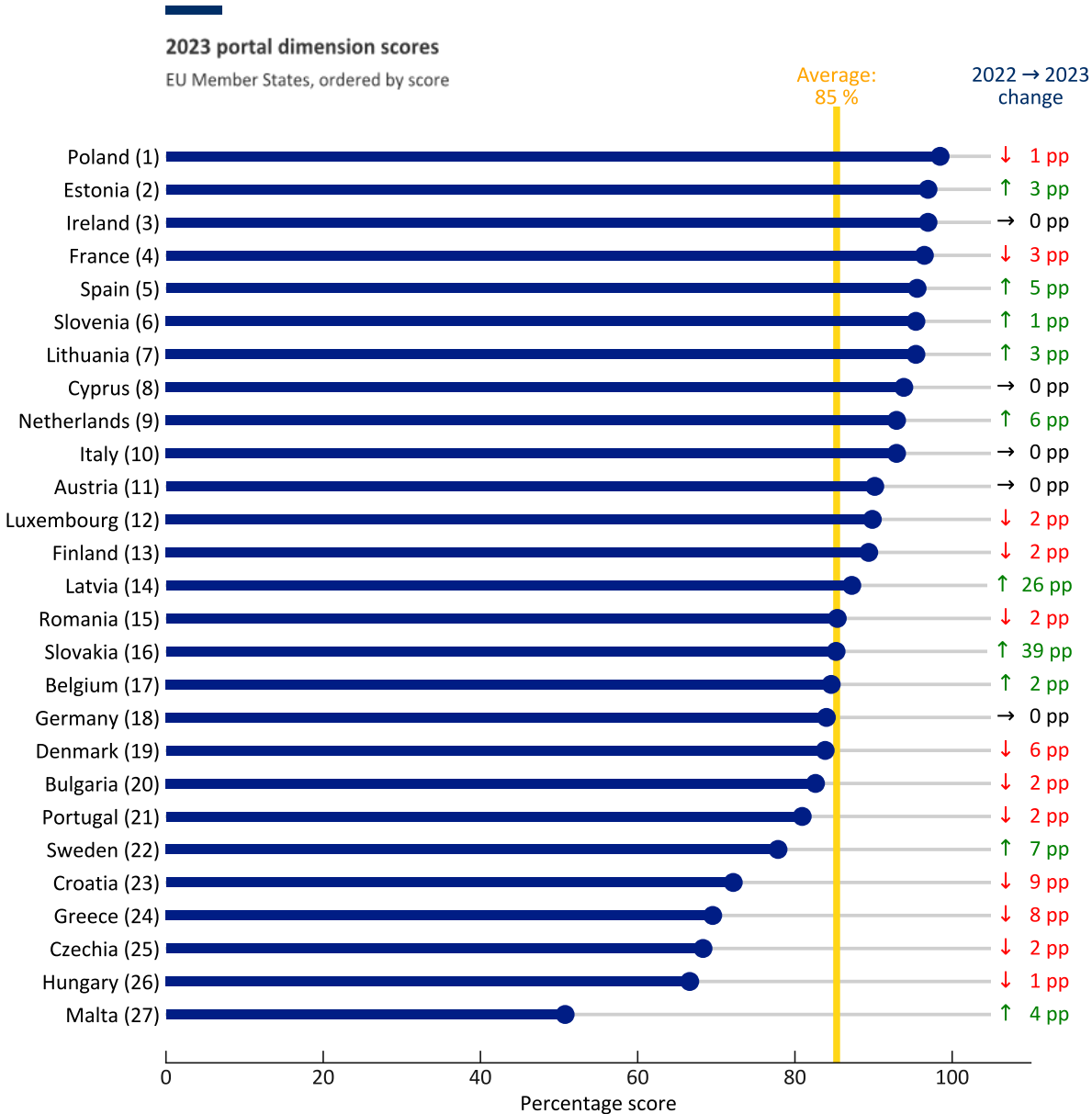


Figure 39: EU Member State scores on the portal dimension

## B. European Free Trade Association countries

### Portal features

National open data portals are in place in all three participating EFTA countries: **Iceland** (<https://opingogn.is>), **Norway** (<https://data.norge.no> and <https://datafabrikken.norge.no>) and **Switzerland** (<https://opendata.swiss/en/>). All the national portals offer users advanced data search functions, the ability to search by file format or data domain and the ability to download datasets. The ability to download datasets is a new functionality on **Iceland's** portal. Furthermore, all three participating EFTA countries offer users a way to query metadata programmatically. **Norway** provides a SPARQL endpoint, whereas **Iceland** and **Switzerland** offer APIs.

As in 2022, **Iceland** and **Norway** reported that they had a general feedback mechanism and dataset-level feedback mechanisms for users. All three countries reported that their national portals did not provide a mechanism for users to rate datasets. Only **Norway** offers users the possibility to request datasets through the national portal, although the team typically receives less than one request a month. **Norway** also reported that it presents the data requests it receives on the national portal in a transparent manner. **Iceland** said that it provides the contact details of data providers in the metadata of each dataset, allowing users to contact the provider with specific requests.

**Norway** and **Switzerland** offer a preview function for tabular and geospatial data. In terms of geospatial data, Norway has its own geoportal. Its national portal is a metadata-catalogue and does not contain actual data. These two countries also have a dedicated section on their national portals to showcase reuse cases, which are linked to the datasets used. Users can submit their own reuse cases for publication.

### Portal usage

All three participating EFTA countries perform activities to gain insights into the national portal's usage and use these insights to improve the portal. In **Iceland**, the team uses Plausible's web analytics tool; **Norway** uses Google Analytics and surveys; and **Switzerland** uses Matomo for web analytics. The national open data teams reported approximately 120 000 unique visitors per month to **Iceland's** portal (compared with 230 000 in 2022), about 8 000 visitors per month to **Norway's** portal (compared with 11 500 in 2022) and about 21 000 to **Switzerland's** portal (compared with 17 000 in 2022). In addition, the three national portal teams monitor what keywords are used to search for data and content, as well as what the most and least frequently consulted pages are.

On all three portals, metadata is available in a clear language that is readable and understandable to humans and machines. Furthermore, **Iceland** and **Norway** run analytics on API usage and whether metadata describing the datasets is accessible via an API. On **Iceland's** portal, 100 % of traffic is generated by API usage only. The amount of traffic generated by API usage is unknown for **Norway's** and **Switzerland's** data portals. This is the same as last year.

### Data provision

As in 2022, approximately half of public sector data providers contribute data to the national portal in **Norway** and **Switzerland**. In **Iceland**, only a few public sector data providers contribute. The team in Iceland points out that the national portal was launched only in 2021 and is a work in progress. In Switzerland, a law regulating the provision of open government data at the federal level will come into force on 1 January 2024 (currently, participation is encouraged through various open data strategies). Therefore, the team expects to have the majority of data providers at the federal level contributing to the portal within the next 4 years. Furthermore, all the EFTA countries assist data providers with their

publication processes. For example, the national data portal in **Norway** has a team dedicated to engaging with data providers. The Norwegian Digitalisation Agency has also launched a national toolbox for data sharing.

**Norway** and **Switzerland** reported that their national portals harvest local or regional data sources and that the harvesting process occurs automatically. Furthermore, all three national portals include real-time or dynamic datasets. More than 30 % of the metadata links to such data in **Iceland** and **Norway**. In **Switzerland**, this number is between 1 % and 10 %. This is similar to the situation in 2022.

### Portal sustainability

As in 2022, all the participating EFTA countries have a strategy to ensure the national portal's sustainability. **Iceland's** and **Norway's** strategy documents describe target audience groups and how to reach them. All three participating EFTA countries take action to promote the national data portal's activities and the available open data. For example, **Switzerland's** portal team has an active presence on social media to promote new publishers and new datasets, and it tweets about interesting datasets (#datasetoftheweek) and events. Each country also makes its portal's source code and relevant documentation available to the public.

**Norway** and **Switzerland**, but not **Iceland**, have a process to review and improve their national portals regularly. In **Norway**, these reviews are undertaken quarterly; in **Switzerland**, they take place biannually. **Norway** and **Switzerland** have also conducted a user satisfaction survey in the past year. The results of **Norway's** survey revealed that users are sometimes confused by the concept of a metadata-catalogue and expect to find the actual data on the national portal. Respondents to **Switzerland's** survey requested improvements to the search function (35 %), the preview function (27 %), the description of data/metadata (27 %) and the filter function (24 %) <sup>(246)</sup>.

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<sup>(246)</sup> [https://opendata.ch/news/opendata-swiss-empfehlungen-auf-basis-der-umfrageergebnisse/#pll\\_switcher](https://opendata.ch/news/opendata-swiss-empfehlungen-auf-basis-der-umfrageergebnisse/#pll_switcher).



### Overall European Free Trade Association country performance

In 2023, the EFTA average maturity score on the portal dimension was 78 % (Figure 40). The three countries experienced only slight changes (of between 1 pp and 3 pp) in their scores compared with the previous year. **Norway** remains the most mature (95.7 %) among the EFTA countries in the portal dimension. **Switzerland** had the biggest year-on-year increase in its score (+ 3 pp), while **Iceland** saw a slight year-on-year decrease of about 2 pp.

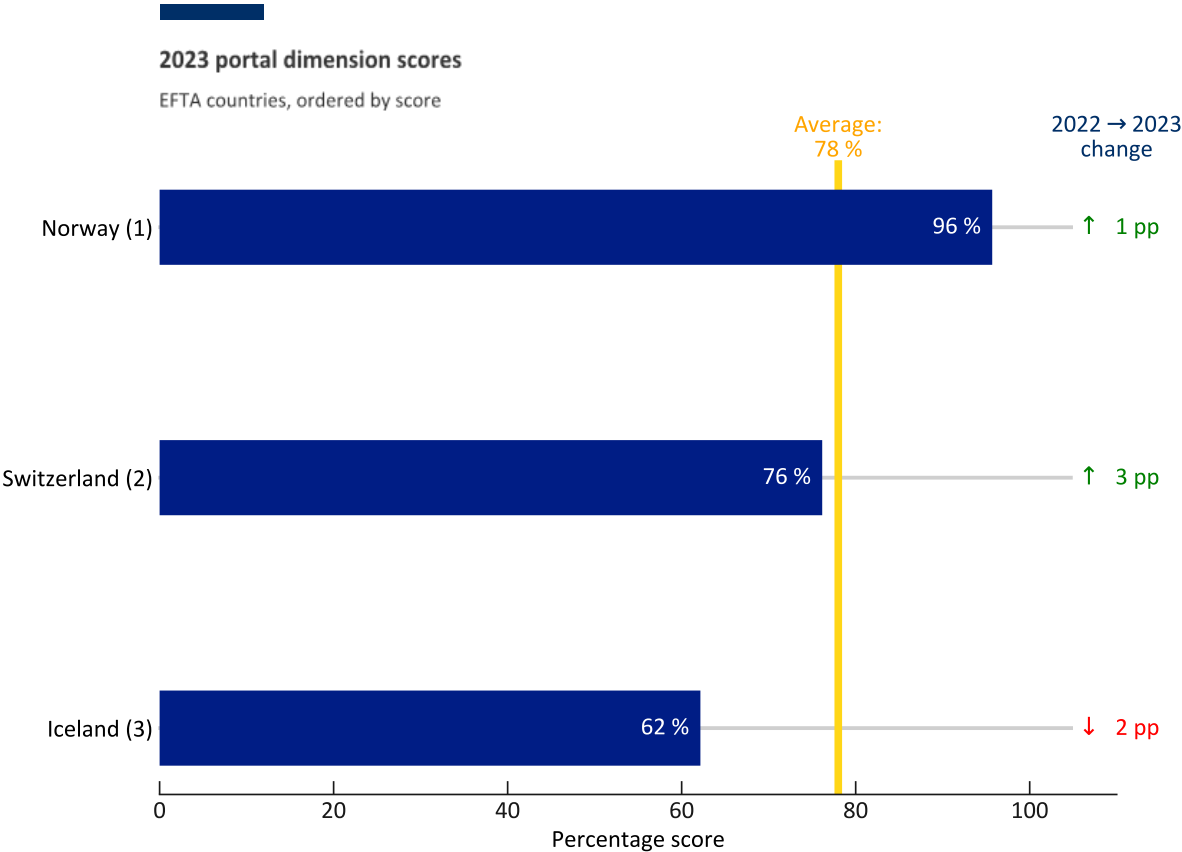


Figure 40: EFTA country scores on the portal dimension

Regarding scoring distribution on the indicators (Figure 41), **Norway** scores high on all four indicators. **Iceland** has a large variance, scoring much higher on the portal usage indicator than on the other three. In general, the three EFTA countries perform well on portal usage. The portal features and data provision indicators tend to be the lowest-scoring indicators (except for **Switzerland**, which scores relatively high on data provision). These indicators could, therefore, be areas of focus for improvement.

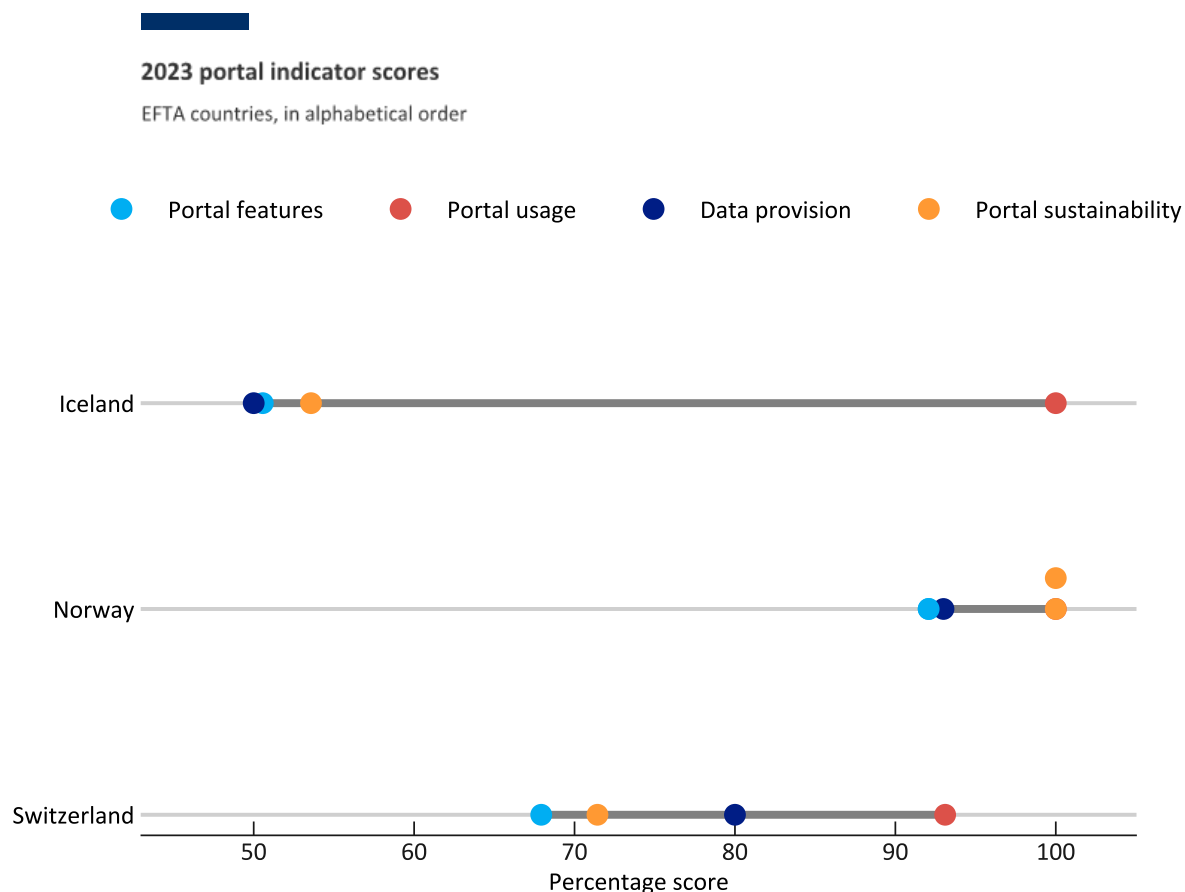


Figure 41: Portal indicator scores for each EFTA country

## C. Candidate countries

### Portal features

National open data portals are in place in four of the participating candidate countries (80 %): **Montenegro** (<https://data.gov.me>), **Albania** (<https://opendata.gov.al/en>), **Serbia** (<https://data.gov.rs>), and **Ukraine** (<https://data.gov.ua/en>). **Bosnia and Herzegovina** does not currently have a national portal. **Montenegro's** national portal faced a cyberattack during the data collection phase of this year's ODM assessment, so some answers about the national portal (e.g. evidence provided in the form of URLs) could not be verified. The research team referred to Montenegro's 2022 ODM questionnaire in these instances.

The four countries with an open data portal offer users advanced data search functions, the ability to search by file and data domain and the ability to download datasets. In addition, **Serbia** and **Ukraine** offer users a way to query the metadata programmatically through APIs. The portals in **Albania**, **Serbia** and **Ukraine** support a preview function for tabular data, and those in **Montenegro**, **Albania** and **Ukraine** support a preview function for geospatial data.

**Albania** and **Ukraine** offer a general feedback mechanism on their national portals. Only **Serbia** and **Ukraine** offer a feedback mechanism at the dataset level. Furthermore, **Ukraine** is the only candidate country reporting that users have a feature to rate datasets (a ‘plus 1’ or ‘minus 1’ summary rating system).

**Serbia** and **Ukraine** offer users ways to request datasets through the national portal. Serbia’s portal connects to the government’s open data hub, which provides instructions on requesting datasets. However, no process exists for the national team to direct requests to the relevant data sources. Ukraine offers a portal feature that logged-in users can use to request datasets but points out that most users prefer to communicate (by email or other official means communication) directly with the Ministry of Digital Transformation or the data provider. In addition, **Serbia** and **Ukraine** have a designated area on their national portal to showcase use cases and allow users to submit their own use cases.

### Portal usage

All candidate countries with a national portal monitor the portal’s traffic and use analytics to better understand users’ behaviour and improve their portals. These countries also monitor what keywords are used to search for data on the portal and identify the most and least consulted pages. One of **Ukraine**’s most significant updates to the national portal was based on usage statistics. The team found that most portal users wanted to find applications and analytics based on open data and take courses to increase their skills, in addition to finding datasets. The CKAN<sup>(247)</sup> platform that the Ukrainian national portal uses could not offer a clear, user-friendly interface for these features. Therefore, the team separated its data store, analytics and portal performance modules and developed Diia.OpenData (<https://diia.data.gov.ua>), a national competence centre in the field of open data, which inherited code from the national portal.

Regarding unique portal visitors, **Montenegro** (before the cyberattack) measured around 1 200 visitors per month. **Albania** counted 940 visitors per month. **Serbia**’s portal had approximately 4 900 monthly visitors (compared with 28 000 in 2022), and **Ukraine**’s had 230 000 monthly visitors (compared with 180 000 in 2022).

**Montenegro**, **Serbia** and **Ukraine** also run analytics on API usage. API usage accounts for approximately 50 % of **Montenegro**’s portal traffic (before the cyberattack) and 50 % of **Serbia**’s portal traffic. In **Ukraine**, 87 % of portal traffic was generated by API usage. In all participating candidate countries except for **Bosnia and Herzegovina**, metadata is available on the national portal in a language that is readable and understandable by humans and machines.

### Data provision

In **Ukraine**, all public sector data providers contribute data to the national portal. In **Albania** and **Serbia**, approximately half of data providers contribute data. Furthermore, **Montenegro**, **Albania**, **Serbia** and **Ukraine** stated that they performed activities to support data providers with their publication processes. For example, in Serbia the Office for IT and eGovernment offers technical and other expert support to data providers wishing to publish open data and organises targeted training sessions and meetings. Montenegro similarly provides training to data providers. Ukraine has a curriculum that aims to improve the quality of datasets of central executive and local self-governing bodies.

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<sup>(247)</sup> <https://ckan.org/>.

Four candidate countries (all except **Montenegro**) have regional and local open data portals. However, only the regional and local portals of **Serbia** and **Ukraine** are also discoverable via the national portal, with the harvesting process occurring mostly automatically.

In **Albania**, **Serbia** and **Ukraine**, the national data portal includes real-time or dynamic datasets. These account for between 21% and 30 % of the metadata on Albania's portal, less than 10 % of the metadata on Serbia's portal, and between 11 % and 20 % of the metadata on Ukraine's portal.

### Portal sustainability

**Montenegro**, **Serbia** and **Ukraine** reported that they had a strategy in place to ensure the open data portal's sustainability. This is an increase of two countries compared with last year, when only Ukraine had such a strategy. Apart from **Bosnia and Herzegovina**, the countries perform activities to promote the availability of data on their portals. **Albania** indicated that it promotes its portal during events organised in TechSpace, the largest technology lab in Albania, funded by the Albanian government. The lab supports start-ups and students to deliver projects and ideas in the field of information and communications technology. The national data portal teams in **Albania**, **Serbia** and **Ukraine** are active on social media.

**Montenegro** and **Albania** have conducted a user satisfaction survey in the past year. The key findings from Montenegro were that the usability of datasets, including visualisation functions, and communication models require improvements. The main finding from Albania was the need for additional datasets on the portal, especially datasets related to businesses and their operations. Moreover, all countries apart from **Bosnia and Herzegovina** indicated they had a process in place to review the portal regularly. In **Montenegro**, **Serbia** and **Ukraine**, the review of the portal occurs annually, while it happens less frequently in **Albania**.

### Overall candidate country performance

In 2023, the average maturity score on the portal dimension for the participating candidate countries was 61 % (Figure 42). **Ukraine** remains the top performer, at 93.4 %, and **Serbia** and **Montenegro** saw considerable improvements compared with last year (both + 16 pp). **Albania** also experienced an increase in its score (+ 8 pp). However, **Bosnia and Herzegovina**'s score on the portal dimension fell significantly (– 20 pp). In 2022, Bosnia and Herzegovina had available a pilot portal with example datasets for testing; however, no portal was available this year for the research team to evaluate.

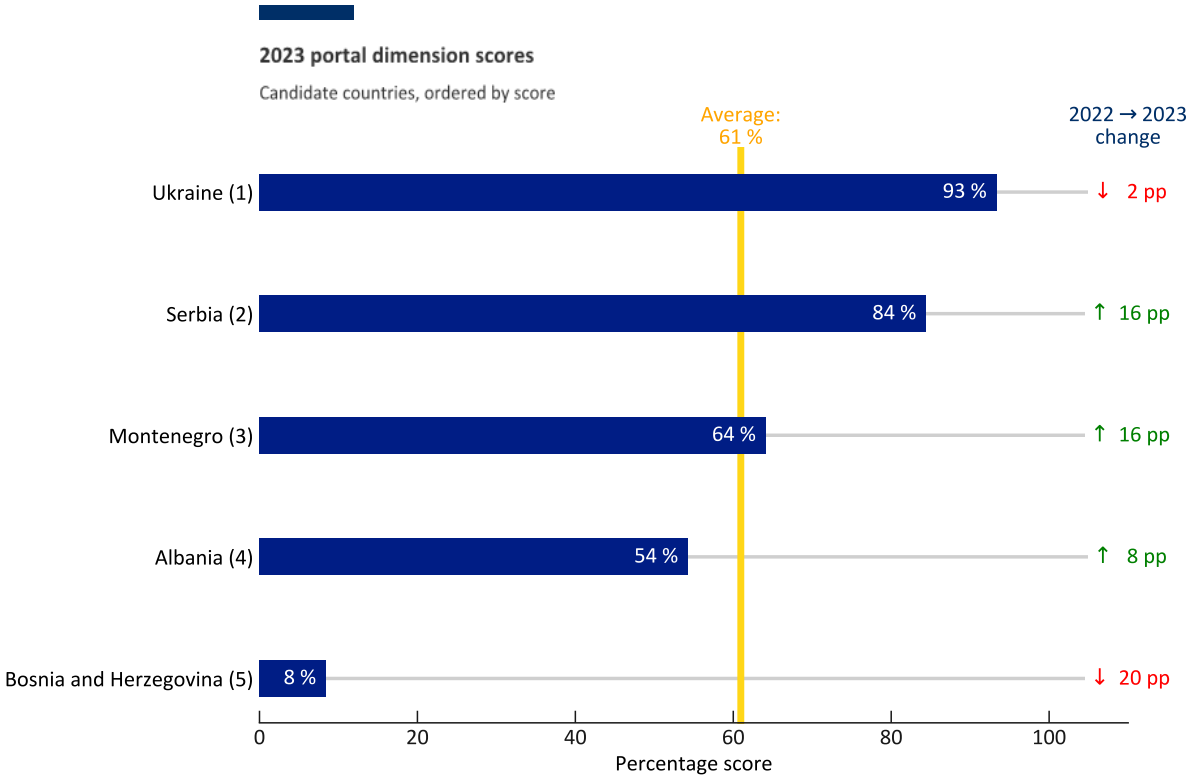


Figure 42: Candidate country scores on the portal dimension

Figure 43 shows the distribution of scores for each indicator of the portal dimension for the candidate countries. **Montenegro** and **Albania** have broad distributions, meaning that they do well on some indicators but score low on others. **Bosnia and Herzegovina**, **Serbia** and **Ukraine** have narrower distributions, meaning that they tend to perform consistently across the indicators. Typically, the candidate countries perform best on the portal usage indicator. In general, the portal features and data provision indicators tend to be the lowest-scoring indicators, and these could be focus areas for improvement (except for **Ukraine**, which scores highly on portal features, while **Albania** could also focus on portal sustainability).

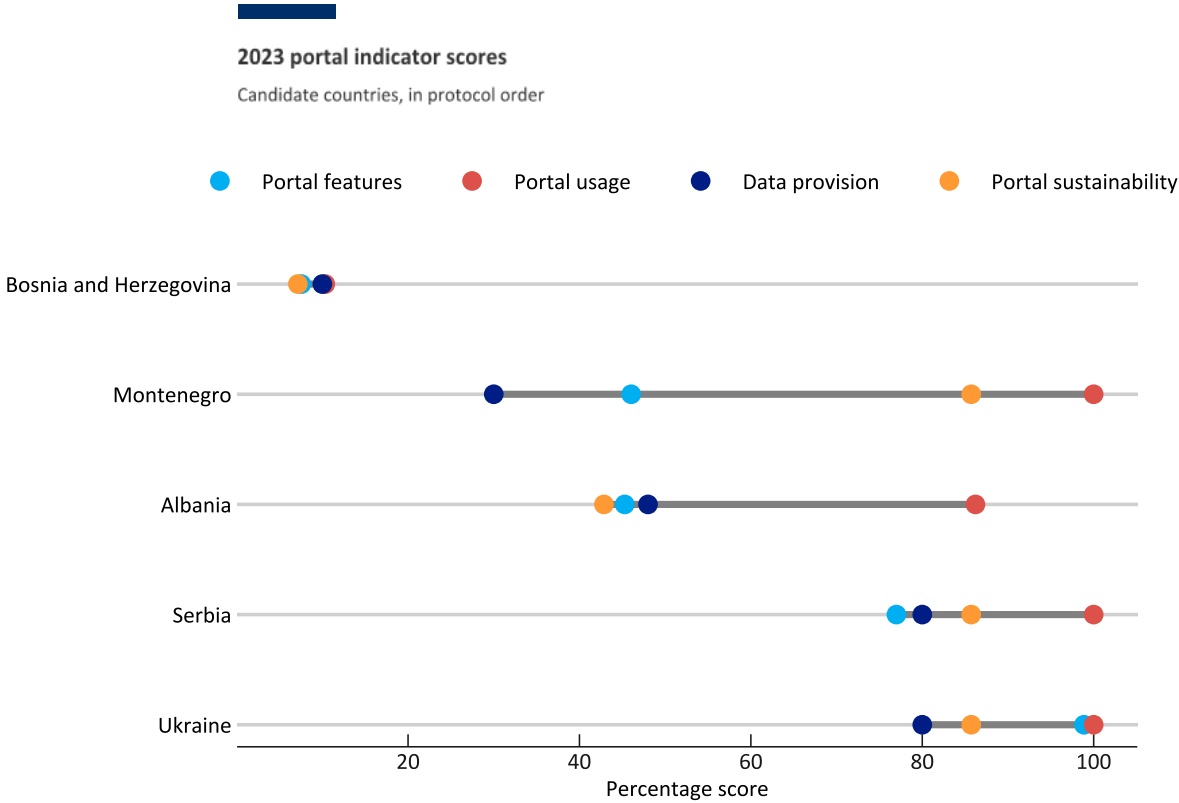


Figure 43: Portal indicator scores for each candidate country

## Chapter 6: Open data quality

When data is collected, procedures must be in place to process, clean and format it for its primary use. There may also be procedures to ensure that the collected data meets a certain standard of quality. To prepare this data for open publication, additional processing may be required to remove confidential information, using methods such as aggregation or anonymisation. The original dataset thus becomes suitable to be distributed and reused by others.

The quality of the data refers to the overall state of the dataset<sup>(248)</sup>. Preparing high-quality data includes dealing with missing values and other inaccurate elements, harmonising data structures and making the data available in accessible formats (e.g. HTML, CSV, GIF). 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 such as author, date and keywords. Specifications such as DCAT-AP<sup>(249)</sup> (which was designed to describe public sector datasets in Europe and is, therefore, the reference specification in the ODM 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. High-quality data is, therefore, more likely both to be taken up for reuse and to create impact.

The **quality** dimension of the ODM assessment encourages national portals to publish datasets with high data and metadata quality. The ODM methodology emphasises metadata quality, since national portals aim to make datasets discoverable and harvest metadata; the underlying data quality is the responsibility of data publishers. The ODM methodology nonetheless 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 compliant with the DCAT-AP metadata standard and several deployment quality requirements. Table 14 summarises the key elements of the quality dimension.

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<sup>(248)</sup> <https://op.europa.eu/en/publication-detail/-/publication/b601d9cc-b3c0-11ec-9d96-01aa75ed71a1/language-en/format-PDF/source-276052107>.

<sup>(249)</sup> <https://joinup.ec.europa.eu/collection/semantic-interoperability-community-semic/solution/dcat-application-profile-data-portals-europe/release/11>.

Table 14: Indicators of the quality dimension

Indicator	Key elements
<b>Metadata currency and completeness</b>	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 a minimum of delay on the national portal. The portal provides access to a vast range of data, both historical and contemporary. Preparations are under way to ensure that high-value data is interoperable with high-value datasets from other countries.
<b>Monitoring and measures</b>	Mechanisms are in place to monitor metadata quality on the national portal, as well as its 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.
<b>DCAT-AP compliance</b>	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.
<b>Deployment quality and linked data</b>	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.

The following sections discuss each group of countries separately: (A) EU Member States, (B) EFTA countries and (C) candidate countries. Further detail on the indicators is provided in the analysis of the EU-27. The sections on the EFTA and candidate countries discuss the dimension and indicator results of these two groups.

## A. EU Member States

### 6.1. Metadata currency and completeness

This indicator assesses the extent to which countries have a systematic approach to ensuring 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 a minimum of delay on the portal where the dataset is made discoverable. Furthermore, the completeness of data that has a time component and preparations to ensure that high-value datasets are interoperable with other datasets on the portal are also evaluated by this indicator.

#### Currency and completeness

In 2023, 21 Member States (78 %) indicated that, on average, the metadata describing the datasets available on the national portal was updated within a day from when its primary source was updated. This is an increase of one Member State, **Hungary**, which now updates metadata on its portal within a day, up from within a week in 2022. Furthermore, in five Member States (18 %) – **Belgium, Denmark, Croatia, Italy** and **Austria** – the metadata is updated within a week, on average. Only **Romania** reported that updating the metadata on its portal took longer than a week on average.

Timely updates to metadata are ensured by having a predefined approach in place that is aided by automatic harvesting processes. A total of 26 Member States (96 %) reported having a predefined



approach to ensuring that metadata is kept up to date, a steady increase from 89 % in 2022 and 85 % in 2021. Only **Bulgaria** did not indicate having such an approach. Overall, this steady progress over the years demonstrates that systems for updating metadata are becoming more systematic and ingrained in national portals' working processes. Up-to-date metadata on national portals is crucial for users to obtain correct information about the data. However, some countries indicated that it was the responsibility of the original sources and providers of datasets, namely government institutions with the support of national teams, to ensure that the metadata was kept up to date.

In **Austria**, there is a structured approach to ensuring that metadata is kept up to date and consistent with the requirements of individual datasets. The approach has several components.

- **Data stewardship.** Each dataset is assigned to a data steward responsible for its upkeep.
- **Time-triggered updates.** Some datasets have predefined schedules for updates, which are built into the system to prompt the responsible data steward automatically.
- **Event-triggered updates.** Other datasets are updated when specific events occur (e.g. legislative changes or significant weather events).
- **User feedback mechanism.** Users can report issues with the metadata, which are then reviewed and acted upon.
- **Cooperation Open Government Data Austria Forum.** This serves as a platform for data providers and stakeholders to discuss best practices, challenges and methods of keeping data and metadata up to date.
- **Quality checks.** Automated and manual quality checks are performed to ensure metadata accuracy.
- **Documentation.** Best practices and guidelines on metadata updating are documented and provided to all data stewards and contributors.

In **Portugal** the metadata is automatically generated by actions on the datasets. Two primary forms of data registry ensure that the metadata is updated. These are through portal APIs <sup>(250)</sup>, where the data and metadata are updated, and through harvesting <sup>(251)</sup>. Another example is **Slovakia**, where the SPARQL endpoint enables data stewards to track metadata quality using predefined or custom queries.

### Automatic metadata sourcing

Ensuring that metadata is kept up to date depends in part on the extent to which metadata is obtained automatically from the data's source. In 2023, 14 Member States (52 %) reported obtaining 90 % or more of datasets' metadata automatically from the source (Figure 44). This overall number has been stable since 2022, although there have been changes in the underlying countries. More specifically, six countries (22 %) – **Belgium, France, Italy, Hungary, Poland** and **Sweden** – reported that all metadata (100 %) was updated automatically on the national portal. Furthermore, eight Member States (30 %) stated that they obtained between 90 % and 99 % of their metadata from the source automatically. This is an increase from seven countries in 2022, with **Denmark** having increased the extent of automatically updated metadata from 70–89 % to 90–99 %. The remaining Member States have less than 90 % of their metadata updated automatically, which suggests that a lot of metadata is manually edited to some degree. This is more time-consuming than automatic updates and can create friction as the amount and complexity of data increases. Furthermore, editing metadata manually increases opportunities for human error.

<sup>(250)</sup> <https://dados.gov.pt/pt/datasets/dataset-estrutura-de-missao-prr-contratualizacao/>.

<sup>(251)</sup> <https://dados.gov.pt/pt/datasets/justica-no-mapa/>.

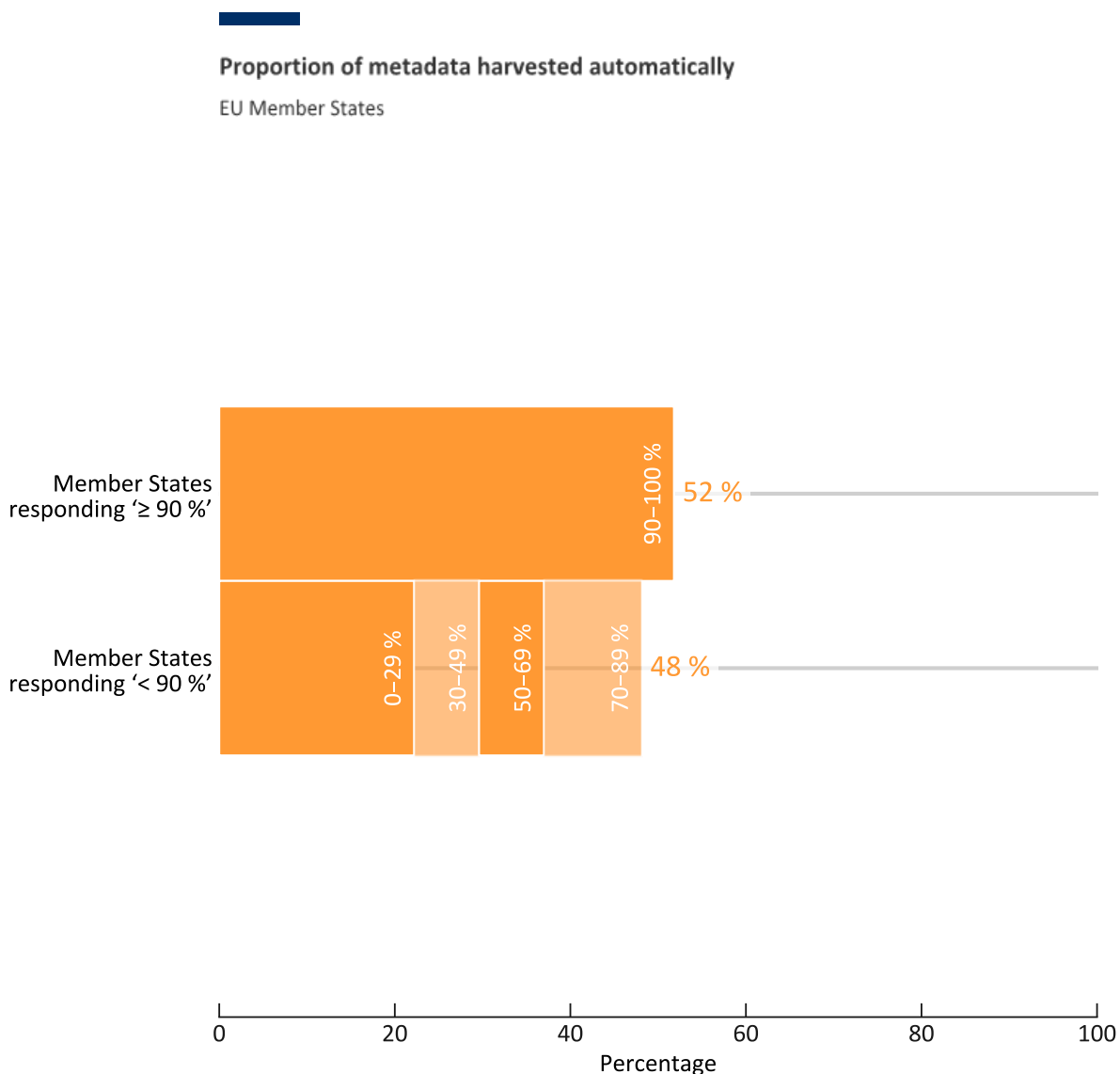


Figure 44: Proportions of metadata obtained automatically on EU-27 national portals

### High-value datasets

Following the publication of the implementing regulation on high-value datasets <sup>(252)</sup>, Member States have begun publishing high-value datasets and preparing to ensure their interoperability with available datasets from other countries. In 2023, 22 Member States (81 %) reported that they were making progress on ensuring the interoperability of datasets, particularly high-value ones, in their country. This reflects the preparatory work done by 17 countries (63 %) in 2022. In preparation, **Spain** is adapting its technical interoperability standard (a national standard) to converge with the latest version of DCAT-AP (v. 2.1.1), including by making the necessary adaptations to reflect the provisions on high-value datasets and the guidelines from the Data Governance Act. **Luxembourg** is setting up an inventory of datasets from the organisations concerned and performing a technical analysis of this data to understand what technical solution might be appropriate. **Croatia** is creating a new open data policy that will ensure the interoperability of datasets. Other countries, such as **Hungary**, indicated

<sup>(252)</sup> <https://digital-strategy.ec.europa.eu/en/news/commission-defines-high-value-datasets-be-made-available-re-use>.

that they were waiting for the upcoming version of DCAT-AP, which will enable them to ensure the interoperability of datasets. **Czechia** also noted that it is waiting for common technical specifications to be published to avoid ad hoc country-to-country integrations. To achieve EU-wide interoperability, it is participating in the definition of DCAT-AP for metadata of high-value datasets.

In addition to these examples, **Austria** provided details of its multipronged strategy to ensure the interoperability of high-value datasets.

- **Standardisation.** Following the EU guidelines and Commission Implementing Regulation (EU) 2023/138, Austria is standardising the data structures, formats and metadata for high-value datasets to ensure cross-border compatibility.
- **API development.** Austria is working on developing and deploying APIs that conform to international standards, enabling easier data exchange and integration between different countries.
- **Cross-border collaboration.** Initiatives are being undertaken to collaborate with neighbouring countries and EU Member States to create seamless data exchange platforms, particularly for datasets that have cross-border implications.
- **Quality assurance.** Automated and manual checks are being implemented to ensure that the interoperable datasets maintain a high level of quality and reliability.
- **User and stakeholder feedback.** An open channel for user and stakeholder feedback is maintained to identify issues and make the necessary adjustments.
- **Legal and ethical compliance.** A priority is ensuring that cross-border data sharing complies with legal and ethical standards. Therefore, legal teams are involved to ensure that data sharing aligns with the general data protection regulation and other regulations.

Austria also highlights some accompanying challenges.

- **Data harmonisation.** One of the challenges is the harmonisation of data collected through different methods and using different standards across countries.
- **Technical hurdles.** Ensuring that different data platforms can communicate effectively with each other presents technical challenges.
- **Data governance.** Ensuring that all data providers adhere to the agreed-upon standards and governance models can be difficult.
- **Resource constraints.** Implementing interoperability solutions requires significant human resources and financial investment.

### Dataset currency and completeness

In addition to the importance of the currency and completeness of metadata, it is also essential that the datasets themselves are current and complete. Four Member States (15 %) indicated that, where applicable, all the datasets on their national portals covered their entire historical periods. This is an increase of two countries since 2022, with **Denmark** and **Malta** joining **Poland** and **Slovenia** in offering a complete time series of relevant datasets. Furthermore, 13 Member States (48 %) indicated that the majority of their eligible datasets covered the entire period over which the data was collected, and 4 Member States indicated that this was true of approximately half of their datasets. As in 2022, 7 Member States (26 %) reported that only a few datasets on their portals were up to date and covered the complete period of data collection.

Having complete and up-to-date data is vital for reusers, since the applications and reuse cases they create 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

(where this real-time change is relevant), for example weather or traffic data, should be updated in 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.

## 6.2. 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

In 2023, all 27 Member States (100 %) reported that they monitored metadata quality on their portals. This is an increase from 26 in 2022 and 2021. Moreover, 20 Member States (74 %) also reported publishing information about metadata quality on their portals. Countries use a variety of tools to monitor and validate metadata. In the **Netherlands**, for example, metadata quality is validated when metadata is synchronised on the national portal from connected portals. Every dataset must be validated against the mandatory setting in the Dutch DCAT-AP <sup>(253)</sup> before it can be added to the portal. The data owner is responsible for ensuring that the metadata passes validation.

**Spain** follows a similar approach, with metadata quality checked during registration or upon updating each dataset. Datasets must be compatible with the Spanish NTI-RISP standard <sup>(254)</sup> to be accepted for publication on the national portal. Whether the data is uploaded automatically or manually, a report is generated that informs the publishers when these quality standards are not met, so that the metadata can be adjusted accordingly. In addition, the Spanish team conducts individualised audits on publishers that follow the methodological approach of the Metadata Quality Assessment <sup>(255)</sup>, specifically evaluating the quality of metadata based on three complementary dimensions: discovery, interoperability and context. The Metadata Quality Assessment is also used in other countries, such as **Ireland, Hungary and Romania.**

In **Finland**, the team uses the Berners-Lee 5-star open data model <sup>(256)</sup> to analyse its metadata and communicate the metadata quality of each dataset <sup>(257)</sup>. The team also reacts to portal users’ feedback on issues with datasets, including incomplete descriptions and missing metadata. It also monitors broken links and expired datasets and sends monthly reminders to the original data provider in advance. The team also plans to start reporting on DCAT-AP compliance (i.e. in terms of mandatory, optional and supported recommended fields) in the future.

### Accompanying licence information

Open data is defined as such in its licensing terms. 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. This year, as in 2022, 22 Member States (81 %) indicated that licensing information accompanied more than 90 % of the open data available on their national

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<sup>(253)</sup> <https://data.overheid.nl/en/ondersteuning/open-data/dcat>.

<sup>(254)</sup> <https://datos.gob.es/en/doc-tags/nti-risp>.

<sup>(255)</sup> <https://data.europa.eu/mqa/methodology?locale=en>.

<sup>(256)</sup> [https://www.w3.org/2011/gld/wiki/5\\_Star\\_Linked\\_Data](https://www.w3.org/2011/gld/wiki/5_Star_Linked_Data).

<sup>(257)</sup> [https://www.avoindata.fi/data/en\\_GB/report/openness](https://www.avoindata.fi/data/en_GB/report/openness).

portals (Figure 45). Member States know the importance of providing licensing information, since they all (100 %) assist publishers in choosing appropriate licences by producing guidelines. Moreover, 23 Member States (85 %) provide guidelines or recommendations on using standard licences, such as the Creative Commons (CC) licence <sup>(258)</sup>.

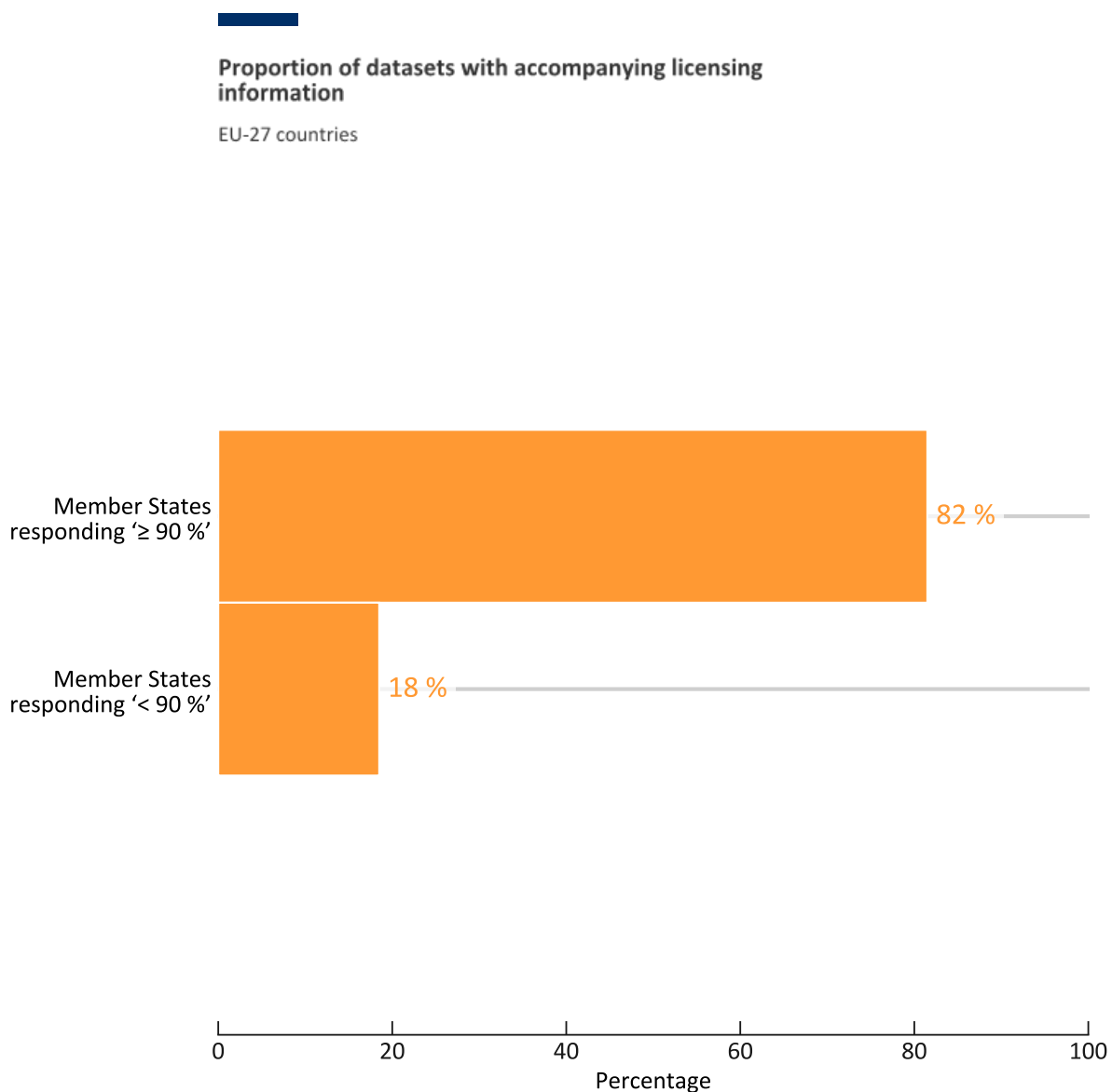


Figure 45: Proportions of datasets accompanied by licensing information on EU-27 national portals

Preferences regarding open licences vary between countries. In several countries, the use of standard licences is prescribed by law, while in others it is simply recommended. In countries including **Bulgaria**, the **Netherlands**, **Austria** and **Slovenia**, it is mandatory to use a CC licence when publishing open data. There are also several countries, such as **Denmark**, **Ireland**, **Luxembourg** and **Poland**, where CC licences are recommended but not mandatory. In Austria, while CC licences (specifically CC-BY 4.0) are mandatory for Austrian public sector bodies publishing open government data, the Austrian

<sup>(258)</sup> <https://creativecommons.org/share-your-work/ccllicenses/>.

Framework for Open Government Data Platforms <sup>(259)</sup> serves as an official agreement between the federal and state levels.

Five Member States (19 %) – **Germany, France, Croatia, Malta and Finland** – have their own national licences. For example, Germany recommends Datenlizenz Deutschland 2.0 <sup>(260)</sup> for use by all public bodies.

### Activities to support data providers

Besides providing guidelines on licensing, all Member States (100 %) regularly conduct activities or have mechanisms in place to motivate data providers to publish data accompanied by high-quality metadata and to assist them in doing so. This is up from 96 % in 2022, with **Belgium** now conducting regular reviews of metadata mapping. Furthermore, 26 Member States (96 %) conduct activities to incentivise the publication of data in machine-readable formats (all except Croatia) and offer guidelines to data providers to help them to improve the quality of their data (all except Latvia).

In general, the activities to support data providers include regular meetings, training sessions, webinars and workshops, for example to establish a common understanding of the importance of high-quality data publication. For example, in **Sweden** the requirements for publication are explained as part of the Data Ambassadors training programme. Data providers are also supported with guidelines <sup>(261)</sup>. In **Italy**, the open data team has direct and regular contact with data providers to support them in publishing high-quality metadata. This activity is an objective of the 3-year plan for information and communications technology in public administration.

The team in **Romania** organises one-on-one support for users, and it hosts and attends webinars, working groups and information sessions centred on open data governance and metadata recommendations provided by the European Commission. Similarly, the team in **Czechia** organises annual conferences on topics such as high-quality metadata. It also provides guidelines on preparing metadata for cataloguing records based on DCAT-AP standards <sup>(262)</sup> and offers e-learning courses that focus on this topic <sup>(263)</sup>. The team also strongly recommends to open data publishers that they monitor metadata quality through dashboards.

### 6.3. DCAT-AP compliance

DCAT is a World Wide Web Consortium standard designed to facilitate interoperability between data catalogues published online <sup>(264)</sup>. 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 <sup>(265)</sup>. The DCAT-AP compliance indicator assesses the extent to

<sup>(259)</sup> [https://neu.ref.wien.gv.at/at.gv.wien.ref-live/documents/20189/68315/Framework for Open Government Data Platforms 1.3 fin.pdf/0cfc7d99-feca-447b-8628-e6106ffc84ad](https://neu.ref.wien.gv.at/at.gv.wien.ref-live/documents/20189/68315/Framework%20for%20Open%20Government%20Data%20Platforms%201.3%20fin.pdf/0cfc7d99-feca-447b-8628-e6106ffc84ad).

<sup>(260)</sup> <https://www.govdata.de/dl-de/by-2-0>.

<sup>(261)</sup> <https://www.digg.se/kunskap-och-stod/oppna-och-delade-data/offentliga-aktorer/vagledning-for-att-tillgangliggöra-information#h-Taframmetadataochdokumentation>.

<sup>(262)</sup> [https://opendata.gov.cz/cinnost:priprava-katalogizacniho-zaznamu?s\[\]=dcat](https://opendata.gov.cz/cinnost:priprava-katalogizacniho-zaznamu?s[]=dcat).

<sup>(263)</sup> <https://data.gov.cz/vzdělávání/e-learning/>.

<sup>(264)</sup> <https://www.w3.org/TR/vocab-dcat-2/>.

<sup>(265)</sup> For more information see the European Commission's web page 'DCAT Application Profile for data portals in Europe' (<https://joinup.ec.europa.eu/collection/semantic-interoperability-community-semic/solution/dcat-application-profile-data-portals-europe>) and the guide by data.europa.eu (formerly the European Data Portal) *Open data goldbook for data managers and data holders* (<https://data.europa.eu/en/training/data-providers-guide>).

which metadata on national portals complies with the DCAT-AP standard for describing public sector datasets and what efforts are made to assist data publishers in following DCAT-AP.

### Helping data providers to be DCAT-AP compliant

In 2023, 24 Member States (89 %) stated that they had provided documentation on DCAT-AP to their data providers, an increase from 81 % in 2022, with **Latvia**, **Luxembourg** and **Slovakia** now providing such documents. **Malta** did not respond to the question in 2023. This documentation might be created by the Member States or by data.europa.eu or published on European Commission websites such as the JoinUp platform<sup>(266)</sup>. For example, in **Latvia** the national portal provides guidelines for data providers, including guidelines on DCAT-AP, under ‘Standards and guidelines used on the portal’<sup>(267)</sup>. This is also the case in **Finland**, where there are guides for data providers with sections about DCAT-AP that link to various materials from data.europa.eu<sup>(268)</sup>.

### Investigating causes of lack of DCAT-AP compliance

In addition to efforts to assist data providers in complying with DCAT-AP, 22 Member States (81 %) actively investigate the most common causes of non-compliance. This is an increase from 21 Member States in 2022, with **Malta** reporting that it now investigates cases of non-compliance. In **Malta**, this non-compliance can often be traced back to data legacy issues. In **Italy**, three main points tend to explain cases of lack of DCAT-AP compliance: controlled and standardised vocabularies have not been used, there has been inappropriate use of technology configuration or mandatory properties are missing. Similarly, **Romania** notes that a low level of awareness of controlled vocabularies and a lack of standard management and structured publication are common causes of non-compliance. This is further echoed by **Lithuania**, where non-compliance is also caused by the external catalogues from which the national portals import data or by problems with catalogue implementation.

### Extent of compliance with DCAT-AP specifications

DCAT-AP has various metadata properties that can be used to describe data. As a specification, DCAT-AP applies standards to datasets through classes of properties that are mandatory, recommended or optional<sup>(269)</sup>. Each class’s properties are structured in a hierarchy of mandatory, recommended or optional. For example, ‘access URL’ (a URL that grants direct access to a dataset) is a mandatory property and ‘download URL’ (a URL that grants direct access to a downloadable file) is an optional property, both in the (recommended) ‘distribution’ class of properties.

Figure 46 shows the proportions of Member States whose metadata mostly adheres to DCAT-AP classes. There has been a steady increase in uptake of DCAT-AP among Member States over the years. In 2023, 23 Member States (85 %) declared that more than 90 % of the metadata on their national portals complied with the DCAT-AP mandatory classes (agent, catalogue, dataset, literal, resource), compared with 19 Member States in 2022. This change was driven by **Estonia**, which increased from 51–70 % coverage of mandatory classes in 2022 to more than 90 % in 2023, and **Spain** and **Slovakia**, which increased from 71–90 % coverage of mandatory classes in 2022 to more than 90 % in 2023. Furthermore, 20 Member States (74 %) stated that more than 90 % of the metadata on their national portals also complied with the DCAT-AP recommended classes (category, category scheme,

<sup>(266)</sup> <https://joinup.ec.europa.eu/>.

<sup>(267)</sup> <https://data.gov.lv/lv/standarti>.

<sup>(268)</sup> <https://www.avoindata.fi/fi/opas/viimeistele-datan-avaaminen>, <https://www.avoindata.fi/en/dcat-ap> and <https://tietomallit.suomi.fi/model/fi-dcatap/>.

<sup>(269)</sup> [https://joinup.ec.europa.eu/sites/default/files/distribution/access\\_url/2020-06/e4823478-4458-4546-9a85-3609867ad089/DCAT\\_AP\\_2.0.1.pdf](https://joinup.ec.europa.eu/sites/default/files/distribution/access_url/2020-06/e4823478-4458-4546-9a85-3609867ad089/DCAT_AP_2.0.1.pdf).

distribution, licence document), an increase from 19 Member States in 2022. This change was driven by **Malta**, which has increased the proportion of datasets using recommended classes from 31–50 % to more than 90 % in the past year. Finally, 16 Member States (59 %) said that more than 90 % of the metadata on their national portals complied with the DCAT-AP optional classes (catalogue record, checksum, document, frequency), a rise from 12 Member States in 2022.

In terms of particular DCAT-AP properties, 18 Member States (67 %) reported that more than 90 % of the metadata on their national portals provided a reference to where the data could be downloaded or accessed through an API (i.e. the ‘download URL’ property) and 19 Member States (70 %) reported that more than 90 % of the metadata on their national portals provided a reference to a web page from where the data could be accessed (i.e. the ‘access URL’ property).

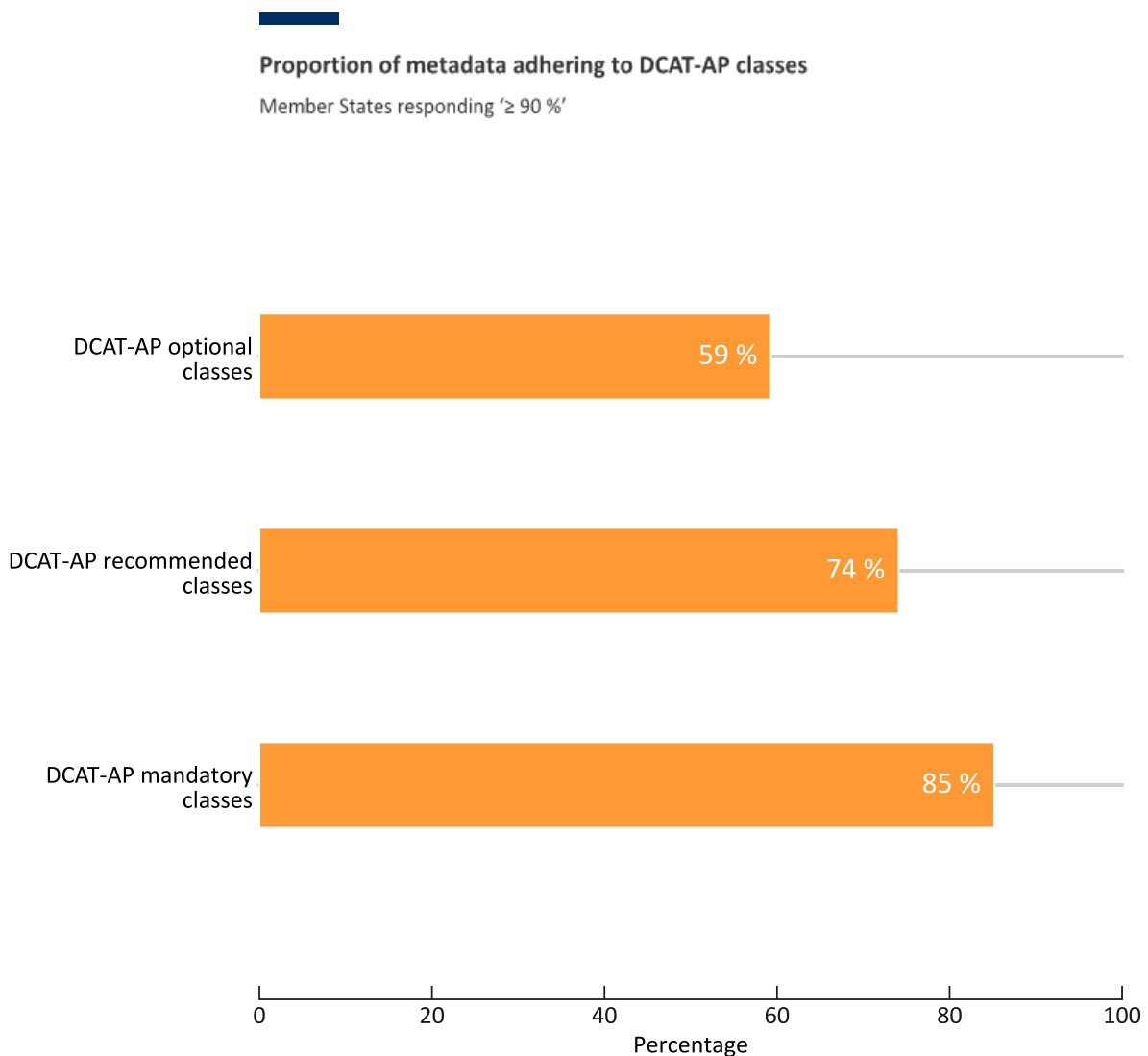


Figure 46: Proportions of metadata adhering to DCAT-AP classes on EU-27 national portals



#### 6.4. 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 <sup>(270)</sup> or the FAIR principles <sup>(271)</sup>, 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 uniform resource identifiers (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. A total of 23 Member States (85 %) stated that they used a model to assess the quality of data deployment. This is a net increase of three Member States compared with 2022, with **Latvia, Portugal** and **Sweden** now reporting the use of such models. However, the **Netherlands** no longer indicated use of a model in this year's questionnaire. One popular model for assessing data deployment quality is the Berners-Lee 5-star open data model, used by countries such as **Croatia, Italy, Cyprus, Luxembourg, Malta** and **Finland**. This model is often used as a decision-making tool to determine which datasets can be published on a national open data portal.

Moreover, 26 Member States (96 %) reported that they conducted activities to promote to data providers methods to ensure higher-quality data and activities to familiarise them with these methods, a sharp increase from 89 % in 2022 and 83 % in 2021. For example, the **Belgian** national open data team provides training on general data modelling <sup>(272)</sup> and holds thematic working group sessions on semantic data exchange <sup>(273)</sup>. Furthermore, **Estonia** provides online training on open data to support open data publishers <sup>(274)</sup> and **Sweden** explains the 5-star open data model as part of its Data Ambassadors training programme.

In **France**, the open data team has developed a dataset quality strategy inspired by the 5-star model. This strategy includes several components.

- **Licence.** France has developed its own open data licence <sup>(275)</sup>. The team provides guidelines and training on choosing a licence and why a particular licence may be appropriate <sup>(276)</sup>.
- **Reusability.** The team focuses on data literacy and organises events that foster the reusability of data, highlighting the importance of quality data documentation <sup>(277)</sup>, metadata descriptions <sup>(278)</sup> and open data reuse <sup>(279)</sup>. Reuse cases are highlighted on the portal in the same way as data is and are also promoted through active editorial communication <sup>(280)</sup>.
- **Machine readability and openness.** The team provides documentation to support data producers in publishing data in a machine-readable format <sup>(281)</sup>.

<sup>(270)</sup> <http://5stardata.info/en/> and <https://joinup.ec.europa.eu/sites/default/files/inline-files/W3C04.pdf>.

<sup>(271)</sup> <https://www.go-fair.org/fair-principles/>.

<sup>(272)</sup> <https://github.com/belgif/review/tree/master/Training>.

<sup>(273)</sup> <https://github.com/belgif/thematic>.

<sup>(274)</sup> <https://digiriigiakadeemia.ee/>.

<sup>(275)</sup> <https://www.etalab.gouv.fr/wp-content/uploads/2017/04/ETALAB-Licence-Ouverte-v2.0.pdf>.

<sup>(276)</sup> <https://www.data.gouv.fr/fr/licences>.

<sup>(277)</sup> <https://guides.etalab.gouv.fr/qualite/documenter-les-donnees/>.

<sup>(278)</sup> <https://guides.etalab.gouv.fr/qualite/documenter-les-donnees/#description-des-metadonnees>.

<sup>(279)</sup> <https://guides.etalab.gouv.fr/juridique/reutilisation/#qu-est-ce-qu-une-reutilisation>.

<sup>(280)</sup> <https://www.data.gouv.fr/fr/posts/>.

<sup>(281)</sup> <https://guides.etalab.gouv.fr/data.gouv.fr/> and <https://doc.data.gouv.fr/a-propos/que-publier-et-comment-le-publier>.

Deployment quality

Several characteristics of data and its accompanying metadata make data more accessible for reuse (Figure 47). In 2023, 22 Member States (82 %) offered more than 90 % of their national portals’ datasets with an explicit open licence, a decrease of one country – **Sweden**, which now offers 71–90 % of datasets with an explicit open licence – compared with 2022. Furthermore, 19 Member States (70 %) provide more than 90 % of published data in a structured format, an increase since 2022 of two countries – **France** and **Slovakia**, which previously offered 71–90 % of their datasets in a structured format. Regarding the provision of data in a machine-readable format, 15 Member States (56 %) do this for more than 90 % of their published data, the same number as in 2022. Also stable between 2022 and 2023 is the figure of only 8 Member States (30 %) offering more than 90 % of published data with URIs. This quality feature is still not widely used, with 11 Member States (41 %) providing URIs for less than 10 % of their published data. Although 6 Member States (22 %) – **Denmark, France, Latvia, Portugal, Slovenia** and **Slovakia** – now offer more than 90 % of published data with linked data, up from only 3 in 2022, this feature is still the least mature, with a total of 15 Member States (56 %) offering less than 10 % of published data with links to other trusted sources to provide additional context for reusers.

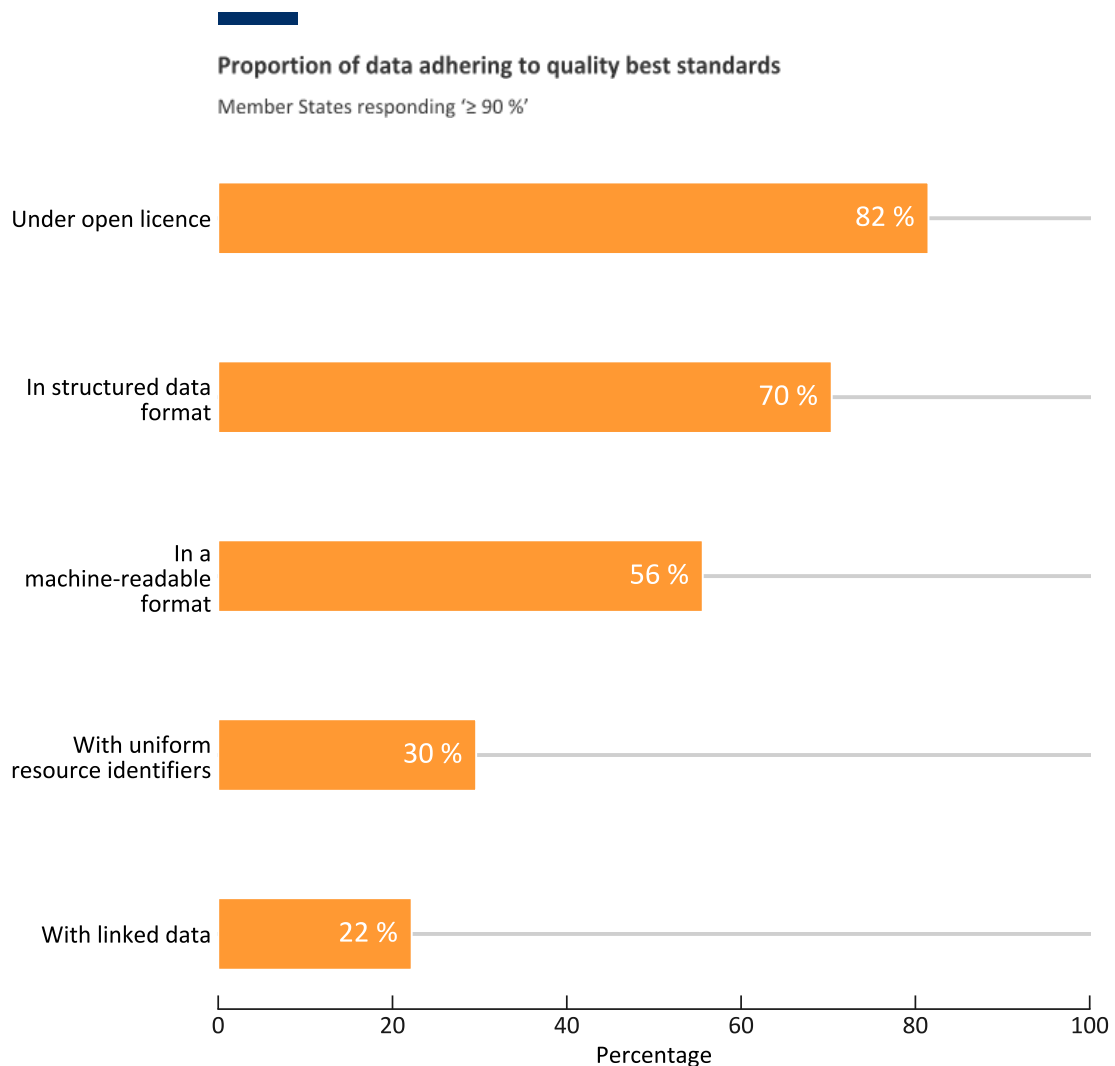


Figure 47: Proportions of datasets adhering to common standards of quality deployment on EU-27 national portals

### 6.5. Overall EU Member State performance

In 2023, the average maturity score of the EU Member States on the quality dimension was 82 %, an increase of 5 pp on 2022 and a step forward from the plateau in performance between 2020 and 2022 (Figure 48). This year’s average score is a 20 pp improvement on 2018, representing significant progress by the Member States over the past 6 years in making data openly available and ensuring that it adheres to quality criteria. Among the four dimensions measured in the ODM assessment of the EU-27, the quality dimension scores third-highest on average, scoring 3 pp lower than the portal dimension and 7 pp lower than the policy dimension.

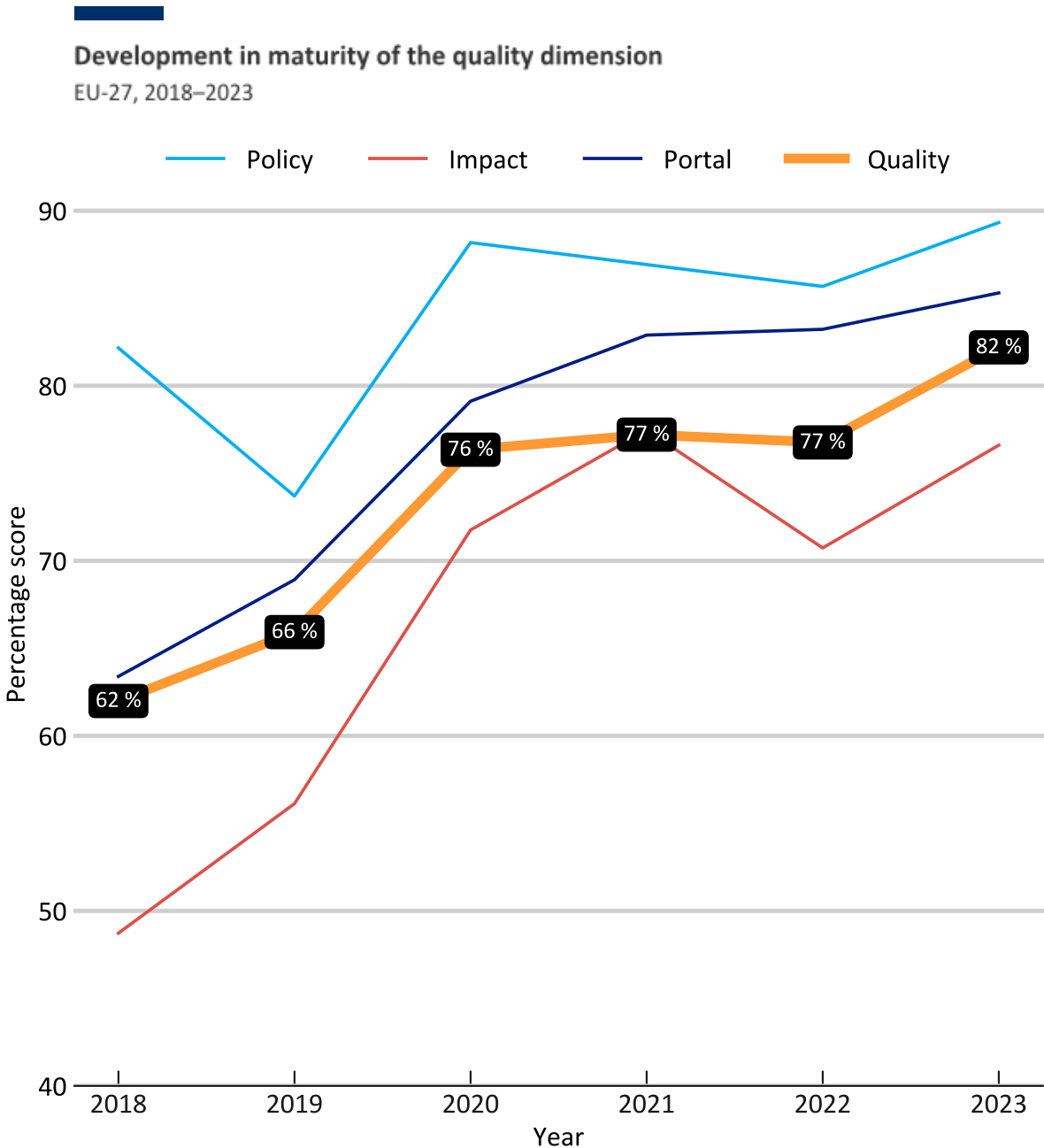


Figure 48: Average performance of the EU-27 on the quality dimension since 2018

The increase in the average quality dimension score was driven mainly by an increase in the monitoring and measures indicator (+ 7 pp) (Figure 49). The increase on this dimension was supported by year-on-year increases of 4 pp each on the DCAT-AP compliance and the deployment quality and linked data indicators. The average quality dimension score increased despite a 3 pp decrease in the metadata currency and completeness indicator.

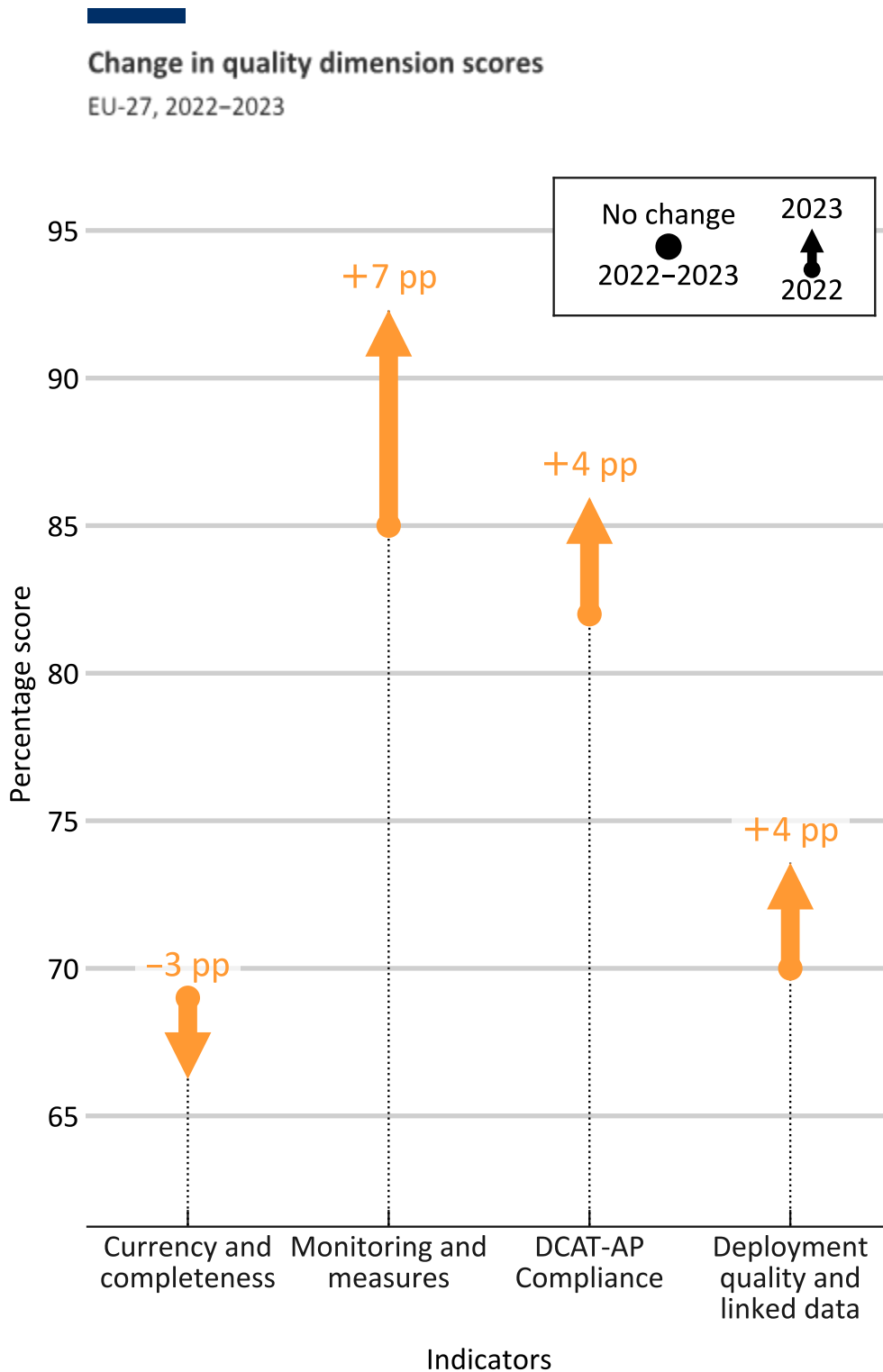


Figure 49: Average change in the quality dimension indicators for the EU-27 between 2022 and 2023

Each Member State has a unique scoring distribution on the indicators (Figure 50). However, on average, improvement efforts should be directed towards the metadata currency and completeness and the deployment quality and linked data indicators, as these both trail behind the monitoring and measures and the DCAT-AP compliance indicators. This means countries that should ensure that they define and establish approaches to assessing the quality of datasets published on their national portals and ensure that datasets are available under an open licence, in a structured data format, in a machine-readable format, with URIs and with links to other trusted sources. In addition, it seems that further efforts are required on the metadata currency and completeness indicator, following the publication of the implementing regulation on high-value datasets, to ensure interoperability between high-value datasets by June 2024.

Furthermore, although the DCAT-AP compliance indicator continues to improve on average, countries scoring lower than 75 % on this indicator should strive to move their score closer towards the EU-27 average by investing in measures to ensure that data providers supply data properly described through its metadata.

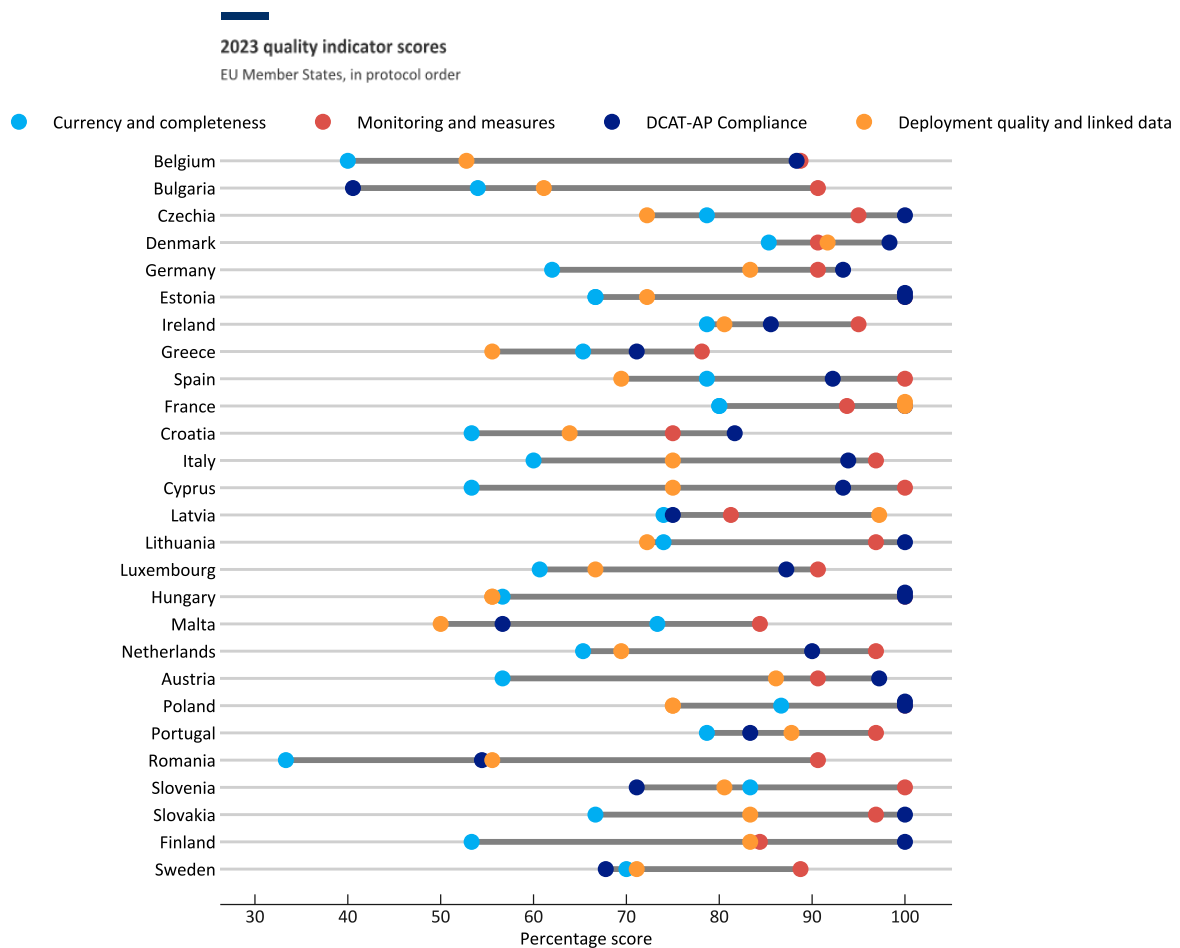


Figure 50: Quality indicator scores for each EU Member State

In terms of individual country performance, **France** (96.9 %), **Denmark** (94.6 %) and **Poland** (93.1 %) take the top three spots in this dimension for 2023 (Figure 51). **Slovakia** and **Latvia** are the biggest climbers in the rankings compared with 2022 (+ 21 pp), followed by **Malta** (+ 19 pp), **Portugal** (+ 17 pp) and **Hungary** (+ 15 pp). A total of 18 Member States (67 %) score above the EU-27 average of 82 %. The nine Member States (33 %) that score below the EU-27 average form a broad tail, with scores ranging from 60.5 % to 80.8 %. Only five countries experienced a decrease in score from the previous year.

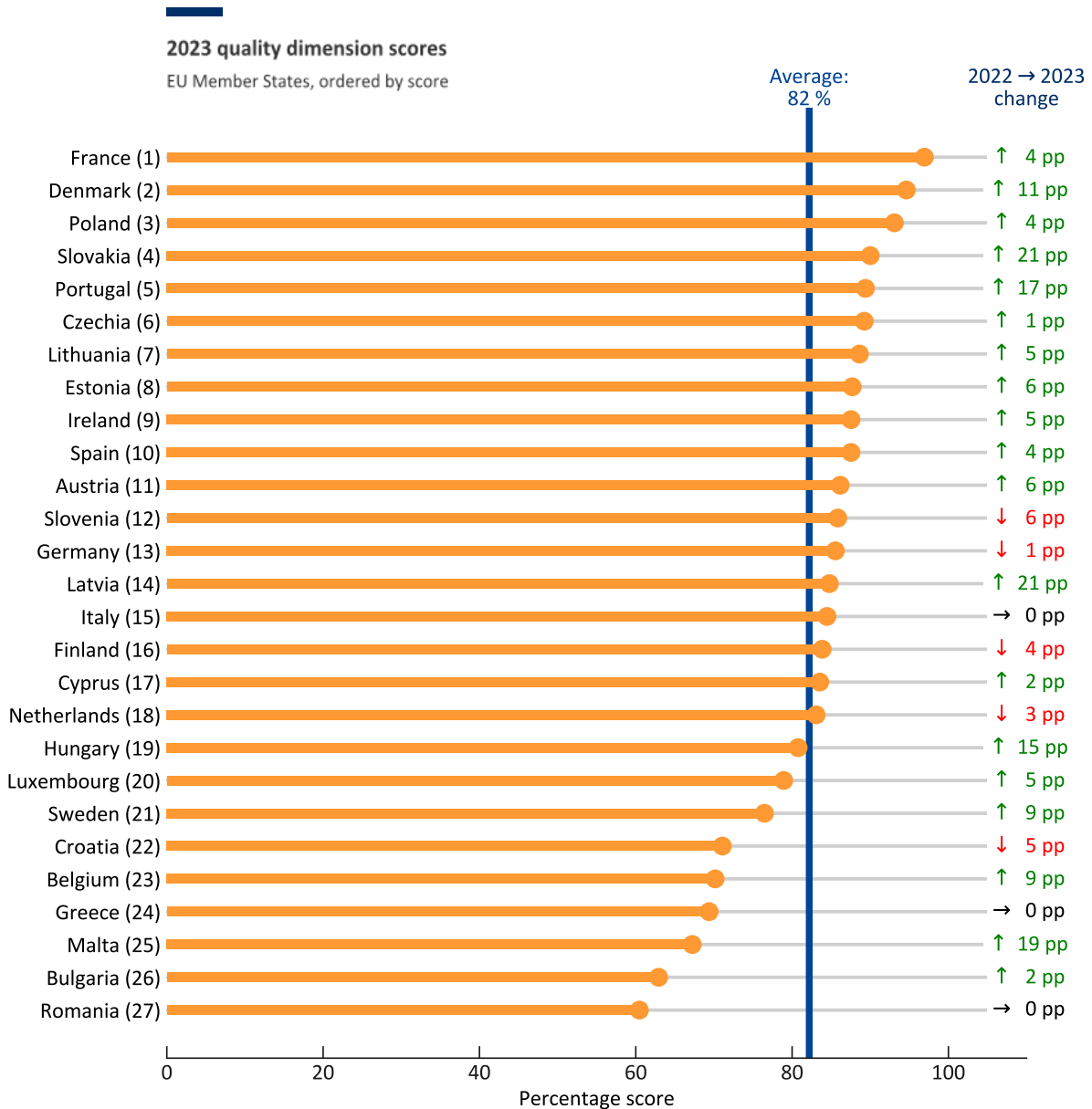


Figure 51: EU Member State scores on the quality dimension

## B. European Free Trade Association countries

### Metadata currency and completeness

The results for the metadata currency and completeness indicator for the three participating EFTA countries are similar to those in the previous year. All three countries reported that they had a predefined approach to ensuring that the metadata on the national portal was kept up to date. Moreover, **Iceland** and **Norway** reported that all the metadata on their portals (100 %) was obtained from the source automatically rather than edited manually. The team in **Switzerland** reported this to be the case for 90–99 % of datasets on its portal. In addition, all three countries stated that the metadata on the national portals was updated within a day when the metadata changed at the source. Moreover, in **Iceland** the majority of datasets cover the entire period from when they were first published to the present. This is the case for approximately half of the datasets in **Norway** and for just a few in **Switzerland**.

### Monitoring and measures

In 2023, all the participating EFTA countries reported that they monitored the quality of their metadata on their portal. In **Iceland**, this is done by the National Land Survey<sup>(282)</sup>, in **Norway** through the data.europa.eu Metadata Quality Assessment tool<sup>(283)</sup> and in **Switzerland** by the Open Data Government Office. The data portal team in Norway also publishes an assessment of the metadata on its portal<sup>(284)</sup>.

All the participating EFTA countries have guidelines in place to assist publishers in choosing an appropriate licence for their data. For example, **Iceland** has a guide on how to publish open government data<sup>(285)</sup>. As was the case in 2022, **Norway** and **Switzerland** reported that they had developed their own licences to foster open data publication. The countries' guidelines also provide recommendations on the use of either CC licences (**Norway** and **Iceland**) or the country's own licence (**Norway** and **Switzerland**). **Norway's** custom licence<sup>(286)</sup> is compatible with CC-BY 4.0 and exists mainly due to historical reasons. Furthermore, **Switzerland** and **Norway** reported that 90 % or more of the open data available on the national portal was accompanied by licensing information. **Iceland** reported that this was true of less than 10 % of the open data on its national portal.

Furthermore, all the participating EFTA countries conduct regular activities to incentivise or assist data providers in the publication of data in machine-readable formats and high-quality metadata. This is usually in the form of regular webinars or weekly meetings.

### DCAT-AP compliance

As in 2022, **Norway** and **Switzerland** stated that they offered documentation on DCAT-AP to data providers through their national portals. Moreover, **Norway** and **Switzerland** reported that more than 90 % of their metadata was DCAT-AP compliant and that more than 90 % used recommended classes. **Switzerland** furthermore reported that between 51 % and 70 % of the metadata on its national portal used optional classes, with **Norway** reporting that this applied to 31–50 % of its metadata.

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<sup>(282)</sup> <https://gatt.lmi.is/geonetwork/srv/ice/catalog.search#/home>.

<sup>(283)</sup> <https://gitlab.com/dataeuropa/mqa>.

<sup>(284)</sup> <https://data.norge.no/guidance/metadata>.

<sup>(285)</sup> <https://handbook.opendata.swiss/en/content/glossar/bibliothek/ogd-richtlinien.html>.

<sup>(286)</sup> <https://data.norge.no/nlod/en/2.0/>.

Moreover, both **Norway** and **Switzerland** reported that they actively investigated the main causes of lack of DCAT-AP compliance. In **Norway**, the national open data portal does not allow registration if mandatory classes are missing. For optional classes, metadata quality is measured and displayed for each dataset. In **Switzerland**, a common cause of lack of compliance is complex data catalogue structures used by data publishers and problems with mapping them to the database management system Postgres. As a result, even where datasets are DCAT-AP compliant, metadata gets lost because of the presence of classes and properties that are not used on opendata.swiss.

Furthermore, in both **Norway** and **Switzerland**, the datasets' metadata includes a reference to where it can be downloaded or accessed by its API. This applies to over 90 % of metadata in **Switzerland** and between 31 % and 50 % in **Norway**. In addition, both countries reported that over 90 % of metadata on their national portals provides a reference to a web page from which the data can be accessed.

In terms of DCAT-AP, **Iceland** stated that its national legislation did not specify what type of standards should be used, meaning that the use of DCAT-AP is recommended instead of mandatory and therefore is not a priority. In addition, the team in **Switzerland** stated that it now used DCAT-AP CH version 2, which the eCH, a standardisation body in Switzerland, recently approved.

### Deployment quality and linked data

All three EFTA countries have implemented a model to assess the quality of data deployment. **Iceland** and **Switzerland** <sup>(287)</sup> reported that they used the 5-star open data model, while **Norway** uses the FAIR principles <sup>(288)</sup>. Moreover, the three EFTA countries stated that they conducted activities to promote high-quality data and familiarise data providers with ways of ensuring higher-quality data, for example through conferences (**Iceland**) or providing training materials (**Norway**).

Regarding the provision of datasets with a standard open licence or an explicit custom open licence, **Switzerland** offers more than 90 % of its datasets with an open licence. In **Norway**, this figure is between 71 % and 90 %, and in **Iceland** less than 10 % of datasets are accompanied by an open licence. In all three countries, more than 90 % of datasets are available in a structured data format. Furthermore, **Norway** reports that over 90 % of its data is also published in an open and machine-readable format, uses URIs and is linked to other trusted sources to provide additional context for users. In **Switzerland**, between 51 % and 70 % of datasets are published in an open and machine-readable format, 10–30 % use URIs and less than 10 % are linked to other trusted sources. In **Iceland**, over 90 % of datasets are in an open and machine-readable format, while less than 10 % use URIs or are linked to other trusted sources.

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<sup>(287)</sup> <https://www.stjornarradid.is/efst-a-baugi/frettir/stok-frett/2015/11/19/Efni-fra-namskeidi-um-opin-gogn/>.

<sup>(288)</sup> <https://data.norge.no/guidance/metadata>.



Overall European Free Trade Association country performance

In 2023, the EFTA average maturity score on the quality dimension was 75 % (Figure 52). **Norway** remains the top performer, scoring 90.8 %, with a 9 pp lead on **Switzerland** despite dropping 2 pp on its score compared with 2022. **Iceland** has experienced a considerable increase of 10 pp since 2022.

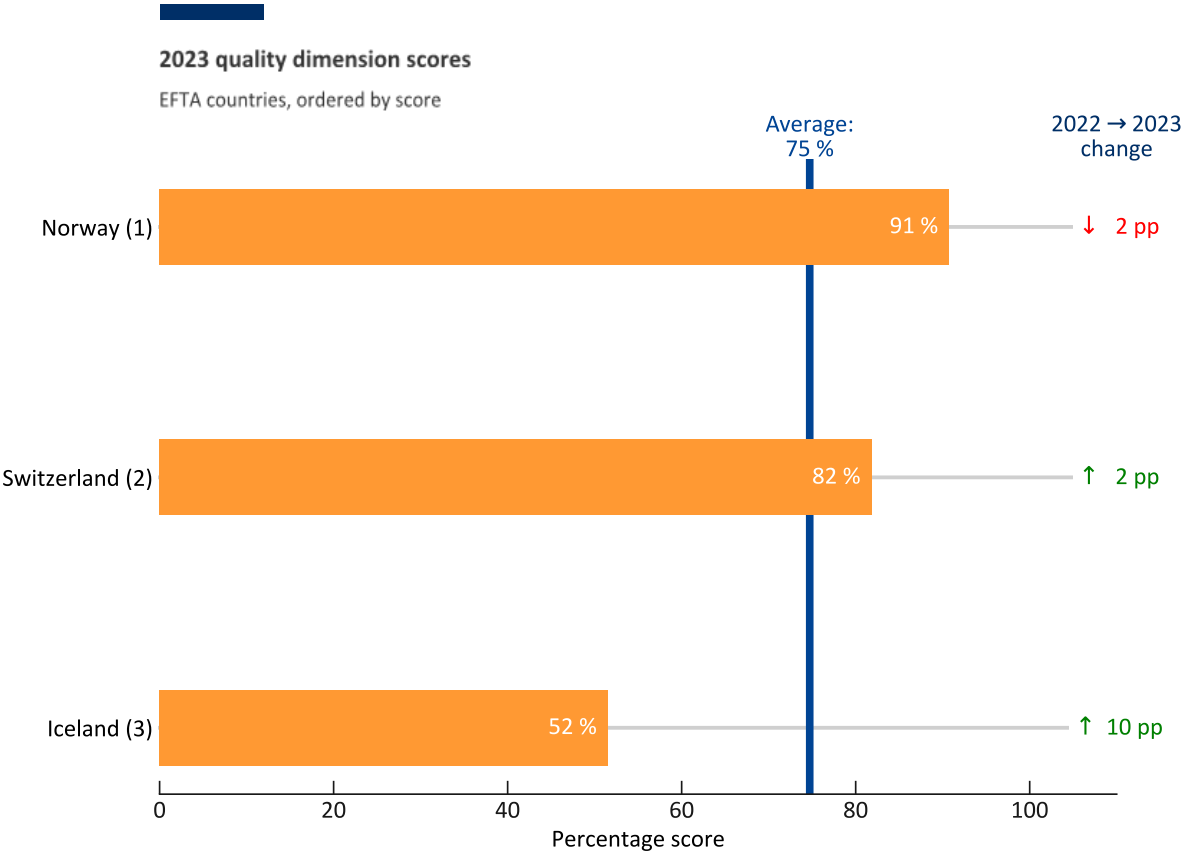


Figure 52: EFTA country scores on the quality dimension

The three countries have different scoring distributions on the indicators (Figure 53). **Iceland**'s overall maturity in the quality dimension is pulled down by its low performance on the DCAT-AP compliance indicator. By contrast, DCAT-AP compliance is **Switzerland**'s highest-scoring indicator. Whereas **Iceland** scores highest on the metadata currency and completeness indicator, this is the lowest-scoring indicator for both **Norway** and **Switzerland**. To improve their scores, Iceland would benefit from focusing on DCAT-AP compliance, and **Norway** and **Switzerland** should put a greater focus on ensuring that metadata is kept up to date using automated means. **Norway** shows the most consistent scoring on the indicators (with a narrow distribution), whereas **Iceland**'s indicator scores cover a wide range.

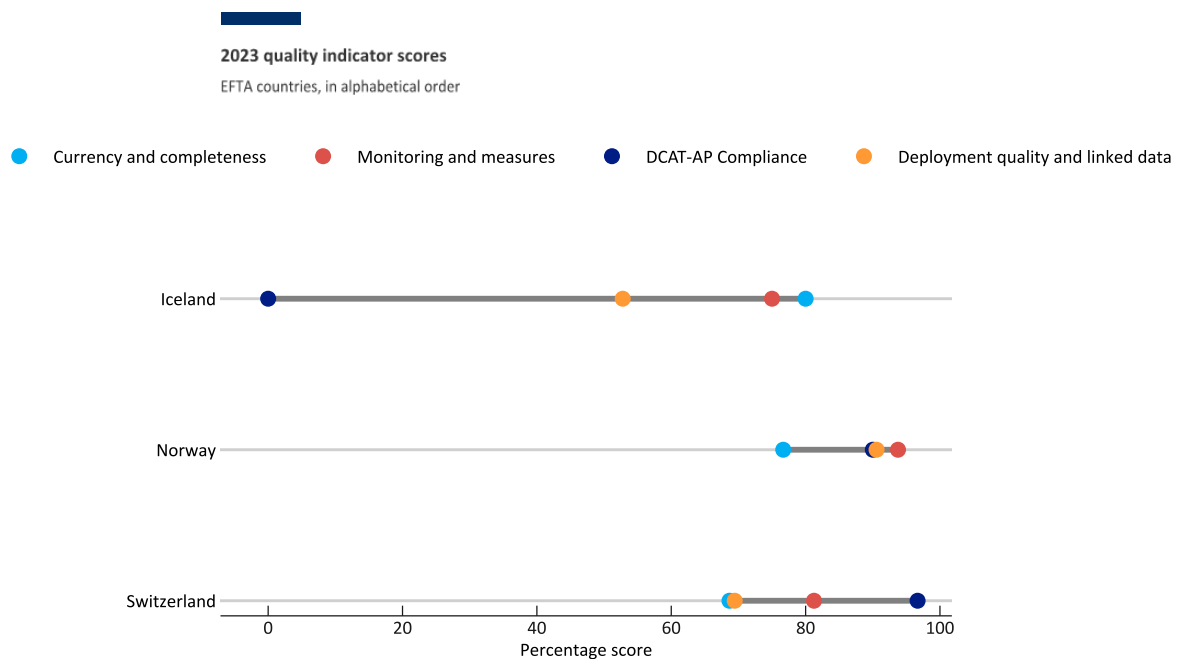


Figure 53: Quality indicator scores for each EFTA country

## C. Candidate countries

### Metadata currency and completeness

**Albania**, **Serbia** and **Ukraine** reported that they had a predefined approach to ensuring that the metadata on the national portal was kept up to date. In terms of obtaining metadata automatically from the source, **Ukraine** obtains 50–69 % in this way, and **Bosnia and Herzegovina** and **Montenegro** obtain less than 30 % of their metadata automatically, as was the case in 2022. While **Albania** and **Serbia** reported obtaining less than 30 % of their metadata automatically in 2022, these figures have risen to 90–99 % and 30–49 %, respectively. Furthermore, metadata is updated within a month after a change at the source in **Bosnia and Herzegovina** and within a day in the other four candidate countries.

Regarding the extent to which published data cover the entire period from first publication until the present day, in **Ukraine** this applies to all datasets; in **Albania** and **Serbia**, it applies to the majority of datasets; and in **Montenegro** it applies to approximately half of datasets. In **Bosnia and Herzegovina**, none of the datasets meets this criterion.

## Monitoring and measures

**Montenegro, Serbia** and **Ukraine** reported monitoring metadata quality on their portals. For example, **Serbia** monitors metadata quality using two dashboards – one for local-level datasets <sup>(289)</sup> and one for all datasets <sup>(290)</sup>. In **Ukraine**, the team conducts checks and uses monitoring instruments to assess datasets and their metadata quality. The approach includes the following aspects:

- a dataset moderator checks the correctness of the metadata before its publication;
- all metadata fields must be filled in manually by the data provider or automatically through an API when a dataset is created;
- the national portal team uses a business intelligence tool to monitor metadata regularly <sup>(291)</sup>.

**Serbia** and **Ukraine** stated that they published guidelines and had tools to assist publishers in choosing an appropriate licence for their datasets. Furthermore, all participating candidate countries except **Albania** provide recommendations on the use of CC licences. Regarding licences, both **Serbia** and **Ukraine** reported that over 90 % of the datasets available on the national portal were accompanied by licensing information.

All the countries apart from **Bosnia and Herzegovina** indicated that regular activities or mechanisms were in place to incentivise data providers to publish data in a machine-readable format and assist them in doing so. Furthermore, **Montenegro, Serbia** and **Ukraine** stated that similar activities and mechanisms were in place to promote the provision of high-quality metadata.

## DCAT-AP compliance

**Ukraine** is still the only country that reports supplying data providers with documentation on DCAT-AP <sup>(292)</sup>, including in the form of data harvesting guidelines <sup>(293)</sup>. **Montenegro, Serbia** and **Ukraine** reported that over 90 % of the metadata on their portals complied with DCAT-AP mandatory classes. Furthermore, **Montenegro** and **Ukraine** stated that over 90 % of the metadata on their portals also used DCAT-AP recommended and optional classes. These recommended and optional classes are used for 71–90 % of datasets in **Serbia**. No country has a national extension of the DCAT-AP standard. **Ukraine** is the only country that investigates the causes of lack of DCAT-AP compliance. It finds that the most common causes of non-compliance are problems harvesting from regional and local portals in the context of the internal legal framework of regional and local data providers.

In **Montenegro, Serbia** and **Ukraine**, over 90 % of the datasets' metadata references where the data can be downloaded. In **Montenegro** and **Ukraine**, 90 % of their datasets' metadata also references a web page from which the data can be accessed.

<sup>(289)</sup> <https://app.powerbi.com/view?r=eyJrIjoiMzIzZGRmMTUtYWNmYi00ODFiLTlkNzktZGY3ZjllZjA0YjlyIiwidCI6ImU5ODY5ZDIILTVmMTYtNDE1Ni04OWIwLWQ1MjYzMGZmNzAwMCIsmMiOjI9&embedImagePlaceholder=true&pageName=ReportSection4f901c371aea6dfeb859>.

<sup>(290)</sup> <https://app.powerbi.com/view?r=eyJrIjoiYTkyOGFkMWItNTZhYS00ODQ5LTljNTEtZmE2M2FIZThmZjllZjA0YjlyIiwidCI6ImU5ODY5ZDIILTVmMTYtNDE1Ni04OWIwLWQ1MjYzMGZmNzAwMCIsmMiOjI9&embedImagePlaceholder=true&pageName=ReportSection>.

<sup>(291)</sup> <https://data.gov.ua/pages/analitika>.

<sup>(292)</sup> <https://diia.data.gov.ua/info-center/dcat>.

<sup>(293)</sup> <https://data.gov.ua/uploads/files/2021-06-29-135404.275118-.pdf>.

### Deployment quality and linked data

**Montenegro** <sup>(294)</sup> and **Ukraine** use the 5-star open data model to assess the quality of data deployment. These two countries and **Serbia** conduct regular activities to promote high-quality data and familiarise data providers with ways to ensure higher-quality data. This is done through several means, including promoting the 5-star model, sharing standards for quality datasets and programmes run by public organisations.

**Montenegro, Serbia** and **Ukraine** indicated that over 90 % of the datasets on their national portals were made available under a standard open licence or an explicit custom open licence, as was the case in 2022. **Montenegro** was the only country that reported that over 90 % of datasets were available in a structured data format, were in an open and machine-readable format and consistently used URIs.

**Albania, Serbia** and **Ukraine** reported that they monitored improvements in the quality of open data deployment on their portals. For example, Albania actively engages with institutions to understand the reasons behind the nonconformity of data provided. These discussions include dialogue on data formatting standards, compatibility with open data protocols and the overall objectives of open data.

### Overall candidate country performance

In 2023, the average maturity score on the quality dimension for the participating candidate countries was 50 % (Figure 54). Ukraine remains the top performer at 94.0 %. All the participating candidate countries have improved their score since 2022, with Serbia experiencing the most significant year-on-year increase of 14 pp.

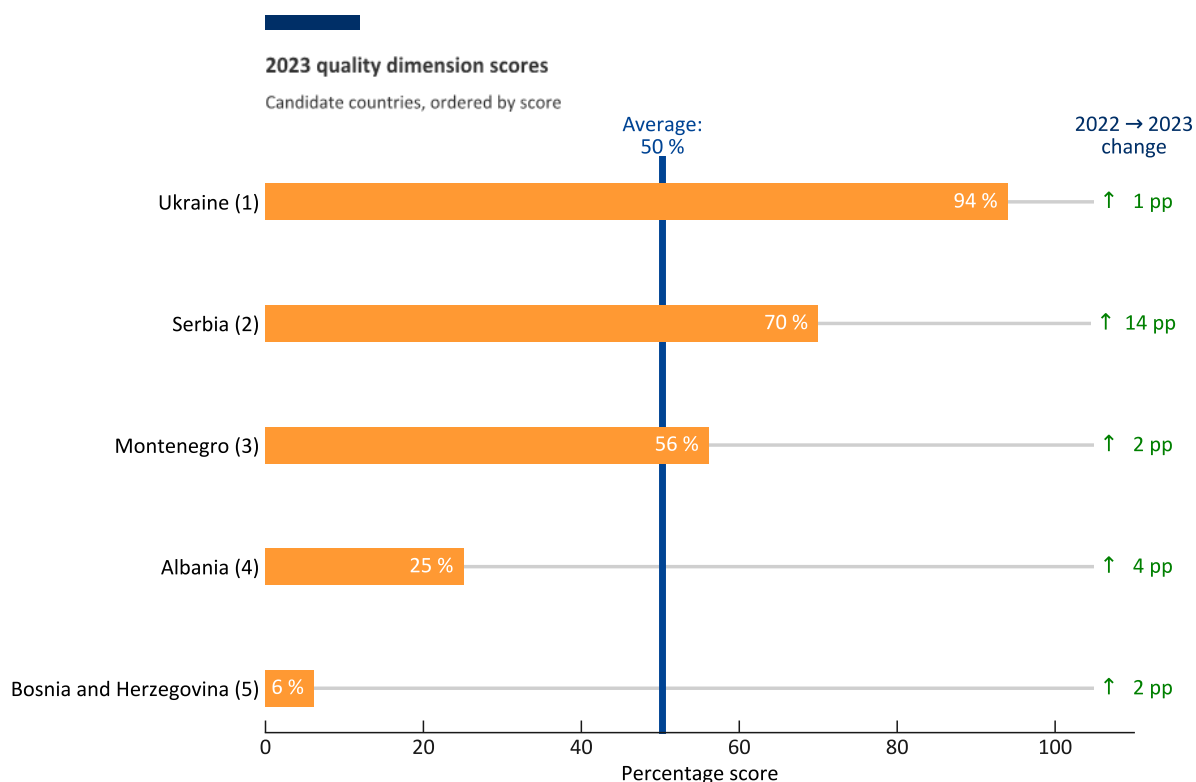


Figure 54: Candidate country scores on the quality dimension

<sup>(294)</sup> <https://5stardata.info/hr/>.

Figure 55 shows the distribution of scores on each indicator of the quality dimension for the candidate countries. Both **Bosnia and Herzegovina** and **Ukraine** have narrow distributions, meaning that they score consistently across the indicators. On the other hand, **Albania** has the widest score distribution, scoring low on DCAT-AP compliance but high on metadata currency and completeness. **Bosnia and Herzegovina**, **Albania** and **Serbia** could focus on the compliance of their metadata with DCAT-AP to improve their lowest-scoring indicator. In contrast, **Montenegro** and **Ukraine** could concentrate on the metadata currency and completeness indicator, their lowest-scoring indicator.

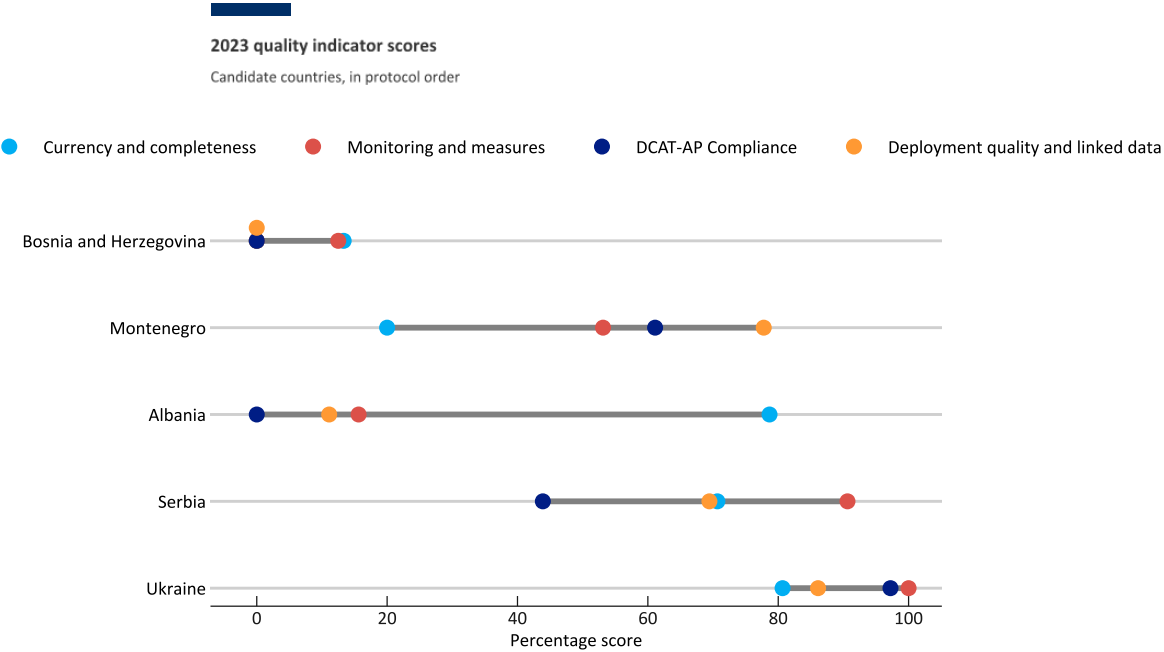


Figure 55: Quality indicator scores for each candidate country

## Chapter 7: 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 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 countries in more mature clusters. Clustering also enables more focused recommendations to be formulated for each group of countries. This chapter explains the clustering method and then delivers recommendations for each cluster of countries.

### 7.1. 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 named: beginners, followers, fast-trackers and trendsetters. The clusters are visualised in Figure 56.

Most countries (27 out of 35; 77 %) have a maturity score above 73 %, which is the 25th percentile. The distribution is therefore skewed towards higher scores, meaning that most countries have high scores. The skewed distribution manifests as a clear gap in scores between the 65 % and 73 % marks, below which the least mature cluster lies, namely the **beginners** (14–65 %) (the beginners cluster coincidentally falls below the 25th percentile). The remainder of the countries are more tightly packed. A reasonable boundary between the **followers** and the **fast-trackers** was judged to lie at the 86 % mark, which defines the followers as countries with scores between 73 % and 85 % and the fast-trackers as countries with scores between 88 % and 95 %. The most mature cluster, the trendsetters, is made up of countries whose maturity score falls in the top 10 % of participating countries (i.e. those scoring above the 90th percentile). The **trendsetters**, therefore, score between 96 % and 98 %.

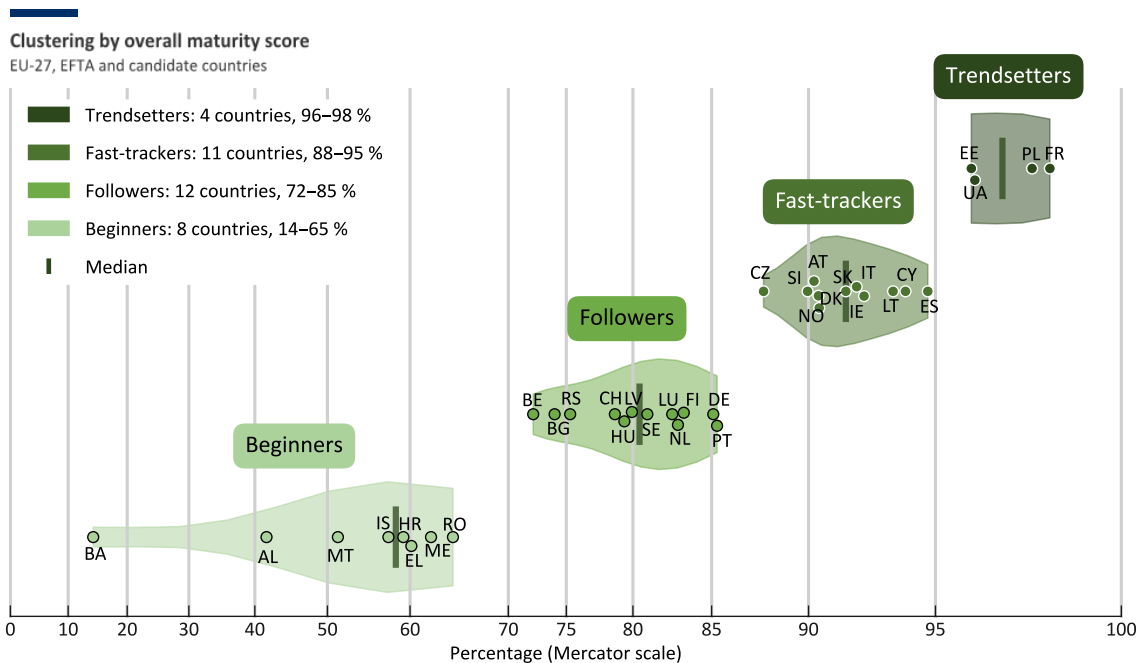


Figure 56: Four-group clustering of participating countries based on overall maturity score

The clusters are as follows.

- **Trendsetters (96–98 %)**. Estonia, Ukraine, Poland and France.
- **Fast-trackers (88–95 %)**. Czechia, Slovenia, Norway, Denmark, Austria, Slovakia, Ireland, Italy, Lithuania, Cyprus and Spain.
- **Followers (73–85 %)**. Belgium, Bulgaria, Serbia, Switzerland, Hungary, Latvia, Sweden, Luxembourg, the Netherlands, Finland, Germany and Portugal.
- **Beginners (14–65 %)**. Bosnia and Herzegovina, Albania, Malta, Iceland, Croatia, Greece, Montenegro and Romania.

Figure 57 shows the average score on each open data dimension for each cluster. The **trendsetters** have the highest average score on all four dimensions. However, among the four dimensions, the portal and quality dimensions are below the cluster average (97 %), with the quality dimension scoring the lowest of the four. The **fast-trackers** have a similar scoring profile to the trendsetters, with the portal and quality dimension scoring below the cluster average (92 %) and the quality dimension being the least mature. The **followers**, on the other hand, score above the cluster average (80 %) on the policy and portal dimensions. The quality dimension falls below the cluster average and the impact dimension is the least mature by a large gap. The **beginners** outperform on the policy dimension compared with their cluster average (51 %). The score for the portal dimension is also above the cluster average. Although the beginners perform relatively well on the policy and portal dimensions, their scores on these dimensions are at least 15–20 pp lower than those of the followers. The quality dimension falls below the cluster average and the impact dimension trails significantly compared with the average scores on the other three dimensions.

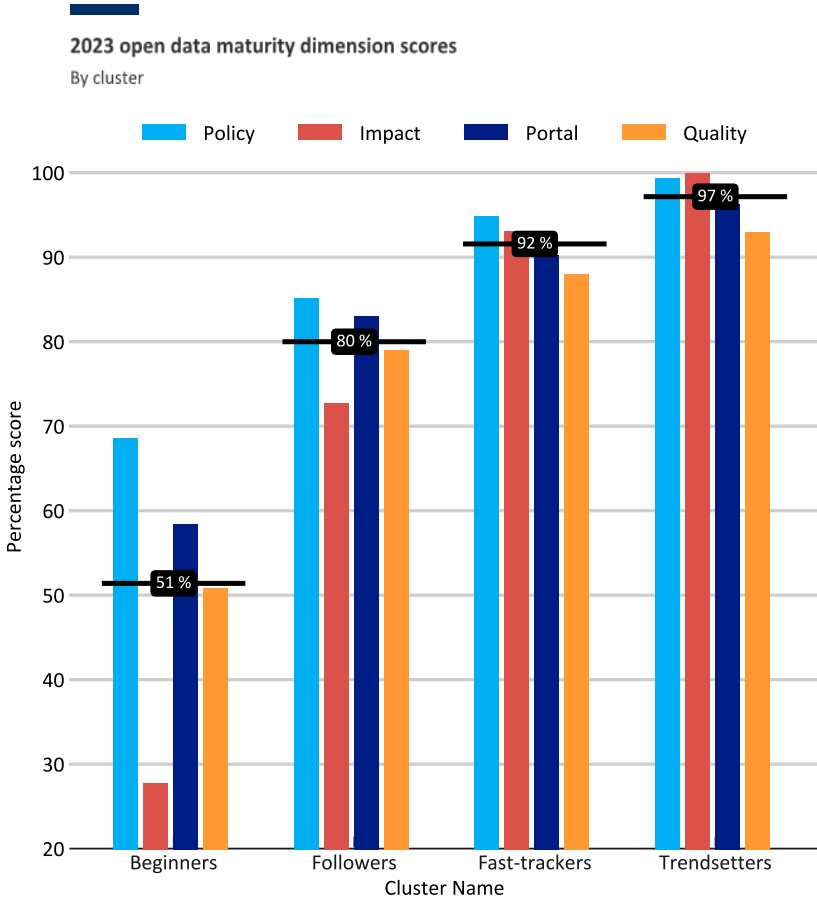


Figure 57: Average scores on each dimension of the ODM assessment for the four clusters

These groupings offer indicative profiles that exemplify the maturity level of the countries in each cluster (Table 15). Of course, the descriptions of these clusters generalise the characteristics of the countries within them.

Table 15: General characterisation of the four maturity-based clusters

Cluster	Characteristics
<b>Trendsetters</b>	<p>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.</p> <p>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.</p> <p>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.</p>
<b>Fast-trackers</b>	<p>The country shows a good level of maturity in all dimensions. Overall, the country demonstrates activities to boost data publication, with a strategic approach to increasing the quality of published metadata and increasing compliance with quality standards.</p> <p>The national portal provides a good level of functionalities that cover the needs of basic and advanced users.</p> <p>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.</p>
<b>Followers</b>	<p>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.</p> <p>Some activities are conducted to boost the publication of high-quality metadata from different providers; however, often, a systematic approach to ensuring higher publication quality across the board is lacking.</p> <p>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.</p>



<p><b>Beginners</b></p>	<p>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.</p> <p>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.</p> <p>More action is needed to enable high-quality data publication, and limited efforts are directed towards ensuring the adoption of DCAT-AP standards. Visible limitations exist regarding open data publication, with only a few reuse examples.</p>
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## 7.2. Recommendations

The following general advice is applicable to each cluster of countries to help them improve on their current ODM assessment scores.

### Trendsetters

#### **Maintain the ecosystem, experiment and share knowledge**

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.
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 the 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 beyond state funding, for example by charging for value-added services on the portal. 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 experimental impact assessment framework. In addition, start developing country-specific metrics to measure impact. 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 ensure a variety of insights. Improve the method iteratively over time.
5. Continue to assess the economic impact of open data at both micro- and macroeconomic levels. Reiterate such 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. Enable users to comment on and rate datasets

and embed their feedback and ratings in the search algorithms. Enable publishers to improve their data publication based on reusers' feedback and ratings.

7. Continue to improve the quality of both metadata and data by boosting the use of tools on your portal (e.g. for the validation of metadata). 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. Prepare for the Data Governance Act by evaluating options to extend the 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. The assessment covered in this report focuses on the implementation of the open data directive, with particular attention to the adoption of high-value datasets. However, other EU legislation, such as the Data Governance Act and Data Act, will have a substantial impact on European countries. Moreover, by preparing for the Data Governance Act, European countries can continue their efforts to increase the visibility of public sector information on their portals. 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.
9. Work with training institutions on providing advanced open data courses and training, and tailor training curricula to cover more advanced topics. Make such courses formally recognised and provide certification upon successful completion.
10. Share your knowledge and the results of your experimentation with other countries and enable them to learn from your best practices and contribute to your research, for example in shared areas of focus or where you experience similar barriers. Reach out and cooperate with other countries on developing 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**

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 organisations (e.g. develop 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 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 formats (e.g. hackathons) to formats that enable business opportunities to increase medium- to long-term engagement. 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 high-value datasets 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 topic 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. As the open data directive is implemented in your country, adapt the national portal to ensure the clear visibility of the datasets. Update the portal to engage your audience better. 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 taking the opportunity to promote the developers as well.
7. Monitor access and usage of the portal and enhance knowledge in your team of the profiles of your portal's typical users. Ensure the reusers' privacy when performing web analytics and be explicit with them about how the insights will be used. Enable such insights to flow into improving the portal features, the access to data and the variety of data published in your country.
8. 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 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 Data Act and start exploring options to address them.
9. 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 and blog items written by the community), by providing value-added features and by exploring additional funding options.
10. Enforce minimum standards on the quality of metadata and data by using analytics tools to monitor data publication – for both metadata (compliance with the DCAT-AP schema) and data (publication formats). Develop validation schemas 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**

1. Update the national strategy on open data to reflect technical and policy developments at the EU level. In particular, address the requirements of the latest open data directive by identifying high-priority domains and high-value datasets for publication through APIs. Support publication through legislation where suitable.
2. Set up a governance structure that accounts for the characteristics of your country. Engage potential reuse groups (e.g. data 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 on the actions of each sector.
3. Develop a yearly plan for online activities (events, conferences, etc.) to promote open data. Focus on 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 on a medium- to long-term basis (e.g. data challenges). 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 experience 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 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 in line with this demand. Focus on fostering open data reuse by the public and private sectors and encourage the 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. Carry out regular updates to 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 APIs 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 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 Data Act.
  9. Increase 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.
  10. 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 to clean up data, and specifically the use of validators for metadata compliance.

## Beginners

### Think big, act small

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).

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 high-value datasets as a point of focus.
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 data publication best practices and reuse cases during these events.
5. Establish relevant communication channels and 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. 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, evaluate 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, specifications and existing guidelines developed at the European level.
9. Make sure you run and maintain a modern portal that enables 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 to promote relevant developments and showcase reuse. Ensure 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.
10. 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 is carried out. Ensure that sufficient resources are allocated to open data awareness-raising activities with both publishers and potential reusers.

## Conclusions

Countries in Europe continue, on average, to improve in the four dimensions of ODM covered by the ODM methodology: **policy**, **impact**, **portal** and **quality**. All but five EU Member States have increased their overall ODM score year-on-year. In particular, improvements in the impact and quality dimensions drove improvements in overall ODM in 2023.

The relative ranking of the dimensions remains unchanged from 2022. **Policy** continues to be the most mature dimension on average. Two and a half years after the open data directive (Directive (EU) 2019/1024) needed to be transposed into national law (by July 2021), EU Member States are realising their open data policies through practical measures and activities. The governance and implementation of open data initiatives in particular have improved year-on-year. Member States are starting to prepare for high-value datasets, with some categories, such as geospatial and statistics datasets, and some tasks, such as identifying and inventorying high-value datasets and addressing legal barriers, showing more progress than other areas.

While the **portal** dimension remains the second most mature, it has matured the least on average among the four dimensions year-on-year. The provision of data has improved the most year-on-year, and portal usage has continued to increase. Several Member States have recently modernised their portals or launched new ones with more advanced features. Overall, however, portal features have not changed significantly since the last benchmarking exercise.

While it still ranks third in terms of maturity, average scores on the **quality** dimension have significantly increased year-on-year, closing the gap with the **portal** dimension. Measures to monitor and improve metadata quality in particular have increased year-on-year, suggesting that Member States are supporting data providers in their efforts to increase the quality of their metadata. These efforts are reflected in improved DCAT-AP compliance and data deployment quality. However, the currency and completeness of metadata have slipped slightly compared with the previous year.

**Impact** remains the least mature dimension, but it has seen the greatest year-on-year improvement. One reason for the **impact** dimension scoring the lowest among the four dimensions is that open data reuse and the impact resulting from this reuse are partly outcomes of the other dimensions. In other words, a good open data policy, a good portal and good metadata quality encourage reuse, and reuse can lead to impact. Of course, specific efforts are needed to stimulate reuse and create impact, but maturity in the other dimensions supports this. Member States have significantly improved year-on-year in their actions taken to document reuse, the methodologies used to collect and classify those reuse cases and the activities performed to understand the requirements behind reuse cases. This has translated into a greater awareness of available reuse cases. However, systematically collected data on the impact created by open data, such as from impact assessments, is still largely unavailable.

Looking ahead, one of the periodic revisions of the ODM methodology is planned for 2024, which will see the 10th anniversary of the ODM assessment. Countries have significantly improved since the initiative was launched. The intention is to systematically stimulate ODM in Europe, pushing it beyond its current level, and to keep pace with policy changes while ensuring consistency and comparability with previous ODM assessments.

The data-sharing ecosystem in Europe continues to evolve. The Member States must apply the implementing regulation on high-value datasets (Commission Implementing Regulation (EU) 2023/138) before June 2024. On average, the EU Member States are making greater progress on geospatial and statistics datasets than datasets in the other four categories. Although Member States

indicate good progress in terms of identifying and inventorying high-value datasets, other areas of the technical requirements are less advanced.

Furthermore, not all data can be shared under an open data licence. Nonetheless, reusing non-open data similarly holds great value for citizens, researchers, businesses, and other organisations. The Data Governance Act (Regulation (EU) 2022/868) and the Data Act (under proposal) introduce measures to increase data availability and overcome technical obstacles to the reuse of data. Specifically, the Data Governance Act includes mechanisms to facilitate the reuse of certain public sector data that cannot be made available as open data. It also includes measures to make it easier for citizens and businesses to make their data available for the benefit of society. The Data Act includes measures that enable users of connected devices to access the data generated by these devices, as well as mechanisms for public sector bodies to access and use data held by the private sector during public emergencies. Just like open data, data issued by government that cannot be made open must also be identified and catalogued in a transparent way.

To support the additional data needs of European governments, businesses and civil society that cannot be addressed exclusively using public administrations' open data, the European Commission is establishing common European data spaces (295) to spearhead 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 in full respect of the data providers' rights and confidentiality.

Open data can be reused in data spaces as well as anywhere else, alongside industrial data. Therefore, open data is complementary to the data in data spaces and could spur further innovation in an ecosystem where more data (whether open or non-open) is made available for reuse. Moreover, data spaces may also be sources of original data, including new open data, whether derived from pre-existing open data or created by processing the data offered by data space participants in ways that make it suitable for redistribution under an open licence. These new means of accessing and sharing data may influence reusers' expectations and behaviour, for example in terms of the support they need from national open data teams and the functionality they require to create reuse cases that combine open and non-open data.

In 2024, the new waves of implementation of the European data strategy will present national open data teams with two new challenges. First, unless the responsibility sits with the team itself, the open data team must coordinate with peer civil servants who are leading the new data-sharing government initiatives related to the Data Governance Act and data spaces. Second, the open data team needs to increase its efforts to inform citizens of the new opportunities and educate them about the new data sources, in addition to the traditional open data offering. All of this without spreading its limited resources even thinner. Ultimately, the benefits for citizens and businesses will make the extra effort worth it.

Next year, 2024, is also an election year for the European Parliament and a new 5-year legislative term. Although the authors do not expect dramatic changes in the trajectory on which the European data strategy is implemented, it is natural to perceive some uncertainty around the speed of implementation and the means of its continuation under a new administration. For the many civil servants for whom the opportunities arising from data represent a compelling means to improve the lives of citizens, it is paramount that next year is not spent waiting for guidance and direction; rather, it should be a fruitful time, giving rise to renewed energy and ambition for their data programmes.

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<sup>(295)</sup> <https://digital-strategy.ec.europa.eu/en/library/staff-working-document-data-spaces>.

