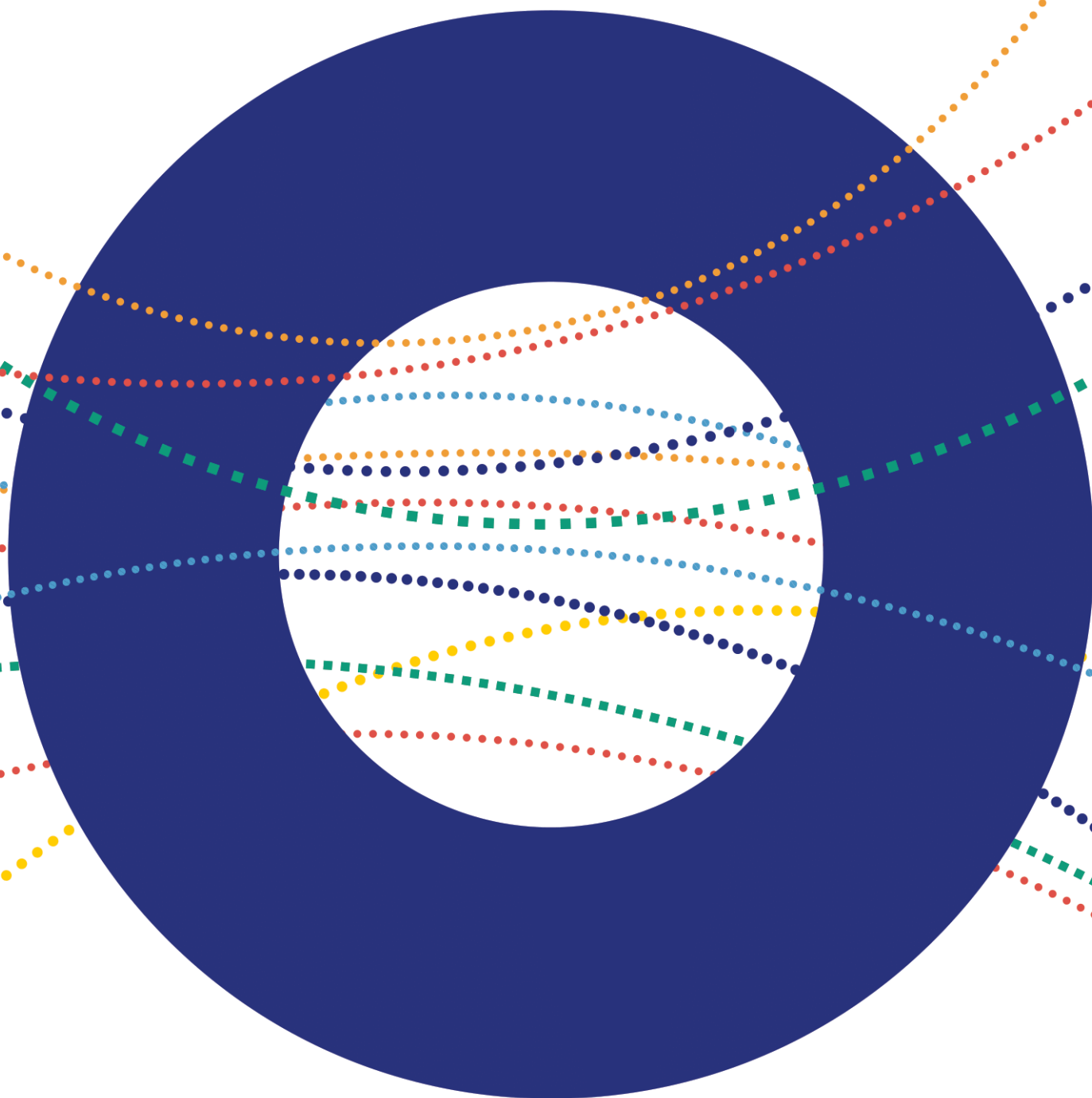




Open Data Maturity Report 2021



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Executive Summary

The *Open Data Maturity* assessment 2021 benchmarks the development of European countries in the field of open data.¹ This is the seventh consecutive annual report by data.europa.eu² (formerly conducted by the European Data Portal). This report aims to support countries to better understand their level of maturity, to capture their progress over time, to find areas for improvement, and benchmark this against other countries. Additionally, the study provides an overview of best practices implemented across Europe that could be transferred to other national and local contexts. The assessment measures maturity against four open data dimensions:

- **Policy:** focusing on countries' open data policies and strategies
- **Impact:** looking into the activities to monitor and measure open data re-use
- **Portal:** assessing portal functions and features that enable users to access open data via the national portal and support interaction within the open data community
- **Quality:** focusing on mechanisms that ensure the quality of the (meta)data

Three trends found during the assessment are highlighted below: the transposing of the Open Data Directive into national law, the more prominent focus on measuring open data impact, and the continued value creation of the COVID-19 pandemic. Afterwards, the overall ranking, country clustering, and developments per dimension are summarised.

Trends and findings of the Open Data Maturity assessment 2021:

1. Member States update their policies to transpose the Open Data Directive into national law.

Many Member States reported that they are in the process of, or have already completed, transposing recent development in EU regulation regarding open data and high-value datasets into national law. The Directive (EU) 2019/1024 of the European Parliament and of the Council³ (further referred to as the Open Data Directive) came into force in July 2019 and is the key piece at the centre of the European Union legal framework that regulates open data, and the re-use of public sector information (PSI).

The Open Data Directive requires the adoption of a future implementing regulation by the European Commission, i.e., of a list of high-value datasets to be provided free of charge and through APIs. The procedure towards the adoption of the implementing regulation is still ongoing, this landscaping exercise got a first glimpse of the approach Member States will use to implement the upcoming regulation, showing the activities that countries are performing to comply with EU regulation.

¹ It assesses the level of open data maturity in the European Union's Member States (EU27), the participating European Free Trade Association (EFTA) countries Iceland, Norway, and Switzerland, the participating Eastern Partnership (EaP) countries Georgia and Ukraine, as well as Montenegro and the UK.

² [Data.europa.eu](https://data.europa.eu) is the official portal for European open data. The portal was launched in the spring of 2021, integrating the pre-existing European Data Portal and European Union Open Data Portal into a single, coherent core component of the public sector data infrastructure that has been set up by the European Union, its institutions and Member States.

³ <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32019L1024&from=EN>

2. Understanding, monitoring, and measuring open data impact is becoming more prominent.

The open data impact dimension experienced the highest improvement compared to the other dimensions, see figure 1. More and more European countries are successfully performing activities to understand and capture the extent to which open data is reused and how value is created. This is in line with one of the objectives of the Open Data Directive to reap the full potential of open data re-use. In recent years, impact was often measured by monitoring user analytics of national open data portals or by keeping a list of use cases. This year a clear trend has shown towards conducting in-depth research, such as desk research or surveys, in order to quantify and verify the open data impact. This will, in the long-term, result in a more structured and aligned approach of measuring open data impact and more accurate estimations of the impact on society and economy as a whole.

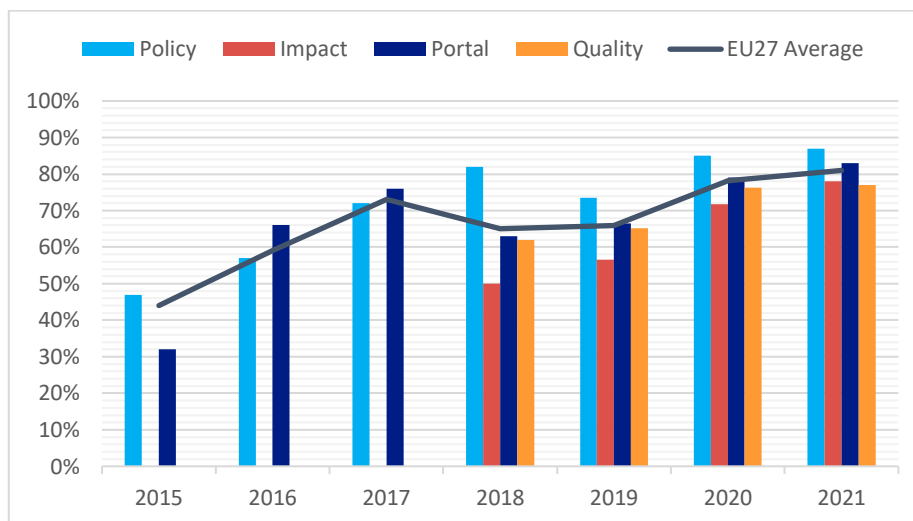


Figure 1: The Open Data Maturity scores of the EU27 (used to be EU28 until 2019)

3. In 2021, the COVID-19 pandemic continues to highlight the value and impact of open data.

The 2021 assessment proved that open data creates high social impact on raising awareness on health and wellbeing related issues, such as the current COVID-19 pandemic. Last year's assessment showed the emphasis on the importance of systematically collecting and making data available to the public as a response to the pandemic. The need to respond to the emergency led many countries to start publishing related data and developing initiatives and dashboards to make the data more easily understandable and insightful for European citizens. The initiatives and dashboards are in most cases complemented with recent statistics about national vaccination rates, vaccination productions capacities, protective equipment availabilities, intensive care capacities, etc. This year's assessment shows a continuation and strengthening of the high social impact created by these efforts.

The overall Open Data Maturity scores in 2021

Figure 2 illustrates the overall open data maturity scores of all 34 participating European countries in 2021.

- European countries are becoming more mature across the board. Countries' maturity scores are concentrated in the higher end of the spectrum.
- In 2021, the average open data maturity score of the EU27 countries is 81%, an increase of 3 percentage points compared to 2020.
- After being a top performer for seven years in a row, this year France leads the ranking for the first time with a score of 97,5%.
- The group of top performers is completed by Ireland, Spain, Poland, and Estonia, as well as Ukraine who showed an impressive growth from 17th to 6th place in the overall ranking.

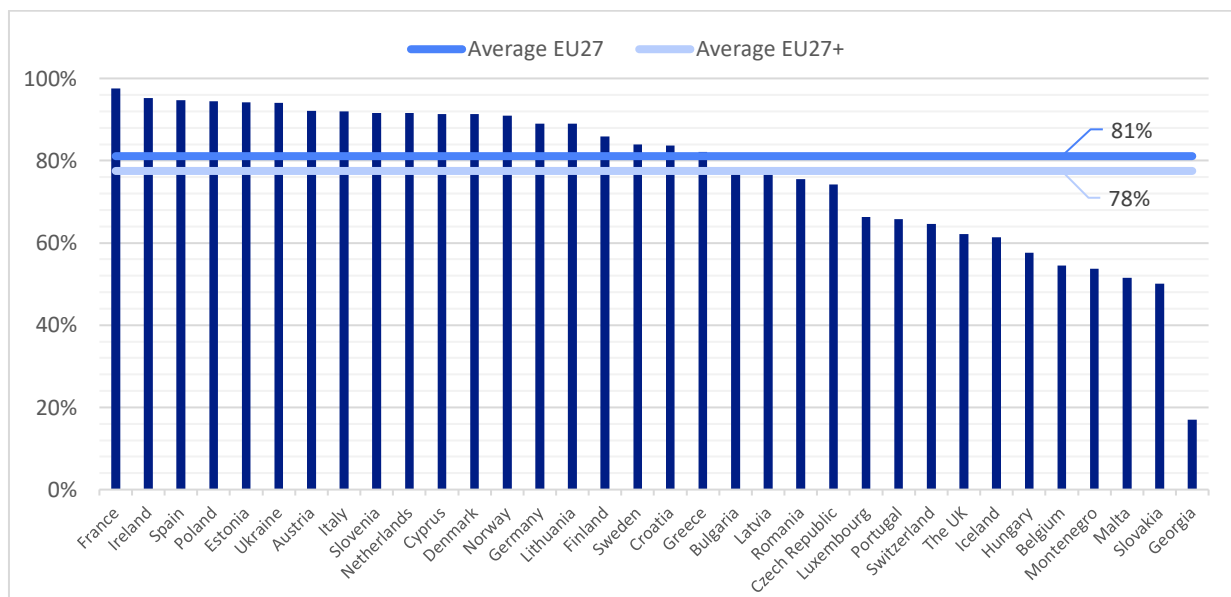


Figure 2: The overall open data maturity scores of the 2021 assessment

The clustering of the countries in 2021

The open data maturity clusters are presented in figure 3. The 2021 clustering exercise categorises countries – from low performing to high performing – as beginners, followers, fast-trackers, and trend-setters. The figure shows that:

- The maturity of European countries is concentrated in the higher end of the spectrum.
- The trend-setter cluster consists of the top performing six countries: the retained top performers Estonia, France, Ireland, Poland, Spain, and newcomer Ukraine.
- The nine countries included in the fast-tracker cluster show highly similar scores, as the cluster is concentrated on a range of 3%. In fact, the maturity scores of seven countries of the fast-tracker cluster, fall within a range of 1,5%, showing the high level of comparability between those countries in terms of open data maturity.

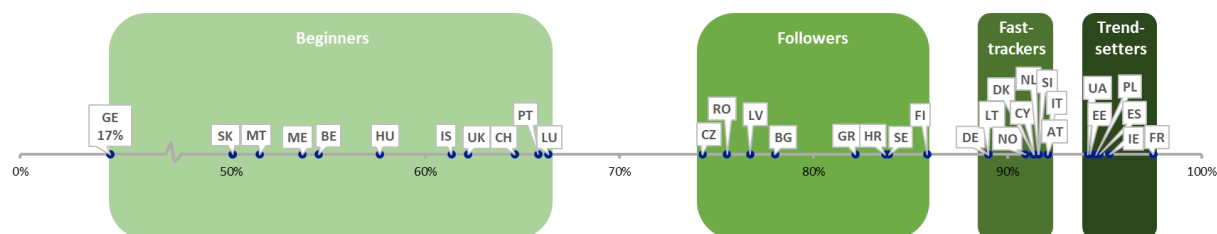


Figure 3: Clustering of the 2021 maturity scores of the participating European countries

Open Data Maturity scores on the four dimensions in 2021

Figure 4 shows the average maturity level of the EU27 on each of the four dimensions and compares it with last year's score. The figure shows that:

- All dimensions show an improvement compared to last year, showing the ongoing efforts that the Member States put into progressing the quality and quantity of open data.
- Similar to last year, policy is the most mature dimension with a score of 87%.
- The impact dimension experienced the most improvements with an increase of 6 percentage points compared to last year. There is an increasing interest in monitoring and measuring the open data re-use and the impact it generates.
- The portal dimension also shows significant improvement with a score of 83% in 2021. The launch of several new national open data portals improved the features, user analytics and sustainability of the portals.
- The quality dimensions improved only limited, making it the least mature dimension of the 2021 assessment.

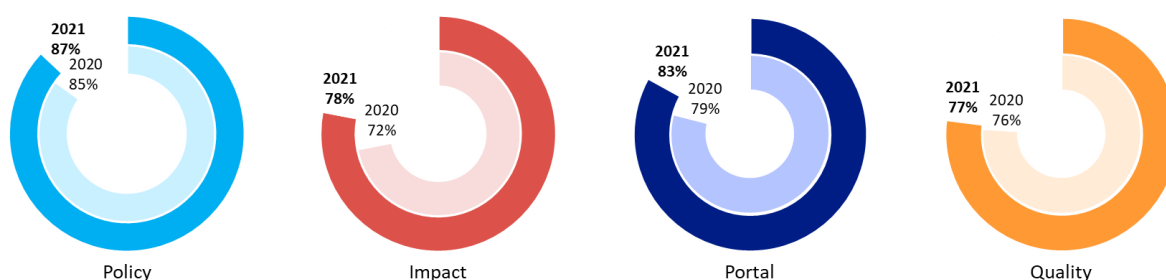


Figure 4: The 2021 maturity scores of the EU27 per dimension compared to last year

Upcoming revision of the methodology

The currently used methodology was last revised in 2018 based on maturity and focus topics. The last two years, scores of the countries are high and are gradually approaching the 100%. This proves the value of a revision of the methodology. In 2022, the methodology will undergo its next revision, especially in the context of the Open Data Directive⁴ and the implementation of the high value datasets but also to further integrate aspects such as measuring open data impact ensuring high-quality and high-value data. The new methodology will aim to stimulate the Member States to continue to improve and grow beyond the current assessment and ensure consistency and comparability of the results.

⁴ <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32019L1024&from=EN>

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Introduction

Data.europa.eu is the main point of access for European open data. The portal aims to improve access to open data, foster high-quality open data publication at all levels, and to create impact through open data re-use.

Data.europa.eu (formerly conducted by the European Data Portal) has been conducting an annual benchmarking exercise since 2015, providing European countries with an assessment of their maturity level and documenting their year-on-year progress. The objective of the study is to support the development of countries in terms of their open data practices and enable them to learn from each other.

This report provides an extensive overview of the open data maturity assessment of 2021. Additionally, the report discusses some best practices implemented across Europe that could be transferred to other national and local contexts.

Complementary to this report, the data gathered in this year's assessment – as well as previous editions – are publicly available on the Open Data Maturity Dashboard on data.europa.eu⁵. In addition, country-specific factsheets are provided, which provide a more detailed insight at national level into the results on the four open data dimensions (policy, impact, portal, and quality) in comparison with the average of the Member States and the results from previous years.

The structure of the Open Data Maturity report 2021

The report consists of an introduction, seven chapters analysing the results of the assessment, and finally the conclusions are summarised. In more detail:

- The next section, “**measuring open data maturity**”, summarises how open data maturity is measured within the assessment.
- **Chapters 1-4** provide a detailed assessment of the four open data dimensions in the 27 EU Member States: 1) policy, 2) impact, 3) portal, and 4) quality.
- **Chapter 5** offers an overview of open data maturity in countries outside the EU27 who participated in the 2021 edition of the assessment. This includes EFTA countries, EaP countries, Montenegro, and the United Kingdom.
- **Chapter 6** presents the clustering of the countries into four categories according to their performance: beginner, followers, fast-trackers, and trend-setters. Additionally, the key insights related to the grouping are described.
- **Chapter 7** provides a set of recommendations for the countries depending on the cluster they are associated with, providing indicative guidance for policymakers, portal owners, and other stakeholders to push the open data agenda forward.
- Finally, the **conclusions** are underlined in the final section of the report. This includes main takeaways and reflections from the 2021 landscaping exercise.

⁵ <https://data.europa.eu/en/impact-studies/open-data-maturity>

Measuring open data maturity

This is the seventh edition of the annual open data maturity assessment. In the period 2015-2017 the open data maturity measurement was built on two key indicators: “readiness” and “maturity”, covering the policy developments at country level and the level of sophistication of the national open data portals. A major update to the methodology was carried out in 2018 to better reflect the open data developments taking place across Europe. The 2018 methodology became more ambitious and comprehensive and set a stronger focus on the quality of open data as well as the re-use and impact derived by open data. The scope of the assessment has since then been broadened to comprise four dimensions: policy, impact, portal, and quality.⁶

Every year, the data is collected through a questionnaire sent to the national open data representatives working in collaboration with the European Commission and the Public Sector Information Expert Group. The questionnaire is structured along the four open data dimensions and includes detailed metrics for each dimension to assess the level of maturity.⁷ Dimensions and metrics have been maintained since 2018, to improve clarity or address ambiguities in response to the open data representatives’ feedback. A revision of the methodology is scheduled for 2022.

The definitions of the four open data dimensions are outlined below. The detailed metrics per dimension are presented in the table below.

Open Data Policy focuses on the presence of specific policies and strategies to foster open data at national level. The dimension also analyses the existence of governance structures that allow the participation of private and third sector actors, as well as implementation measures that enable open data initiatives at national, regional, and local level. Furthermore, the dimension looks at training schemes that enhance the data literacy skills of the civil servants working with data and harvesting mechanisms that foster the discoverability of all open data available in the country.

Open Data Impact looks at the activities performed to monitor, and measure open data re-use and the impact derived by such re-use. Beyond this first layer of “strategic awareness”, the impact dimension focusses on four areas of sectoral impact: political, social, environmental, and economic. Within these areas, the questionnaire examines the extent to which monitoring is in place to document the re-use of open data published in these fields, the extent to which applications, products, and services have been developed to address challenges in these fields, as well as the extent to which civil society initiatives exist that are based on such open data and supported by government institutions. In addition, the dimension includes the efforts taken to commission and conduct studies that measure the impact created through open data re-use in each of the impact areas.

Open Data Portal focuses on advanced portal functions that enable both versed and less versed users to access open data via the national portal and features that enhance the interaction between publishers and re-users (via forum and discussion boards). Additionally, the dimension assesses the extent to which portal managers use web analytics tools to better understand their users’ needs and behaviour and update the portals’ features in line with the insights gained from these analyses. The dimension examines the open data coverage across different domains, as well as the approach and measures in place to ensure the portal’s sustainability.

⁶ An extended methodology report can be found on the Open Data Maturity Dashboard, available at <https://data.europa.eu/en/impact-studies/open-data-maturity>

⁷ The complete questionnaire used for the assessment can be found on the Open Data Maturity Dashboard, available at <https://data.europa.eu/en/impact-studies/open-data-maturity>

Open Data Quality focuses on the measures adopted by portal managers to ensure the systematic harvesting of metadata from sources across the country, as well as the currency of the available metadata and where possible the actual data, the monitoring of the compliance with the DCAT-AP metadata standard as well as the quality of deployment of the published data. The fourth dimension provides impulses for portal managers and policymakers to enable open data publication that is good quality all round: using open data formats, machine-readable, high-quality, and suitable to a linked data approach.

Dimension	Metrics
Open Data Policy	Policy framework
	Governance of open data
	Open data implementation
Open Data Impact	Strategic awareness
	Political impact
	Social impact
	Environmental impact
	Economic impact
Open Data Portal	Portal features
	Portal usage
	Data provision
	Portal sustainability
Open Data Quality	Currency
	Monitoring and measures
	DCAT-AP compliance
	Deployment quality and linked data

Chapter 1: Open Data Policy

The first assessment dimension, “open data policy”, focuses on the open data policies and strategies in place at national level, the governance model by which open data is managed in each country, and the measures adopted towards the implementation of these policies and/or strategies.

The policy dimension is composed of the following indicators:

Metric	Key elements
Policy framework	Open data policies and strategies are in place at a national level to provide a long-term strategic vision and action plan for open data. The strategies incentivise open data re-use in both the public and private sector.
Governance of open data	Governance models and coordination activities are in place that ensure the publication of open data at all government levels and support local and regional open data initiatives.
Open data implementation	Data publication plans exist and progress made in line with these plans is monitored. The number of public bodies that charge above marginal costs is also monitored. Training activities for civil servants working with data are in place.

1.1 Policy framework

This indicator analyses the open data policies, strategies, and action plans in the EU27 Member States and their scope. It considers the visions and objectives around open data and the actions to implement those. Also, this indicator focuses on measures to support open data re-use by both private organisations as well as public sector bodies, and the necessary data inventories to enable re-use.

The key piece at the centre of the European Union legal framework that regulates open data, and the re-use of public sector information (PSI) is the Directive (EU) 2019/1024 of the European Parliament and of the Council⁸ (further referred to as the Open Data Directive). The Directive, which came into force in July 2019, is the latest visible output of significant and long-term EU policy effort that was inaugurated in 2003 with the first directive⁹ and forms the basis for the re-use of data from the public sector. The Open Data Directive aims to overcome the barriers that still prevent the full re-use of public sector information by encouraging Member States to facilitate the re-use of public sector data with specific focus on publishing datasets that have a high potential economic and societal impact.¹⁰

Member States had to transpose the Open Data Directive into their national laws by 17 July 2021. Most countries reported that they are in the process of transposing the Directive into national law or already completed it, examples can be found in section 1.1.1 Open data policies. The Commission is inviting countries to complete the process.¹¹

⁸ <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32019L1024&from=EN>

⁹ Directive 2003/98/EC on the re-use of public sector information available at <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32003L0098>

¹⁰ More information about the objectives of the Open Data Directive and the barriers to overcome is available at <https://digital-strategy.ec.europa.eu/en/policies/psi-open-data>

¹¹ The European Commission send a letter of formal notice to 19 countries to express their concerns as stated in their daily news of 30 September 2021. Find more information on: https://ec.europa.eu/commission/presscorner/detail/en/mex_21_4962

The Open Data Directive requires the adoption by the European Commission, via a future “Implementing Regulation”, of a list of high-value datasets (i.e., datasets whose re-use can have major benefits for society and the economy).¹² The procedure towards the adoption of the implementing regulation is still ongoing and expected for early 2022. Before its adoption by the European Commission, internal validation of the draft implementing regulation needs to be completed, then it will be open to a one-month public consultation and finally it will be submitted for opinion to the Open Data Committee composed of Member States representatives. Although the implementing act is not yet publicly available, this indicator provides a first glimpse of the approach Member States will use to implement the upcoming regulation.

1.1.1 Open data policies

Open data policies in the EU27 Member States vary from laws that are put into effect by implementing earlier EU Directives to extensive policy frameworks dedicated to open data or embedded into the broader legislative framework on data and digital developments. All EU27 Member States have a policy framework in place, 81% of the countries created an open data policy within their country, while the remaining 19% use other documentation to structure their open data practices. Additionally, 78% of the EU27 Member States indicate that their open data policy or strategy have been updated within the past 24 months. Many countries indicate they have recently completed, or are still in the process of, transposing the aforementioned Open Data Directive into national law.

In Bulgaria, the open data policy is included in the ‘Access to Public Information Act’¹³ and the ‘Ordinance on the standard terms and conditions for public sector information reuse and its publishing in open format’¹⁴. The Act and the Ordinance settle the social relationships regarding the right of access to public information, as well as the reuse of the public sector information. Similar to other countries, they indicate that the transposition of the new Open Data Directive in national legislation is forthcoming.¹⁵

In Germany, the national open data policy for the federal level has been part of the national E-Government act, which passed by the parliament in May 2017.¹⁶ In February 2021, the federal government adopted a Second Open Data Act and a Data Use Act (DNG) (corresponding to the transposition of the Open Data Directive into national law).¹⁷ The goal is to extensively expand the availability of open administrative data for the federal administration and to simplify and improve the possibilities for using publicly financed open data.

In Ireland, the transposition to the Open Data Directive by Statutory Instrument was published in July 2021. It offers guidance to all public sector bodies to coincide with the publication of the new statutory instrument. The Irish open data policy aims to encourage and drive the publication, uptake and use of open data. This will add value to the economy by increasing transparency, stimulating new business

¹² More information about the act and the adoption of it is available at: https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12111-Open-data-availability-of-public-datasets_en

¹³ <https://e-gov.bg/wps/portal/agency/home/data/opendata/opendata-legal/opendata-legal-national/data-opendata-act%20eng>

¹⁴ <https://e-gov.bg/wps/portal/agency/home/data/opendata/opendata-legal/opendata-legal-national/data-opendata-naredba>

¹⁵ <https://e-gov.bg/wps/portal/agency/home/data/opendata/opendata-legal/opendata-legal-national>

¹⁶ <http://www.gesetze-im-internet.de/egovg/>

¹⁷ <https://www.bmwi.de/Redaktion/DE/Artikel/Service/Gesetzesvorhaben/zweites-open-data-gesetz-und-datennutzungsgesetz.html>

applications, building trust in government, and improving the lives of citizens by delivering better services.

In Slovenia, the open data policy framework consists of the provisions of the Access to Public Information Act which implements the former PSI Directive.¹⁸ A proposal for the amendments to the Access to Public Information Act has been under preparation in order to implement the Open Data Directive. The proposal is in the consultation process with various stakeholders. After the consultation, the proposal can be accepted by the government and adoption by the National Assembly.

In Sweden, there is an open by default and open data policy in place through a number of policy instruments at different levels:

- The national principles for 'Open by Default'¹⁹, established by the Agency for Digital Government (DIGG)²⁰ to support the whole public sector. It includes seven principles to increase the capabilities in the public sector to publish data for re-use.
- The European interoperability framework (EIF)²¹ is nationally implemented to Sweden, governed by the Agency for digital government (DIGG). According to the framework, "data is a common resource that can be reused for purposes other than what they were originally intended for." Therefore, showing the importance of open data re-use.
- The Open Data Directive is being transposed into Swedish legislation by "The PSI law – the law of re-use for official electronic information".²² The law was, at the moment of filling in the questionnaire, on review and will be updated to transposition the revised Open Data Directive.
- The Swedish Fundamental Law states in the principle of public access that, as far as possible, the activities of government agencies, the parliament, and local government decision-making bodies should be open and official information is available for re-use.²³

1.1.2 Open data strategies

Similar to last year's assessment, 96% of the EU27 Member States indicated to have adopted an open data strategy or an equivalent. Not all countries have developed a dedicated strategy exclusively focusing on open data, but rather have the open data aspect embedded into broader digital and data related strategies for open government or have it incorporated in their open data policy documentation.

In Germany, the Federal Government adopted and published a data strategy in January 2021.²⁴ The data strategy contains a dedicated chapter for the government as role model in data provision and usage. In addition, the Federal Government's new "Open Data Strategy for the Federal Cabinet" was published in the summer of 2021.²⁵

¹⁸ <http://pisrs.si/Pis.web/pregledPredpisa?id=ZAKO3336>

¹⁹ <https://www.digg.se/utveckling-av-digital-forvaltning/oppna-och-delade-data/offentliga-aktorer/nationella-principer>

²⁰ Agency for Digital Government (DIGG): <https://www.government.se/government-agencies/the-agency-for-digital-government/>

²¹ https://ec.europa.eu/isa2/eif_en

²² https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/lag-2010566-om-vidareutnyttjande-av-handlingar_sfs-2010-566

²³ <https://www.regeringen.se/other-languages/english---how-sweden-is-governed/>

²⁴ <https://www.bundesregierung.de/resource/blob/992814/1845634/f073096a398e59573c7526feaadd43c4/da-tenstrategie-der-bundesregierung-download-bpa-data.pdf?download=1>

²⁵ <https://www.bundesregierung.de/resource/blob/992814/1940386/1d269a2ad1b6346fc60663bdea9c9f8/20-21-07-07-open-data-strategie-data.pdf?download=1>

In Lithuania, an open data strategy was defined in the Information Society Development Programme for 2014-2020, the "Digital agenda for the Republic of Lithuania".²⁶ Currently, the new Lithuanian Open Data Strategy, the "Lithuanian Digitization Development Program for 2021–2030" is under preparation. One of the objectives is to promote data availability and reuse.

In the Netherlands, the open data strategy is part of the National Data Strategy of the Netherlands.²⁷ An overarching data strategy is being developed, incorporating dealing with open data into this strategy in line with the EU Data Strategy²⁸. The Dutch government provides guidance on how to implement the EU Data Strategy.²⁹

In Poland, the Ministry of Digital Affairs (CPM)³⁰ implemented first open data strategy five years ago, the Open Data Programme 2016-2020. In 2020, the CPM developed a new open data strategy, the Open Data Programme 2021-2027. The Programme implements key issues related to open data and data management, e.g., increasing the number of dynamic and high-value datasets published by API on the national open data portal, increasing re-use and exchange of data, offering open data related education, and the consolidation of a network of open data officers.³¹

1.1.3 Open data action plans

Clear action plans and criteria by which their delivery is measured support in ensuring that the vision and goals defined in the national open data strategies are reached. Action plans are therefore often incorporated in open data policy and strategy documentation to make the next steps in the field of open data more concrete. In 2021, 25 of the EU27 Member States indicate that their national open data policy or strategy includes an action plan with different types of measures to support their open data mission.

In 2020, an "Austrian Digital Action Plan" has been formulated by the Federal Ministry for Digital and Economic Affairs (BMDW)³². The aim of the action plan is to position Austria as digital innovation location. Data solidarity should be achieved through sharing data. Main actions to be taken are, for example, increase social and economic added value through better use of data, improve data literacy through education and training, position Austria as an attractive data location for science and the economy, and ensure transparency and traceability of the data.³³

In Spain, the Aporta Initiative³⁴ developed a national open data strategy including action plans which are reviewed periodically. This plan sets out annually added action for each of the seven lines of action included in the Aporta Initiative.³⁵ This global action plan is complemented by a plan that encourages

²⁶ [https://eimin.lrv.lt/uploads/eimin/documents/files/30310_LRV%20nutarimas\(en\).pdf](https://eimin.lrv.lt/uploads/eimin/documents/files/30310_LRV%20nutarimas(en).pdf)

²⁷ <https://www.digitaleoverheid.nl/overzicht-van-alle-onderwerpen/nieuwe-technologieen-data-en-ethiek/data-agenda-overheid/>

²⁸ https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-data-strategy_en

²⁹ <https://www.rijksoverheid.nl/documenten/rapporten/2020/04/14/mededeling-over-een-europese-datastrategie>

³⁰ Ministry of Digital Affairs (CPM): <https://www.gov.pl/web/digitalization>

³¹ <https://dane.gov.pl/pl/knowledgebase/useful-materials/program-otwierania-danych-na-lata-2021-2027> or <https://dane.gov.pl/pl/article/1281,nowy-program-otwierania-danych-na-lata-2021-2027>

³² Federal Ministry for Digital and Economic Affairs (BMDW): <https://www.bmdw.gv.at/en.html>

³³ <https://www.digitalaustria.gv.at/aktionsplan.html>

³⁴ Aporta Initiative: <https://datos.gob.es/en/about-aporta-initiative>

³⁵ https://datos.gob.es/sites/default/files/datosgobes/iniciativaaporta_planaccionglobal_2021_2022.pdf

open data re-use³⁶, and a plan associated with the platform datos.gob.es, the national open data portal³⁷.

In Estonia, the “Open Data and Data Management action plans for 2021-2022” aims to reach the general goal of publishing public sector data as open by default. The action plan includes 12 actions to be implemented, such as developing a new open data portal, setting up working groups, etc.³⁸

In Slovakia, the “Open Government Partnership National Action Plan of the Slovak Republic 2020 – 2021” was recently adopted.³⁹ The plan follows up on the action plan of previous years preserving the main objectives.⁴⁰ The new plan has fewer commitments in individual chapters in order to focus more on improving the quality of commitment implementation by strengthening mutual cooperation among the Office of the Plenipotentiary of the Government for the Development of Civil Society⁴¹, individual Ministries, other central authorities, and civil society.

1.1.4 Access to real-time and dynamic data

Real-time or “dynamic” data is information whose nature makes it the most useful when it is, without delay, provided for re-use after collection. It has become more widespread with the popularity of the Internet of Things, sensors in smart devices and the social media analysis. Examples could be a weather system, which automatically retrieves real-time data from weather stations to continuously improve and update its forecast, or a public transport app that informs passengers not just of timetables, but of the actual position of the bus they are waiting for as well as the estimated time of arrival. Application Programming Interface (API) is the most popular technology used for the distribution of real-time data, and a key topic in the new Open Data Directive.

A specific focus on enabling real-time data is evident in the policies of many countries as well. In 2021, 85% of the Member States indicate that the national strategies and policies outline measures to incentivise the publication of and access to real-time data.

In Austria, the “Framework for Open Government Data platforms” determines that data available in real time needs to be retrievable through an API. The published records should be available to the public within an adequate period in a timely manner. They have to be published as soon as they are collected and compiled.⁴² Also, the current national efforts on implementing EU high value datasets and national core datasets aim to give a stimulus to the availability of dynamic data.

The Finnish “The Opening Up and Using Public Data” project contains several measures regarding open APIs, technical and semantic interoperability, as well as data quality in order to incentivise and support

³⁶ https://datos.gob.es/sites/default/files/datosgobes/iniciativaaporta_planacciondinamizacion_2021_2022.pdf

³⁷ https://datos.gob.es/sites/default/files/datosgobes/iniciativaaporta_planacciondatos.gob.es_2021_2022.pdf

³⁸ <https://avaandmed.eesti.ee/instructions/action-plans-for-open-data-and-data-management-2021-2022>

³⁹ https://www.opengovpartnership.org/wp-content/uploads/2019/12/Slovakia_Action-Plan_2019-2021_EN.pdf

⁴⁰ <https://www.opengovpartnership.org/documents/slovak-republic-national-action-plan-2017-2019-english-slovak/>

⁴¹ Office of the Plenipotentiary of the Government for the Development of Civil Society:

<https://www.minv.sk/?the-office-of-the-plenipotentiary-for-the-development-of-the-civil-society>

⁴² 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

the publication of and access to real-time or dynamic data. The project has been creating API policies by adapting the JCR API Framework⁴³ into Finnish public administration.⁴⁴

In Romania, the technical team of the national open data portal is collaborating with dynamic data holders to assist them with API usage. In doing so, they offer guides created for the developers.⁴⁵

In Slovenia, the recently adopted “Strategic Working Plan for Open Data 2020-2021”⁴⁶ includes an IoT call for smart cities that will encourage local communities to establish a real-time data flow through IoT sensors. Also, a proposal for the amendments to the Access to Public Information Act has been under preparation in order to implement the Open Data Directive. The law states that bodies that create or obtain dynamic data in the performance of public tasks shall enable their re-use immediately after they are collected and enable their mass transfer or transfer via application programming interfaces.

The Swedish national digitisation strategy outlines the importance and value of dynamic and real-time data. Specifically, “the possibilities of using real-time data to develop, for example, decision support, crisis management or transport systems are very large and should be utilised”.⁴⁷

1.1.5 Supporting the re-use of open data

The Open Data Directive focuses on stimulating open data re-use, which is visible in the national open data instruments of the Member States. In 2021, 89% of the countries indicate that their open data policy of strategy outline measures to support the re-use of open data by the public sector, and 85% also indicate to have measures in place to support re-use of open data by the private sector.

To ensure the possibility of open data re-use, 93% of the Member States’ open data policy or strategy mandates carrying out and maintaining a data inventory by public bodies, whether at national or local levels. Out of this group, 81% indicate that these data inventories also include the data collected by public bodies that cannot be published as open data.

In Denmark, all parties of the “Basic Data Programme” are obliged to maintain their data inventories.⁴⁸ To stimulate the re-use of these inventories by both public and private organisations, the national digital strategy is measured and followed by strong governance.⁴⁹

The French Prime Minister Jean Castex ordered each Ministry to develop a data strategy roadmap in his April 2021 circular.⁵⁰ Such roadmaps will list the objectives related to steering, opening, circulation, and sharing of data. He asked ministries to reference open data on the national portal data.gouv.fr. Within this framework, Ministries are drafting data inventories in order to comply with the government objectives. Also, the Prime Minister reiterated the need for public administrations to strive for open data circulation and re-use. One of the roles of the ministerial chief data officers will be to monitor such measures.

⁴³ <https://joinup.ec.europa.eu/collection/api4dt/news/api-framework-implemented-finland>

⁴⁴ <https://docs.google.com/document/d/114G3o2GL4VV086mOpn2B3rcZligMdJuP/edit#heading=h.gidgxs>

⁴⁵ <https://data.gov.ro/pages/developers>

⁴⁶ https://podatki.gov.si/sites/default/files/reports/Open%20Data_Strates%CC%8Cki%20delovni%20plan_julij2020.pdf

⁴⁷ <https://www.regeringen.se/regeringens-politik/digitaliseringsstrategin/>

⁴⁸ <https://digst.dk/data/grunddata/organisering/>

⁴⁹ <https://digst.dk/strategier/digitaliseringsstrategien/>

⁵⁰ <https://www.legifrance.gouv.fr/circulaire/id/45162>

The Latvian Open Data Strategy⁵¹, describes scenarios for open data re-use, highlights its benefits, and recommends institutions that support with the re-use of open data for both private and public sector organisations. Also, the action plan, included in the strategy, lists activities to support entrepreneurs in creating innovations using open data.

Prioritising high-value datasets

As already mentioned, the European Commission is in the process of developing EU regulation concerning a list of high-value datasets held by the public sector.⁵² 24 of the EU27 Member States (89%) indicate to have high-value domains or datasets identified and prioritised for publication. All Member States have measures in place to assist their stakeholder's involvement in this prioritisation process, often in the form of meetings, working groups, or discussion forums.

In Austria, the Cooperation OGD Austria represents the official forum for exchange and action for regular improvement on open government data. All public sector bodies (ministries, states, cities, and municipalities) and stakeholders are welcome to contribute within this framework and the joint implementation of priorities.

The Bulgarian open data team indicated that many non-governmental organisations, institutes and universities, as well as businesses declare their desire to support the high-value datasets prioritisation process. Joint working groups are being set up in different areas in order to identify as accurately as possible those datasets that are of greatest interest.

In Germany, various data providers and data users were involved in the identification of appropriate datasets through an online survey and workshops in order to prepare for the recently commissioned study 'High Value Datasets in Germany'⁵³.

In Lithuania, the Information Society Development Committee⁵⁴ carries out regular consultations with public bodies on the preparation of a prioritised list of open datasets in each domain. The Committee is currently working on the second stage of the project, data opening. During the project, a list of 583 prioritised open datasets is prepared in collaboration with 51 data owners and will be openly available by 2023.

1.2 Governance of open data

This indicator considers the governance models in place that ensure the publication of open data at all government levels. In addition, the indicator considers the appointment of official roles in civil service that are dedicated to open data and the extent to which open data activities are organised throughout the country to foster the exchange of knowledge on the topic.

1.2.1 Governance structures

All 27 EU Member States indicate to have a governance structure in place to enable the participation and inclusion of various open data stakeholders. The governance structure mainly serves the goal of

⁵¹ <http://tap.mk.gov.lv/lv/mk/tap/?pid=40472319>

⁵² More information about the act and the adoption of it is available at: https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12111-Open-data-availability-of-public-datasets_en

⁵³ https://www.bmwi.de/Redaktion/DE/Publikationen/Studien/studie-hochwertige-datensaetze-in-deutschland.pdf?__blob=publicationFile&v=16

⁵⁴ Information Society Development Committee: <https://ivpk.lrv.lt/en/>

assisting data providers with their open data publication process. In many countries (93%), the governance structure and operating model are published online and accessible to the public.

In Germany, the Competence Center for Open Data (CCOD)⁵⁵ is responsible for promoting and assisting the data publication process at national level and provides help and assistance for the states. Furthermore, the German government is working on a technical solution to connect all existing German data portals with govdata.de, the national portal, being the central entry point for open data requests. The new open data strategy includes an overview of all stakeholders involved with open data.⁵⁶

In Estonia, the Ministry of Economic Affairs and Communications (MoEAC)⁵⁷ is responsible for open data policy in Estonia. The public sector inter-departmental open data working group involves members from different interested ministries and other public sector organisations. The working group meets at least 6 times a year and participation is open to non-members as well (e.g., civil society, private companies, academia). The working group discusses broad issues, from organisations' practical needs to strategic open data policy issues.⁵⁸

The Government of Hungary adopted the "Artificial Intelligence Strategy"⁵⁹ while simultaneously instituting the Hungarian Data Asset Agency (NAVÜ)⁶⁰. The NAVÜ establishes the structured institutional framework of government tasks related to the development of the digital ecosystem of Hungary. The most important task of the agency is to make public databases available in a regulated framework. The aim is to make public administration more effective, and the development of the economy and enterprises substantiate. The NAVÜ's tasks include operating the national public data portal and supporting data providers in the process of publishing open data.⁶¹

The open data governance structure can take many forms. For example, there could be a strong central coordination (top-down) or a more decentralised structure in which initiatives are developed and pursued at the local level, with little need for central guidance if not coordination (bottom-up). The great majority (81%) of Member States use a hybrid model for governing open data in their countries. The remaining group of countries (19%) implemented a top-down approach. None of the EU27 Member States opted for an exclusive bottom-up model.

In Ireland, a top-down approach is used for governing open data. The open data policy is set and coordinated at the national level by the Department Public Expenditure and Reform (DPER)⁶² and is a key element of the government's reform agenda. DPER is responsible for the implementation of government reform across all levels of government, both central and regional. The positioning of the governance structures for open data within DPER provides the structure and ability to drive the policy

⁵⁵ Competence Center for Open Data (CCOD):

https://www.bva.bund.de/DE/Services/Behoerden/Beratung/Beratungszentrum/OpenData/opendata_node.html

⁵⁶ https://www.bmi.bund.de/SharedDocs/downloads/DE/publikationen/themen/moderne-verwaltung/open-data-strategie-der-bundesregierung.pdf?__blob=publicationFile&v=4

⁵⁷ Ministry of Economic Affairs and Communications (MoEAC): <https://www.mkm.ee/en>

⁵⁸ <https://avaandmed.eesti.ee/instructions/avaandmete-poliitika>

⁵⁹ <https://ati.ec.europa.eu/news/hungary-has-published-its-strategy-artificial-intelligence>

⁶⁰ Hungarian Data Asset Agency (NAVÜ): <https://www.navu.hu/>

⁶¹ https://knowledge4policy.ec.europa.eu/ai-watch/hungary-ai-strategy-report_en

⁶² Department of Public Expenditure and Reform (DPER): <https://www.gov.ie/en/organisation/departments-of-public-expenditure-and-reform/>

as national policy with central government departments, local government, government agencies, and all public bodies.

The Spanish government uses a hybrid data governance model. The coordination of different data initiatives, at the ministerial and regional government, takes place through sectoral groups (top-down). In parallel, the government is proactive towards requests of local entities and events hosted by organisations closely linked to citizens, such as the association of infomediary companies (ASEDIE) (bottom-up).

1.2.2 Network of open data officers

To promote and encourage open data publication by public bodies across a country, and to ensure an active dialogue between the national open data team and public administrations, it is beneficial to set up a network of open data ambassadors. These roles, sometimes called open data or PSI “liaison officers”, or “data stewards”, act as contact points across government for all matters related to open data. Their function often entails promoting and supporting the publication of open data within their organisation, maintaining an active dialogue with other liaison officers and the national open data team, exchanging knowledge, and ensuring publication on the national portal. In 2021, 89% of Member States use open data officers as part of their governance models.

In Czech Republic, the Council of Government for Information Society⁶³ established the “Open Data Working Group”. The group consists of 14 open data coordinators from ministries and public bodies from both a regional and national level. A priority list is regularly presented and discussed with members of the Open Data Working Group. The group also provides open data training for civil servants, workshops and consultation for introducing open data policy into all public bodies.

In France, two types of actors are appointed within ministerial organisations, “Chief Data Officers” and “Open Data Officers”. Chief data officers (CDOs) are proactively appointed by ministries, as asked by the Prime Minister in his April 2021 circular. They are in charge of the data policy within their ministries. Etalab leads the network of CDOs and supports them in the implementation of their missions, including the opening and circulation of its data.⁶⁴ Open data officer is not a mandatory role, since open data is a prerogative of the CDO. Nevertheless, some ministries and inter-ministerial services choose to appoint open data officers alongside the CDOs, with the specific role of instilling the open data policy within their structure. The open data officer's missions are to identify the databases whose opening would have the greatest impact, to act as an intermediary between Etalab and the divisions of his ministry and to report needs and feedback to the CDO.

In Lithuania, all public bodies are obliged to appoint a person responsible for organizing the opening of the authority's data, the “Open data Coordinator”. The assigned coordinator has to ensure the process of opening of data, its supervision and compliance with the requirements laid down in the “Law on the Right to Receive Information from State and Municipal Institutions and Agencies”⁶⁵.

1.2.3 Fostering open data initiatives throughout the country

In order to foster open data re-use and stimulate data publishing, governments often support institutions in facilitating open data initiatives. These open data initiatives can include operating

⁶³ Council of Government for Information Society: <https://www.vlada.cz/en/ppov/rvis/government-council-for-information-society-74186/>

⁶⁴ <https://www.data.gouv.fr/fr/datasets/liste-des-administrateurs-ministeriels-des-donnees/>

⁶⁵ <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/TAIS.440732?jfwid=-fxdp8hxx#:~:text=Obtaining%20Private%20Information,-1.,information%20shall%20not%20be%20provided.>

regional or local portals for municipalities or cities as well as activities to boost re-use, such as hackathons, conferences, re-user meetings, competitions and studies into benefits and challenges of publication and re-use. In 2021, all EU27 Member States indicate that, at least some of the open data initiatives, either local, regional, or national, are facilitated or supported at the national level.

In 96% of Member States, local and regional public bodies conduct open data initiatives. In 85%, the national open data policy incentivises and supports these local or regional initiatives. Figure 5 shows a small increase in the amount of local and regional public bodies to conduct open data initiatives compared to last year.

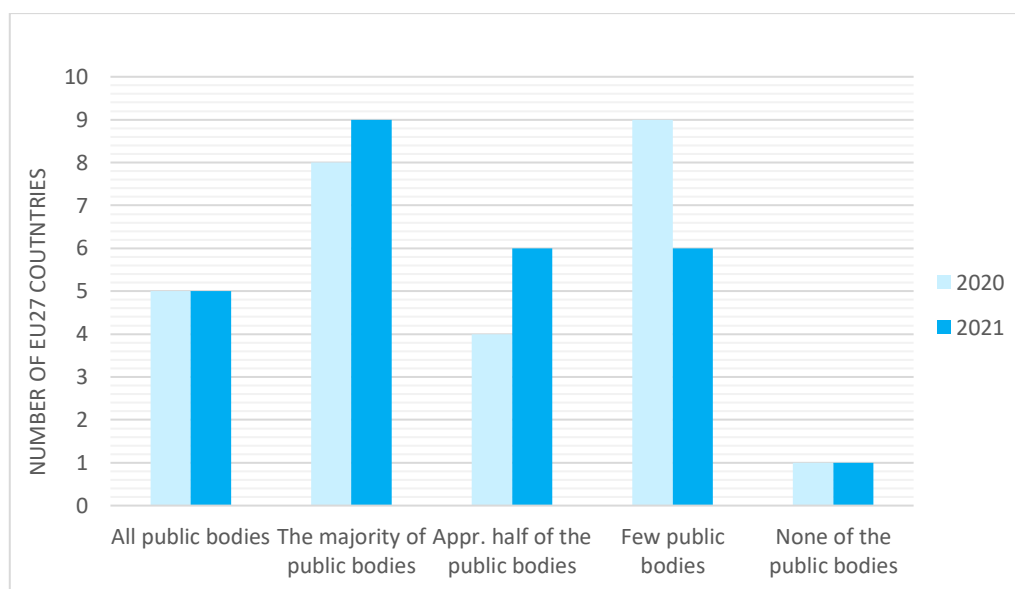


Figure 5: The amount of local of regional public bodies to conduct open data initiatives compared to 2020

A regular exchange of knowledge or experiences among public sector bodies occurs in all EU27 Member States and in 96% of the countries takes the exchange of knowledge also place between public sector bodies and open data re-users. This exchange of knowledge mostly happens during open data events such as hackathons, conferences, or user meetups.

In Germany, the Federal Chancellery⁶⁶ hosted a multi-stakeholder forum in the context of the national Open Government Partnership process, inviting representatives of civil society to talk about the use of open data and data quality.⁶⁷ Furthermore, the Federal Chancellery invited experts from the civil society for an expert-workshop to discuss ideas regarding open government and open data in Germany.⁶⁸

The Greek Ministry organised the “OGP Greece Ideathon” in July 2020.⁶⁹ The aim of the event is to gather innovative proposals for open government, including ideas about the open data required in order to improve the function and monitoring of public. Following that event, in December 2020 they

⁶⁶ Federal Chancellery: <https://www.bundeskanzlerin.de/bkin-en/chancellery>

⁶⁷ <https://www.open-government-deutschland.de/opengov-de/zeitplan-und-konsultation-zum-3-nationalen-aktionsplan-1847194>

⁶⁸ <https://www.open-government-deutschland.de/opengov-de/open-government-partnership/mitmachen>

⁶⁹ <https://mindigital.gr/archives/1511>

organised a workshop aiming at gathering feedback from both public sector entities and open data re-users.⁷⁰

In Romania, all open data initiatives are supported by the national open data team through one-to-one assistance, webinars, facilitation of collaboration with re-users, provision of available resources and standards. The national portal team holds monthly webinars on open data subjects, both for institutions only and mixed, for institutions and re-users. These allow re-users and public bodies to exchange good practices on re-use examples, but also priorities high-value datasets and facilitates collaboration on specific domains.⁷¹

1.3 Open data implementation

This indicator looks at implementation measures in place that enable open data initiatives at national, regional, and local level. More specifically, the indicator analyses the extent to which guidance is provided by means of guidelines or guidebooks that foster the release of open data within the country as well as the availability of data publication plans and the monitoring of progress against these plans. Also, it considers the extent to which arrangements are in place so that the data from regional and local sources can be systematically harvested by the national portals. Additionally, the indicator looks at training activities that enhance the data literacy and skills of the civil servants working with open data.

1.3.1 Guidelines and guidebooks

To foster publication, guidance and assistance on the implementation process of open data plans is often provided in the form of guidelines and guidebooks. All EU27 Member States indicate to have a national document or tool to assist data providers in their publication process. Often, these guidelines are published on the national open data portals.

In Finland, the “Data Owner’s Guide” is available in Finnish, English and Swedish.⁷² The guide provides an introduction to the concept of open data, supports data producers that plan to open their data, explains how to get insights into the re-use of their data, and guidelines on the Share-PSI 2.0 practise.

In Poland, guidelines are spread over a series of documents. The “Open data standards”⁷³ which provides information on legal, security, technical and API related topics, a good practice guide⁷⁴, and a guide for data providers⁷⁵.

In Sweden, an extensive online guide package for open data publication has been established in 2020. This includes several different perspectives, such as societal values, generic data user profiles as well as in depth organisational, technical and legal guidance. The package includes guidance on how to publish

⁷⁰ <https://covidhackgr.gov.gr/ogp/>

⁷¹ <https://data.gov.ro/blog>

⁷² <https://www.avoindata.fi/fi/opas/avoimen-datan-opas>

⁷³ First version of the Open data standards (2018): <https://dane.gov.pl/knowledgebase/useful-materials/standardy-otwartosci-danych>. Open data standards after evaluation and public consultations (2020): <https://dane.gov.pl/article/article-1264,standardy-otwartosci-danych-po-konsultacjach-publicznych>

⁷⁴ <https://dane.gov.pl/knowledgebase/useful-materials/ministerstwo-cyfryzacji-pomaga-urzedom-w-otwieraniu>

⁷⁵ <https://dane.gov.pl/knowledgebase/useful-materials/nowy-przewodnik-dla-dostawcow-danych>

according to the DCAT-AP specification to the national portal, legal advice, and clarifications on the Open Data Directive.⁷⁶

1.3.2 Monitoring data publication

Data publication plans and related monitoring mechanisms serve as tools to oversee progress across national and local public administrations. Moreover, it helps define effective interventions where necessary in order to overcome barriers. In 2021, 96% of Member States indicate to have data publication plans in place, often embedded in national open data policy or strategy documentation. In addition, 96% of Member States indicate to have some form of processes run at the national level to ensure that the open data strategy and actions are implemented, e.g., through monitoring mechanisms. The majority (67%) indicates the status of implementation as satisfactory, another 26% as neutral, and the remaining 7% as unsatisfactory. Some countries indicated to be content of what was achieved this far, yet express the feeling of not wanting to relax, as there is always more progress to be made.

In Germany, the Federal Government has to report the progress of open data implementation to the federal parliament every two years. As part of the open government national action plan a tool is created to monitor its implementation, presenting the quarterly implementation status of all obligations.⁷⁷

In Slovenia, the publication plans are included in the “Strategic Work Plan for Open Data 2020-2021”⁷⁸ with the focus on municipalities’ data and the start of including other bodies as well, such as companies providing public services, in line with the Open Data Directive. Every month the open data portal team reports to the project office at the Ministry of Public Administration⁷⁹ on the progress made. The implementation according to the action plan is also recorded in an annual report.

1.3.3 Harvesting data from regional and local data sources

Looking at countries harvesting from regional and local data sources, similar trends as last year can be observed. In 2021, all national portals of Member States, where applicable, harvested data from local and regional portals. In countries such as Cyprus or Malta, where there are no regional portals, all data is instead published directly on the national open data portals. Interesting is that by 2021, Romania officially launched local activities which the national portal harvests. Figure 6 compares the degree to which existing local and regional sources are harvested by the national open data portal to last year’s numbers. It can be observed that the number of countries harvesting all local and regional datasets increased in 2021.

⁷⁶ <https://www.digg.se/utveckling-av-digital-forvaltning/oppna-och-delade-data>

⁷⁷ <https://www.open-government-deutschland.de/opengov-de/aktionsplaene-und-berichte/zweiter-nationaler-aktionsplan-1591034>

⁷⁸

[https://podatki.gov.si/sites/default/files/reports/Open%20Data Strates%CC%8Cki%20delovni%20plan_julij2020.pdf](https://podatki.gov.si/sites/default/files/reports/Open%20Data%20Strates%CC%8Cki%20delovni%20plan_julij2020.pdf)

⁷⁹ Ministry of Public Administration: <https://www.gov.si/en/state-authorities/ministries/ministry-of-public-administration/>

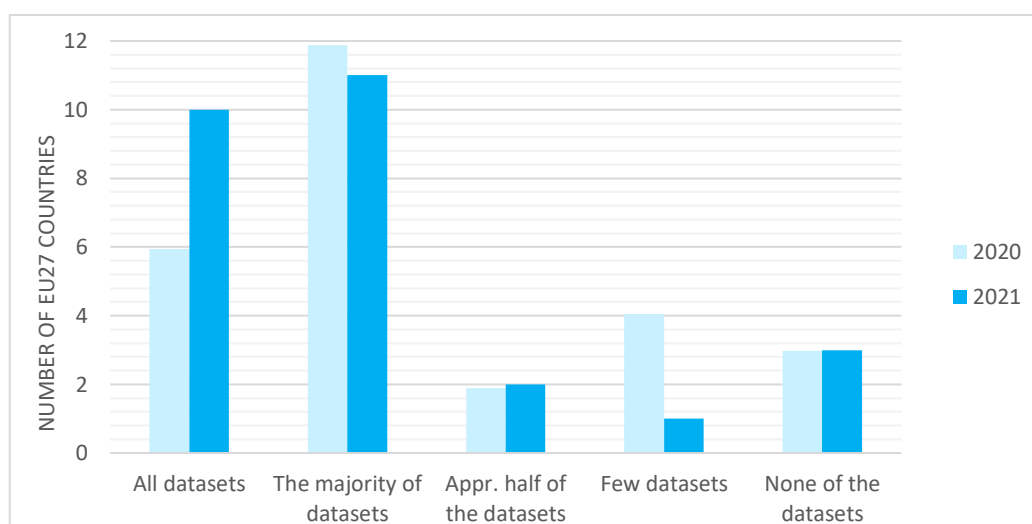


Figure 6: The degree to which existing local or regional sources are harvested compared to 2020

1.3.4 Open data training

In 2021, 26 of the 27 Member States provide training activities to develop the necessary data literacy and skills to support and enable civil servants working with open data. Out of this group, like last year, 19 countries indicate that these training activities also offer a publicly recognised certification and formal recognition as professional development training within public bodies.

The Austrian Federal Administration Academy (VAB)⁸⁰ is the training and further education institute for employees of the federal service. The academy offers the “School of Data Public Services” where a certificate can be earned by students who successfully attend 10 training days in the dedicated curriculum.⁸¹

In Cyprus, the open data team in collaboration with the Open University of Cyprus⁸² offers an “Open Data Training Programme” for PSI liaison offices where they offer trainings on a variety of topics, such as data publishing, licensing, (meta)data quality, APIs, etc. Participants of the programme receive a formal certification, which is considered part of the employees’ qualification for promotion purposes within the public service.

In Poland, the “Open Data Academy” provides a series of eight free three-month courses for employees of ministries and entities, such as central offices, but also scientific and research institutions.⁸³ To continue learning during the pandemic, the academy offered online courses. Each trainee receives a certificate confirming the acquired competences which is formally recognised by relevant institutions.

⁸⁰ Federal Administration Academy (VAB): <https://www.oeffentlicherdienst.gv.at/vab/index.html>

⁸¹ School of Data Public Services:

https://www.oeffentlicherdienst.gv.at/vab/seminarprogramm/verwaltung_verstehen_und_gestalten/public_management_2021.html. The curriculum is available at https://www.oeffentlicherdienst.gv.at/vab_dokumente/2019/vab2019-pm-school-of-data-public-services.pdf

⁸² Open University of Cyprus: <https://www.ouc.ac.cy/index.php/en/>

⁸³ <https://dane.gov.pl/article/1259,otwieramy-akademie-otwartych-danych>

1.4 Overall performance

In this final section, the overall performance of the EU27 Member States is evaluated based on the indicators of the policy dimension discussed throughout the chapter. Similar to previous years, the policy dimension is the most mature dimension of the assessment. In 2021, the overall maturity in the policy dimension of the Member States is 87%, which is an improvement of 2 percentage points compared to last year (see figure 7).

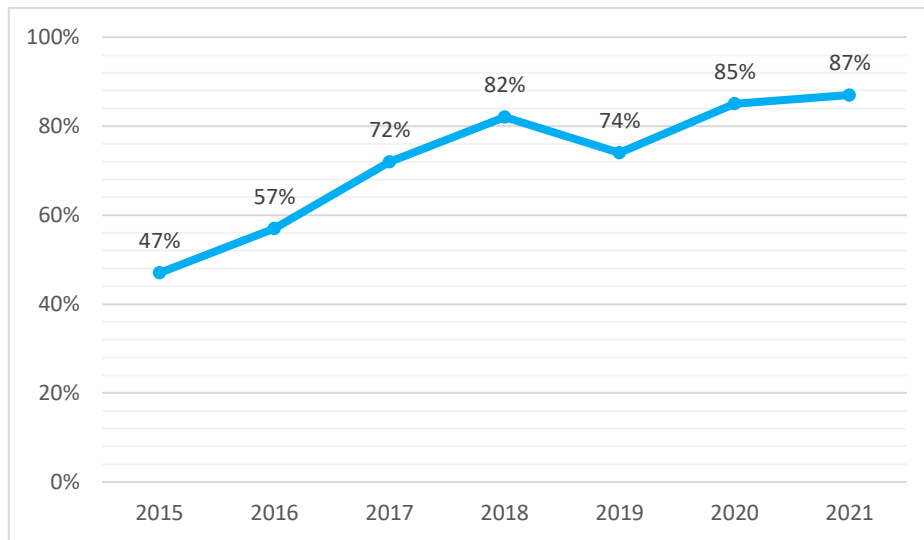


Figure 7: Development in maturity of the EU27 in the policy dimension over the last years

Interestingly, the most mature indicator is the ‘governance of open data’, where last year this was the ‘policy framework’ indicator. Countries improved their efforts to support data providers in their publication process. These efforts almost always involve the set-up of a network of open data liaison officers, which enables processes for implementing the open data strategies. An increasing number of countries foster open data initiatives on local and regional level as well as on the national level. Also, the open data implementation indicator shows an improvement, indicating that countries successfully execute and monitor the implementation of their open data strategies and action plans. Figure 8 shows the average scores on each of the policy indicators compared to last year.

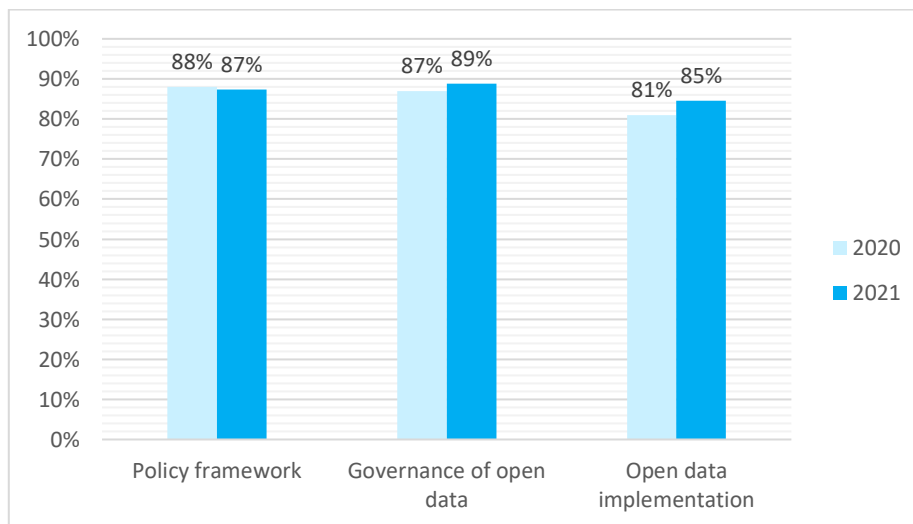


Figure 8: Maturity score per policy indicator compared to last year

Finally, figure 9 shows the country raking of the EU 27 Member States of the policy dimension. The majority of countries score above the EU27 average of 87%, as only 9 countries scored below. Remarkable is the improvement that Slovenia experienced in 2021, climbing from the 15th place to the 1st place, with a score of 99%. Countries completing the list with highest maturity score are Denmark, France, and Italy with a score of 98%.

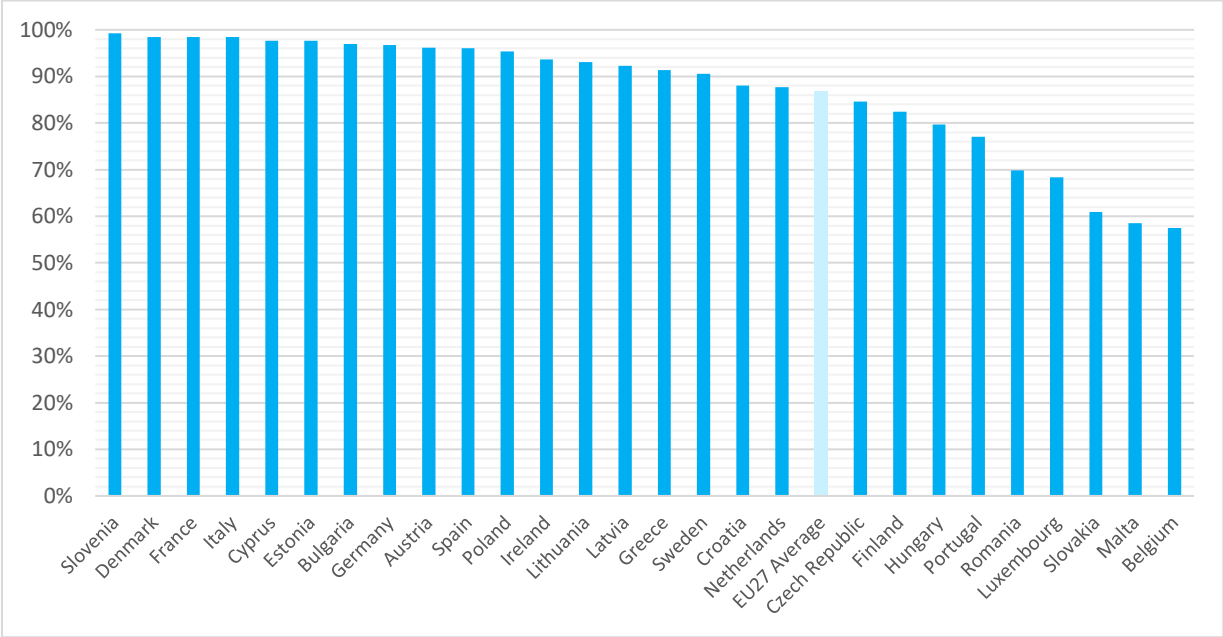


Figure 9: Country ranking for the policy dimension

Chapter 2: Open Data Impact

The second dimension, “open data impact”, analyses the existing approaches and methodologies developed at country and public body level to monitor and measure the re-use and impact of open data. By re-using open data, innovative products can be developed and services to citizens can be improved. The impact created by open data re-use generally refers to some kind of value for citizens, businesses, and society as a whole, for instance, efficiency gains through time or cost savings, or environmental benefits⁸⁴.

As discussed before, the Open Data Directive⁸⁵ encourages Member States to facilitate the re-use of public sector data by publishing those datasets that have a high potential to create economic and societal impact. Making these datasets available will stimulate the development of innovative solutions such as mobility apps, increase transparency by providing access to publicly funded research data, and support new technologies, including artificial intelligence. Open data is a valuable resource that can contribute to the growth of the European economy and to overcoming political, societal, economic, and environmental challenges.

This year, European countries focus more on measuring open data impact and monitoring open data re-use than before. This could be an effect of the Open Data Directive or an increased demand of open data providers and re-users to better understand impact. Many countries have recently conducted research to assess the country’s open data impact, both qualitatively and quantitatively.

Measuring the impact of open data is complex, and there is no consolidated and generally accepted methodology available that enables attempting that on a large scale, for example, at the European or national level. In the context of the Open Data Maturity assessment, the impact dimension focuses on the extent to which countries are *aware* of impact and systematically monitor open data re-use and attempt to measure impact created in selected fields of interest.

The following key elements are explored as part of the impact dimension:

Metric	Key elements
Strategic awareness	Monitoring mechanisms are in place at national and public body level to monitor open data re-use. Methods are in place to measure the impact that can be derived from re-using open data.
Political impact	Various re-use examples can be provided and the re-use of the open data available in this field is systematically monitored.
Social impact	Various re-use examples can be provided and the re-use of the open data available in this field is systematically monitored.
Environmental impact	Various re-use examples can be provided and the re-use of the open data available in this field is systematically monitored.
Economic impact	Studies that focus on the macro and microeconomic impact of open data are commissioned or conducted by Government. Other studies that focus on the economic impact of open data in a particular sector are available.

⁸⁴ For an in-depth analysis of the impact of open data, read the data.europa.eu’s “The Economic Impact of Open Data” report, published in January 2020 at <https://data.europa.eu/sites/default/files/the-economic-impact-of-open-data.pdf>

⁸⁵ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32019L1024>

2.1 Strategic awareness

The first indicator, strategic awareness, emphasises the importance of a structured approach to monitoring and measuring open data re-use and impact. It provides insights into the extent to which public sector bodies measure the re-use of their data and if there are activities in place to support and incentivise public sector bodies to do so. As measuring open data impact is a complex topic, this indicator aims to go beyond monitoring re-use, and also aims to assess whether countries have a definition of 'open data impact' and if there is a methodology in place to measure it.

2.1.1 Monitoring and boosting open data re-use

Researchers, journalists, developers, public and private organisations, etc., all re-use open data to create socio-economic value. For example, public bodies often re-use data from other public sector bodies, enabling these organisations to become more effective and efficient, to make more informed decisions, and to improve their services to citizens. Others use open data to develop innovative products and services, which result in, for example, social or environmental benefits. To learn more about the products that are being developed, and the impact that is being created, it is important to measure open data re-use.

Interestingly, almost all EU27 Member States (96%) have processes in place to estimate the level open data re-use in their country, often in the form of user analytics, surveys, or training programmes. Additionally, 74% of the countries have incentives or obligations in place for public bodies or civil servants to estimate the level of re-use of their own open data. Some countries incentivise public bodies by offering workshops or writing success stories about open data re-use, while others have incorporated in their governance structure a way for open data officers to monitor and report back on open data re-use.

These processes not only monitor the level of re-use, but also show an increasing interest and focus on understanding open data re-use. This becomes apparent by the increasing number of participants in open data trainings sessions, conferences, and hackathons, newly initiated research projects or surveys, or an increased and wider spread interest in re-use statistics. A large share of the Member States (70%) indicate that they observe a strong focus on understanding the level of re-use of open data within their country. This is, for example, represented by dedicating a larger section of a country's new open data strategy to understanding open data re-use or increased interest from other governmental institutions.

The Danish Agency for Data Supply and Efficiency⁸⁶ offers the Data Distributor, which aims to distribute basic data easily and in a straightforward manner. To highlight the potential of public information, they generate monthly reports on the use of the data they provide.⁸⁷

In Estonia, most public bodies request and re-use data from other public bodies using the secure national data exchange infrastructure X-tee (which relies on the X-Road technology)⁸⁸. The X-tee allows for tracking the exact number of data requests coming from each organisation. The general usage statistics of the X-tee (including frequency of data exchange between different organisations) is made publicly available.⁸⁹

⁸⁶ The Danish Agency for Data Supply and Efficiency: <https://sdfe.dk/om-os>

⁸⁷ <https://sdfe.dk/data-skaber-vaerdi/maanedens-anvender-cases-og-temaer>

⁸⁸ <https://logs.x-tee.ee/EE/gui/>

⁸⁹ <https://logs.x-tee.ee/visualizer/EE/>

The German coalition agreement of the current government states that the publication of open data will be part of the daily tasks in public bodies. Also, a new open data policy, in which monitoring open data re-use and use cases will be a central part, is being developed.

Italy implemented a tool to support and incentivise public bodies in measuring the re-use of their own and other public bodies' open data. It is a KPI tool that allows data publishers to monitor their datasets, show when the data was uploaded, what was deleted and what the currency of their data is.⁹⁰ It provides public bodies with the possibility to compare the quality of their data with others and monitor their own progress over time.

In Poland, The Chancellery of the Prime Minister (CPM)⁹¹ monitors the re-use of open data by public bodies via appointed open data officers per ministry, who are responsible for monitoring re-use of their data and reporting yearly to the CPM. The Open Data Programme⁹² implementation reports are based on their contribution. The reports comprise sections showcasing examples of such re-use.⁹³

In Spain, the Aporta Initiative⁹⁴ conducts an annual national survey asking public bodies, from national, regional, and local institutions about the monitoring of their data usage.⁹⁵ The results of the survey serve to confirm the answers for data.europa.eu's annual Open Data Maturity landscaping exercise.

2.1.2 Measuring open data impact

Similar to last year, 78% of the Member States have indicated they have specified a definition for 'impact of open data'. Although most countries do not have an official definition of open data impact, they do stress its importance in official documentation such as strategy documents, and mention that this impact can be observed in the political, societal, environmental, and economic domain.

In France, the latest report of the Open Data Mission⁹⁶ includes a recommendation to evaluate the economic, social, and scientific impact of the opening and sharing of data and source codes. The mission also highlights four impact areas of open data: scientific as a vector of knowledge, economic as a driver of innovation, democratic to improve public service, and political to restore people's confidence in public action. This view is coherent with the ministerial strategy on open data, which advocates for more openness, i.e., more public open data to foster innovation, and transparency, to enhance the external evaluation of governmental policy and the democratic debate.

The Dutch National portal has defined impact by stating that "impact stands for the extent to which making data available, and sharing has an effect on processes and solving issues."⁹⁷ The incentive is that datasets that are more visible, get more attention and at the end provide value.

⁹⁰ <https://bit.ly/3BJKGhx>

⁹¹ The Chancellery of the Prime Minister (former Ministry of Digital Affairs - MDA): <https://www.gov.pl/web/digitalization/about-us1>

⁹² The Open Data Programme: <https://www.dane.gov.pl/media/resources/20171201/Program-EN.doc>

⁹³ <https://dane.gov.pl/pl/knowledgebase/useful-materials/raporty-na-temat-rezultatow-wdrazania-programu-otwierania-danych-publicznych>

⁹⁴ The Aporta Initiative: <https://datos.gob.es/en/about-aporta-initiative>

⁹⁵ <https://datos.gob.es/es/evaluacion-del-ecosistema-de-los-datos-publicos-reutilizables-en-espana>

⁹⁶ <https://joinup.ec.europa.eu/collection/open-source-observatory-osor/news/french-report-prime-minister-open-data-and-open-source>

⁹⁷ <https://data.overheid.nl/impact>

In Slovenia, a definition is provided in their Strategic Working Plan for Open Data 2020-2021.⁹⁸ It states that open data impact is primarily present in four main areas: 1) transparency of the work of public institutions (anti-corruption; political impact), 2) innovative digital economy, 3) solving environment related problems (smart cities), 4) efficient functioning and data-driven decisions of the public institutions.

Although there is no generally accepted methodology to measure open data impact, 70% of the Member States indicate they have developed a methodology within their own country. Additionally, 70% of the Member States conducted studies in the past year that focus on assessing the impact of open data.

During last years' assessment, open data impact was mostly measured by the number of downloads. This year, we observed a trend towards more in-depth research, which will likely result in a more accurate estimation of the impact created by open data. Moving forward, this increased interest in open data impact can have a positive effect on society and the developments within the open data community.

A student from the Johannes Kepler Universität Linz⁹⁹ in Austria wrote a master's thesis on open data and the developments and effects on organisations in Austria.¹⁰⁰

In Croatia, the project Adjustment of Public Authorities Information Systems to the Open Data Portal analysed open data system in Croatia. The used methodology assesses the effect of improving the open data system. Results of the analysis consisted of recommendations to improve the open data system and a methodology for evaluating data values in Croatia.¹⁰¹

In Romania, a methodology is developed to enable recurrent impact evaluations, offer recommendations for the public bodies on how to measure the impact of their own data.¹⁰² It uses several layers to assess impact, looking at the main publishers and re-user categories, but also using several data collection methods: user surveys, comparative analyses, portal usage, expert surveys, and case studies. The impact measurement methodology and evaluation study¹⁰³ are designed to act as a toolbox that can be used by public bodies as well, to conduct their own measuring.

In 2020, the Swedish Lantmäteriet¹⁰⁴ (the national geodata authority) investigated the value of releasing a number of important data sets from a range of authorities free of charge.¹⁰⁵ This study revealed that the economic impact of approximately 300 identified high-value datasets had a total value of 10-21 billion Swedish Kronor (SEK).

2.1.3 Civil-society initiatives and collaboration between government and civil society

All Member States indicate that their governments collaborate with civil society or academia to create open data impact whether political, social, environmental, or economic. Also, 26 out of the 27 Member

⁹⁸https://podatki.gov.si/sites/default/files/reports/Open%20Data_Strates%CC%8Cki%20delovni%20plan_julij2_020.pdf

⁹⁹ The Johannes Kepler Universität Linz: <https://epub.jku.at/>

¹⁰⁰ <https://epub.jku.at/obvulihs/content/titleinfo/5676861>

¹⁰¹ <https://data.gov.hr/hr/standardi-i-prirucnici>

¹⁰² https://data.gov.ro/uploads/page_images/2020-07-17-124412.755459Metodologie-OD2020.docx

¹⁰³ https://data.gov.ro/uploads/page_images/2021-04-15-084014.114635Evaluare-impact-data.gov.ro.pdf

¹⁰⁴ Lantmäteriet: <https://www.lantmateriet.se/>

¹⁰⁵ <https://www.lantmateriet.se/en/about-lantmateriet/Samverkan-med-andra/psi---regeringsuppdrag-till-lantmateriet/>

States offer civil society initiatives that are open data driven and aim to create impact, whether political, social, environmental, or economic. A great example of open data driven initiatives are the COVID-19 dashboards that are developed within the Member States as a response to the current pandemic. As an extension to these dashboards, many countries are offering visuals and statistics about national, regional, and local vaccination rates as well.

The Open Society Fund Prague¹⁰⁶ is a foundation that supports the opening of data in the Czech Republic. In order to incentives to open and re-use data they organise the annual national competition 'Together We Open Data'.¹⁰⁷ The foundation also organises the international conference 'Open Data Expo', with the aim to increase the interest and impact of open data.

In Germany, there are 31 'OK Labs' (Open Knowledge Labs) all over the country, which operate under the leadership of Code for Germany. These Labs work with open data on a daily basis and create several projects, applications, and use cases.¹⁰⁸

The Open Government Partnership (OGP)¹⁰⁹ of Portugal aims to guarantee concrete commitments from governments to promote transparency, encourage public participation, fight corruption, and use new technologies to strengthen participatory democracy.¹¹⁰ An example is Arquivo.pt¹¹¹, which organises an annual contest for innovative works based on open data¹¹².

In Spain, the Valencian Government has entered into agreements with all public universities in the Valencian Community (Universitat Jaume I, Universitat de València, Universitat Politècnica de València, Universitat de Alicante and Universidad Miguel Hernández) to collaborate in training and research activities on transparency and open data. It will have a budget of €70,000 earmarked for awareness-raising, information, and research training activities.¹¹³

The Civic Tech Sweden¹¹⁴ supports people to advocate for more open data and does that in three different themes: 1) Power to the people (a democracy and transparency perspective), 2) Sharing is caring (collaborative economy, common resources, and sustainable development), and 3) I like to move it (focus on transports and mobility).¹¹⁵

2.2 Political impact

The indicator political impact considers the impact of open data on the public sector and citizen engagement and the extent to which countries are monitoring this kind of impact. It focuses on the benefits that open data has in three domains: improving government efficiency, improving government effectiveness, and increasing transparency and accountability. In figure 10, an overview is presented of the perceived level of impact of these domains. The figure shows that in the majority of

¹⁰⁶ Open Society Fund Prague: <https://osf.cz/en/>

¹⁰⁷ <https://osf.cz/en/programmes/living-democracy/our-state-our-data/together-we-open-data-competition/>

¹⁰⁸ <https://www.codefor.de/>

¹⁰⁹ Open Government Partnership: <https://www.opengovpartnership.org/members/portugal/>

¹¹⁰ <https://ogp.eportugal.gov.pt/inicio>

¹¹¹ Arquivo.pt: <https://arquivo.pt/>

¹¹² <https://sobre.arquivo.pt/pt/colabore/premios-arquivo-pt/premio-arquivo-pt-2021/>

¹¹³ http://participacio.gva.es/es/inicio/area_de_prensa/not_detalle_area_prensa?id=933769

¹¹⁴ Civic Tech Sweden: <https://civictech.se/>

¹¹⁵ <https://civictech.se/en/>

the Member States, open data strongly impacts political topics, especially in terms of increasing transparency and accountability.

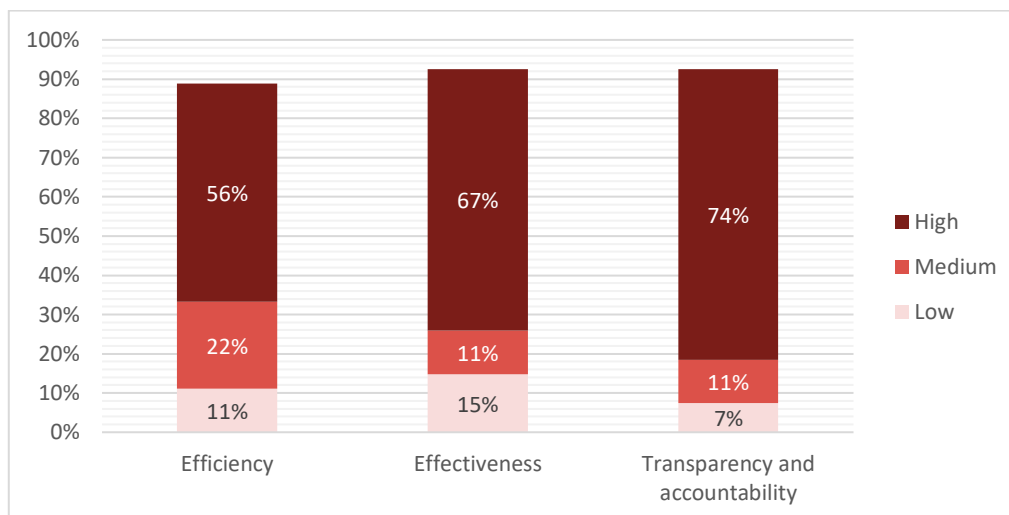


Figure 10: Level of political impact of open data in the EU27 Member States

2.2.1 Monitoring the political impact of open data

In 2021, 81% of the Member States performed activities in the last year to assess the political impact of open data, often in the form of conducting surveys, tracking portal user statistics, and collecting use cases.

In Belgium, a survey was conducted to assess the culture of data in Walloon towns and municipalities, through four themes: the governance of data within the municipality, the compliance with GDPR, open data, and the re-use of data by the municipality.¹¹⁶

In Poland, a ministerial task force publishes yearly reports about the impact of the implementation of the Open Data Programme.^{117 118}

In Sweden an analysis was performed on high-value datasets (HVD), consisting of approximately 300 high-value datasets.¹¹⁹ The report estimated, among other topics, the need for political budgetary decisions for making open data free of charge, even for the public bodies that are financing a big part of their organisation by fees. These questions are politically sensitive in Sweden, to the extent that the discussion reached the Swedish parliament.

2.2.2 Increasing government efficiency

Open data can improve the efficiency of government processes, such as lowering operational costs. Government efficiency can be boosted with open data because it helps public bodies across many dimensions, from making decisions to spending less time on certain tasks. Publishing data under an open licence takes away the need for re-users, such as local administrations or citizens, to explicitly request the data, without compromising on personal data privacy or confidentiality in general. Looking

¹¹⁶ <http://www.futurocite.be/activites/enquete-culture-de-donnee/resultats-2020/>

¹¹⁷ <https://dane.gov.pl/pl/knowledgebase/useful-materials/raporty-na-temat-rezultatow-wdrazania-programu-otwierania-danych-publicznych>

¹¹⁸ <https://data.europa.eu/pl/news/how-poland-fosters-open-data-implementation>

¹¹⁹ https://www.lantmateriet.se/contentassets/e16a59e08cb744149c878776256560e6/bilaga-2_-_vardet-av-oppna-data---samhallsekonomisk-nyttanalyt-av-vardefulla-datamangder.pdf

at this from the perspective of the data provider, time can be saved as they do not have to answer data requests, which ultimately reduces operational costs. Publishing data in an open format, such as CSV, which is typical for tabular data, reduces or eliminates the costs, efforts and skills that required to transform the data into a suitable format for re-use.

Similar to last year, 56% of Member States indicate that open data has a high impact on increasing government efficiency in their country, 22% indicate a medium impact and 11% a low impact. Countries often observe value added when new datasets are being shared by public or private organisations, as it allows administrations to learn from each other and avoids redundant work in case multiple organisations work on similar topics.

In Italy, the LINKORD project (Linked Open Research Data) provides best practices gathered by the Tuscany Region for the realisation of a policy intelligence tool for research and innovation (R&I) policies. The aim of the project is to enable the public administrators to carry out system interventions in the medium- to long-term themselves and to favour new solutions for economic-entrepreneurial development and public-private collaborations, based on access to and re-use of open data.¹²⁰

In Luxembourg, 102 municipality administrations have saved high costs for data acquisition by using open data cadastral map data, topographic databases, and official national orthophoto data provided by Administration du Cadastre et de la Topographie¹²¹.

In Poland, the Integrated Analytical Platform provides a central system for analysing data that is collected and created by public administrations and other sources. The aim of the project is to improve the effectiveness of the public health sector by optimising the use of public funds that are spent on, for example, social insurance for people employed in agriculture, health protection, rehabilitation, and benefits paid by various institutions.¹²²

2.2.3 Increasing government effectiveness

In addition to improving the efficiency of government processes, open data can also improve government effectiveness, especially in helping them to deliver better public services. Public service delivery can be improved, for example, by making it easier for citizens to interact with the government. Open data can also support public administrators in their daily operations, decision-making processes, problem identification and policy making. A number of examples will be presented throughout this paragraph.

In 2021, more than half of the Member States (56%) indicated that open data has a high impact on increasing government effectiveness. Furthermore, 22% of Member States indicate a medium impact, and 11% a low impact. In the countries' responses it is apparent that high quality of service can be achieved using a citizen-centric approach, for example, by involving citizens in the developments of new initiatives, or by providing easy access to highly demanded public information.

In Denmark, the Styrelsen for Dataforsyning og Effektivisering (SDFE)¹²³ launched Dataforsyningen last year. This is a gateway to free public geodata, functionality, and information about data and its

¹²⁰ <http://www.pongovernance1420.gov.it/it/ocpa-2020/linkord-linked-open-research-data-uno-strumento-innovativo-di-policy-intelligence-per-ricerca-e-innovazione/>

¹²¹ <https://act.public.lu/fr.html>

¹²² <https://www.gov.pl/web/cyfryzacja/zintegrowana-platforma-analityczna>

¹²³ Styrelsen for Dataforsyning og Effektivisering : <https://sdfe.dk/>

application possibilities. To optimise the usability of the project, the SDFE collected and incorporated input from users during the development of Dataforsyningen.¹²⁴

In France, the Inter-ministerial Directorate for Digital Affairs¹²⁵ has developed an observatory¹²⁶ where citizens can check how the 250 top administrative procedures score on 8 criteria, including satisfaction and accessibility. Publishing the evaluation of the main procedures helps improve the delivery of services and increase transparency for citizens.¹²⁷

In Slovenia, the application Erar¹²⁸, developed by the Commission for Prevention of Corruption¹²⁹, provides the general public with free-of-charge and user-friendly access to information on business transactions of public sector bodies. The application received the United Nations award for excellence of public service in 2013 and has been one of the most prominent public databases in Slovenia for nearly 10 years. Currently, Erar contains data on approximately 180 million financial transactions from both government and local agencies dating back to 2003. The system increases the level of responsibility of public office holders for effective and efficient use of public finance, decreases risks for illicit management of funds, and limits systemic corruption.

2.2.4 Increasing transparency and accountability

Open data can increase government transparency by enabling citizens to hold their representatives accountable and to value them for their achievements and integrity. Government transparency is increased, for example, by opening up public spending or by offering insights into the elections or the behaviours of politicians. In 2021, an increase in the impact of open data on transparency and accountability was observed, where 74% of the Member States define the impact as high, 11% as medium, and 7% as a low.

An example from Cyprus is the NomosPlatform, which is an online platform that provides information about the activities of the parliament, with a focus on bills that are submitted and voted into laws.¹³⁰ The Nomoplatform offers citizens a complete overview of pending bills and bill proposals in the parliament.

The State Electoral Commission of the Republic of Croatia offers data on all elections held in Croatia since 1990, such as parliamentary, presidential, local, and regional elections, as well as elections for minority councils and for the EU Parliament.¹³¹

In 2020, the Lithuanian Public Procurement Office (PPO)¹³² has opened up data on public contracts regarding the supplies and services aimed at combating COVID-19. The dashboard covers several groups of purchases, such as protective equipment, testing materials, and transportation services. It also contains data on the buyer, supplier, closing of contracts, and prices.¹³³

¹²⁴ <https://dataforsyningen.dk/>

¹²⁵ Inter-ministerial Directorate for Digital Affairs (DINUM): <https://www.numerique.gouv.fr/dinum/>

¹²⁶ <https://observatoire.numerique.gouv.fr/observatoire/>

¹²⁷ <https://www.data.gouv.fr/fr/datasets/observatoire-de-la-qualite-des-demarches-en-ligne/>

¹²⁸ <https://erar.si/>

¹²⁹ Commission for Prevention of Corruption (KPK): <https://www.kpk-rs.si/en/>

¹³⁰ <https://oxygono.org/nomoplatform/>

¹³¹ <https://www.izbori.hr/arhiva-izbora/#/app/home>

¹³² Public Procurement Office: <https://vpt.lrv.lt/en/>

¹³³ <https://vpt.lrv.lt/kovai-su-covid-19-sudarytos-sutartys>

Another example is provided by Estonia, where the country's national institute for statistics¹³⁴ created an application giving an overview of all salaries in Estonia. The app shows the number of employees and gross monthly salaries of the most represented occupational groups in Estonia¹³⁵

In Portugal, the Transparency Portal was recently launched, an online portal that provides insights into the European funds' execution process.¹³⁶ The portal will identify, in real-time, measures and projects financed or co-financed by European funds, related to NextGenerationEU and the Multiannual Financial Framework 2021-2027¹³⁷, for which data will be automatically extracted from the national open data portal.

2.2.5 Open data in policy-making processes

85% of the Member States indicate that open data is used in the policy-making processes in their country, for example as evidence for problem identification and policy formulation. Also, 89% of Member States indicate that open data is used in decision-making processes, for example public administrations making use of open data in their daily operations.

In Greece, most of the drafted legislation or even policy initiatives of the government, are posted on a blog-like platform prior to their submission to parliament. Citizens and organisations can post their comments, suggestions, and criticisms article-by-article. Everyone is invited to provide comments, which have to be considered where applicable.¹³⁸

In Ireland, the Public Policy is a not-profit organisation, which analyses policy documents and formulate deductions and conclusions. They aim to provide independent evidence to inform economic, social, and environmental policies and to communicate relevant research findings to policy makers and interested citizens.¹³⁹

In Portugal, the Education Data Platform gathers data from the Ministry of Education regarding schools, teaching staff, financial records, students, etc. The goal is to provide the needed information in a timely way for municipalities and education authorities to enable them to make policy decisions in an informed way.

The Swedish Agency for Economic and Regional Growth¹⁴⁰ has used data analytics on 6,7 million job advertisements released as open data by the Swedish Public Employment Service¹⁴¹, to create condensed insights about the evolvement of jobs related to digitalisation. The result was used to support a decision support related to the planning of future educations that could enable the digitalisation in society.¹⁴²

¹³⁴ Statistics Estonia: <https://www.stat.ee/>

¹³⁵ <https://andmestikud.stat.ee/ametipalk/>

¹³⁶ <https://transparencia.gov.pt/>

¹³⁷ https://ec.europa.eu/info/strategy/eu-budget/long-term-eu-budget/2021-2027_en

¹³⁸ <http://www.opengov.gr/home/>

¹³⁹ <http://www.publicpolicy.ie/>

¹⁴⁰ Swedish Agency for Economic and Regional Growth: <https://www.government.se/government-agencies/swedish-agency-for-economic-and-regional-growth/>

¹⁴¹ Swedish Public Employment Service: <https://www.government.se/government-agencies/swedish-public-employment-service/>

¹⁴² <https://tillvaxtverket.se/om-tillvaxtverket/bloggen/bloggartiklar/2021-03-02-hur-laser-man-67-miljoner-jobbannonser.html>

2.3 Social impact

The social impact indicator relates to the impact of open data on society as a whole, but also if and how countries monitor the impact in the social field. It assesses the extent to which open data has an impact on societal challenges, such as the inclusion of marginalised groups in society, raising awareness on housing in urban areas, and health and well-being related issues. The re-use examples discussed in this section illustrate how open data impact our society on different levels. In figure 11, an overview is presented of the perceived level of impact of open data on these topics. What stands out is that open data proved to be of high value during the current COVID-19 pandemic, as 89% of the countries indicate there is a high open data impact on this year's newly added category of health and well-being.

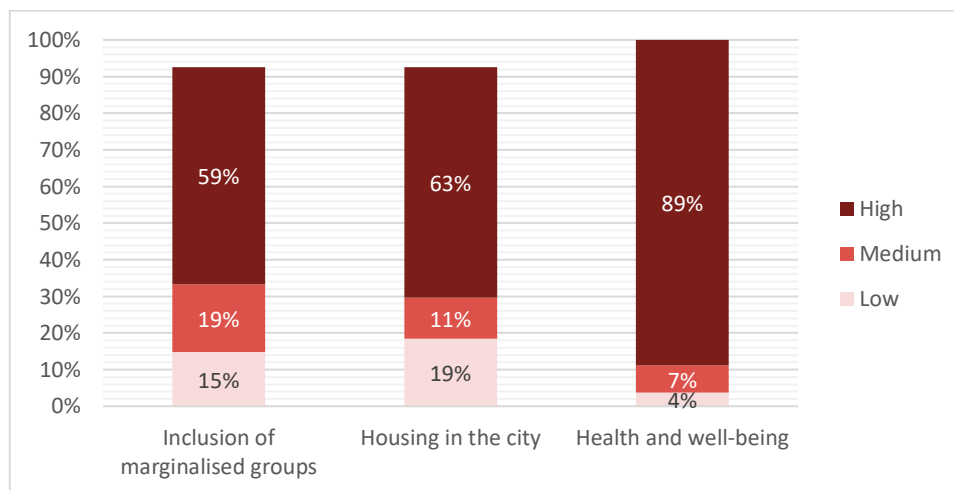


Figure 11: Level of social impact of open data in the EU27 Member States

2.3.1 Monitoring the social impact of open data

In 67% of the Member States, activities are performed to monitor the social impact of open data, such as systematic monitoring, tracking user statistics, or conducting studies and surveys.

The Finnish Institute for Health and Welfare¹⁴³ conducted a research to assess the impact of the COVID-19 crisis on gender equality in Finland. They utilised several open datasets to provide information on the gendered impacts of the COVID-19 pandemic on different socio-demographic groups and its consequences for gender equality in Finland.¹⁴⁴

In Germany, the #SmartDevelopmentHack was launched by the German Ministry for Economic Cooperation and Development (BMZ)¹⁴⁵ and the European Commission.¹⁴⁶ This initiative aimed to seek out digital approaches to cope with the challenges caused by the coronavirus pandemic. The impact of each solution was evaluated, and nine winning projects were appointed. It is expected that the BMZ will carry out evaluations upon project completion to measure the actual impact achieved.

In Spain, the publication "Open data and artificial intelligence, tools for gender equality", explains the concept of gender equality with the current influence of new technologies in our society and policies. A team of female journalists coordinates a volume of interviews with ten women with in-depth experience

¹⁴³ Finnish Institute for Health and Welfare: <https://thl.fi/en/web/thlfi-en>

¹⁴⁴ <https://thl.fi/en/web/thlfi-en/research-and-development/research-and-projects/the-impact-of-the-covid-19-crisis-on-gender-equality-in-finland>

¹⁴⁵ German Ministry for Economic Cooperation and Development (BMZ): <https://www.bmz.de/en>

¹⁴⁶ <https://toolkit-digitalisierung.de/en/smartdevelopmenthack/>

and knowledge on two key elements for the future: the realisation of the importance and potential of open data, and public policies made on the basis of data representing society as a whole and not just 50%.¹⁴⁷

2.3.2 Increasing the inclusion of marginalised groups in society

A wide variety of open data-based applications and services have been developed to encourage the inclusion of marginalised groups into society. Individuals or entire communities, whose participation in politics and society was originally challenged, should be enabled to exercise their rights, take opportunities, and benefit from available resources to equally partake in social, cultural, and political life. In 2021, with a steep increase of 11 percentage-points compared to last year, 59% of the Member States indicated that open data highly impacts the inclusion of marginalised groups into society.

An often-mentioned group that is supported by open data-based applications are people with disabilities. For example, the Polish ‘ParkDots’ locates nearby parking spaces¹⁴⁸, and the French platform ‘Acceslibre’¹⁴⁹ and the German ‘einfach teilhaben’¹⁵⁰ both show if and how institutions support people with disabilities.

In Belgium, an open data-based dashboard was launched to promote gender equality in Brussels’ street names by highlighting which names are appointed to males, females, transgender males, or transgender females.¹⁵¹

Tusla, the Child and Family Agency¹⁵² in Ireland, launched a comprehensive Open Data Portal to allow access to its data on child services, child protection and welfare, family support and domestic violence. They now have 708 datasets on the portal and are one of the most viewed publishers.¹⁵³

2.3.3 Raising awareness on housing in urban areas

Websites and applications that provide information on housing, such as neighbourhood facilities and characteristics, are available in European countries to enable citizens to make informed decisions about where to live and where to do business. The majority of 63% of the Member States indicate that open data has a high impact on raising awareness on housing in cities, 11% estimated the impact as medium, and 19% as low.

In the Netherlands, the Central Bureau of Statistics (CBS)¹⁵⁴ offers the application ‘Monitor Koopwoningmarkt’. This application offers visualisations about the current state of owner-occupied homes, by using various indicators divided over six housing market themes.¹⁵⁵

The Spanish web application Inspide uses open data to show whether a city like Madrid adapts to the current requirements of social distancing. Inspide shows, for example, the width of the pavements

¹⁴⁷ <https://governobert.gencat.cat/ca/que-es/Publicacions/colleccio-govern-obert/intelligencia-artificial/index.html>

¹⁴⁸ <https://www.wroclaw.pl/smartcity/latwiejsze-parkowanie-dla-aut-osob-z-niepelnosprawnosciami-i-autokarow>

¹⁴⁹ <https://acceslibre.beta.gouv.fr/>

¹⁵⁰ https://www.einfach-teilhaben.de/DE/AS/Home/alltagssprache_node.html

¹⁵¹ <https://equalstreetnames.brussels/>

¹⁵² Tusla Child and Family Agency: <https://www.tusla.ie/>

¹⁵³ <https://data.gov.ie/organization/tusla>

¹⁵⁴ Central Bureau of Statistics (CBS): <https://www.cbs.nl/nl-nl>

¹⁵⁵ <https://data.overheid.nl/community/application/monitor-koopwoningmarkt>

represented with colours, and provides figures indicating whether their width is sufficient to maintain the required distance between pedestrians.¹⁵⁶

A Swedish open data portal, called *Open Data Umeå*, offers freely available data about the city of Umeå.¹⁵⁷ It provides, for example, insights into the estimated processing time for applying for a building permit, and when it is smart to send in the application for a faster process.

2.3.4 Raising awareness on health and well-being (e.g., COVID-19)

The COVID-19 pandemic brought about a renewed emphasis on the importance of systematically collecting and making data available to the public. The need to responding to the emergency led many countries to start publishing related data and developing initiatives and dashboards to make the data more easily understandable and insightful. In 2021, to respond to the current pandemic, the landscaping exercise introduced an assessment of the level of open data impact on raising awareness on health and well-being. An overwhelming share of Member States (89%) recognise a high impact on this category, 7% indicated a medium impact, and the remaining 4% indicated a low impact. In the beginning of the pandemic, numerous dashboards were created to visualise the global and national spread of the COVID-19 virus, which proved to be of high value to both citizens and policymakers.¹⁵⁸ In 2021, when the vaccines got approved, many dashboards were extended to also track the global and national vaccination rates.

Great examples of COVID-19 open data-based national dashboards which are complemented by vaccination data can be found in, for example, Bulgaria¹⁵⁹, Cyprus¹⁶⁰, Czech Republic¹⁶¹, Denmark¹⁶², Estonia¹⁶³, France¹⁶⁴, Germany¹⁶⁵, Greece¹⁶⁶, Ireland¹⁶⁷, the Netherlands¹⁶⁸, Portugal¹⁶⁹, Romania¹⁷⁰, Slovenia¹⁷¹, and Slovakia¹⁷². Some countries created dashboards dedicated to vaccination rates only, such as Austria¹⁷³ or Belgium¹⁷⁴.

¹⁵⁶ <https://distanciamiento.inspide.com/>

¹⁵⁷ <https://opendata.umea.se/pages/startsidea/>

¹⁵⁸ <https://data.europa.eu/en/impact-studies/covid-19/global-and-european-dashboards-mapping-spread-covid-19>

¹⁵⁹ <https://coronavirus.bg>

¹⁶⁰ <https://covid19.ucy.ac.cy/>

¹⁶¹ <https://onemocneni-aktualne.mzcr.cz/covid-19>

¹⁶² <https://experience.arcgis.com/experience/aa41b29149f24e20a4007a0c4e13db1d>

¹⁶³ <https://koroonaakaart.ee/en>

¹⁶⁴ <https://www.gouvernement.fr/info-coronavirus/carte-et-donnees>

¹⁶⁵ <https://www.dashboard-deutschland.de/#/themen/gesundheit/gesundheit>

¹⁶⁶ For example, <https://covid19.gov.gr/covid19-live-analytics> or <https://covid19.gov.gr/covid-map-en/>

¹⁶⁷ <https://covid19ireland-geohive.hub.arcgis.com/>

¹⁶⁸ <https://coronadashboard.rijksoverheid.nl/>

¹⁶⁹ <https://insights.cotec.pt/>

¹⁷⁰ <https://coronavirus.casajournalistului.ro/en/>

¹⁷¹ For example, <https://covid19.alpaka.si/en/> or <https://covid-19.sledilnik.org/sl/stats>

¹⁷² <https://korona.gov.sk/>

¹⁷³ <https://info.gesundheitsministerium.gv.at/>

¹⁷⁴ <https://covid-vaccinatie.be/en>

In Italy, the "Vaccines for All" is an experimental non-governmental application that allows to estimate the progress of the vaccination campaign in Italy on the basis of the institutional open data of the COVID-19 emergency.¹⁷⁵

In Sweden, the service "Jag vill ha vaccin nu" (I want vaccine now) collects data about vaccine booking possibilities from a number of public places and visualises where it is possible to book a vaccine appointment.¹⁷⁶

2.4 Environmental impact

This indicator relates to the impact of open data on the environment. It considers aspects such as raising awareness on the water and air quality, noise levels in cities, waste management systems, environmental-friendly transport systems, and the extent to which the impact of open data on these aspects are monitored. In figure 12, an overview is presented of the perceived level of impact of open data on these topics.

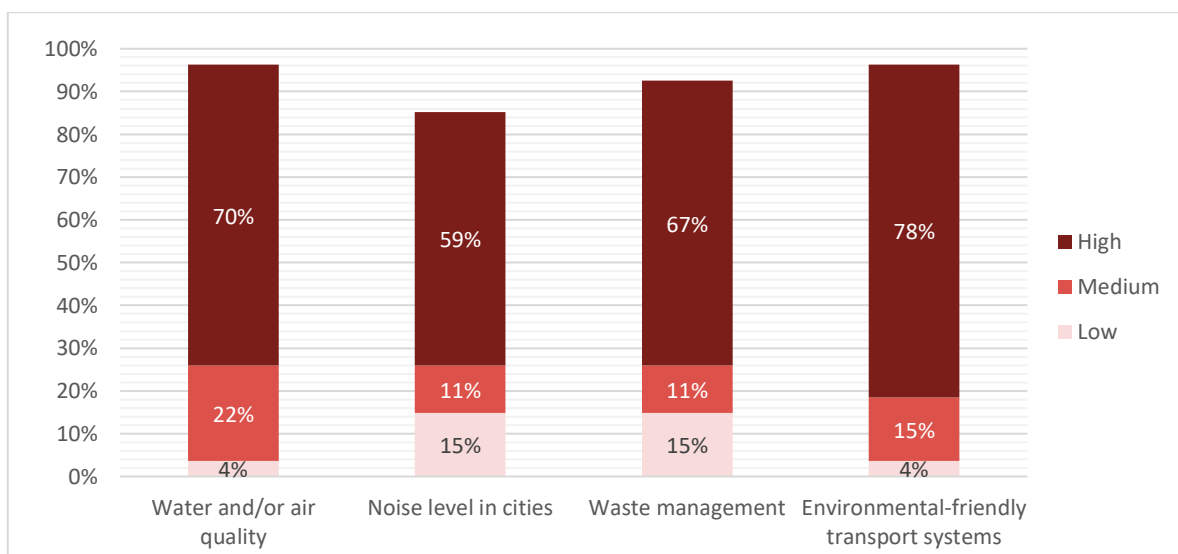


Figure 12: Level of environmental impact of open data in the EU27 Member States

2.4.1 Monitoring the environmental impact of open data

In 74% of the Member States, public sector stakeholders were active in the open data field launch or performed activities to monitor the environmental impact of open data, such as systematic monitoring, commissioning studies, or conducting surveys.

In Austria, the Federal Environment Agency¹⁷⁷ calculated two scenarios up to the year 2030 as a basis for the evaluation and revision of the Climate Strategy 2020 and for the monitoring mechanism on the development of greenhouse gas emissions.¹⁷⁸ That is, one scenario with measures, and one scenario

¹⁷⁵

<https://ondata.github.io/vaccinipertutti/?fbclid=IwAR0CGThSOvJ5A8INGkCqS8xIs565YmqKdU5c8RnOOYHWEiiWpDwwNidcPGo#>

¹⁷⁶ <https://jagvillhavaccin.nu/>

¹⁷⁷ Umweltbundesamt, the Federal Environment Agency: <https://www.umweltbundesamt.at/en>

¹⁷⁸ <https://www.umweltbundesamt.at/fileadmin/site/publikationen/REPO333.pdf>

with additional measures including measures listed in the Energy Strategy Austria¹⁷⁹. To trace back greenhouse gas emissions to type and amount of energy used, basic energy data was used to create the scenarios.

In France, as part of the implementation of a law relating to the fight against waste and to stimulate the circular economy, stakeholders have been collaborating to ensure better visibility on the opening process and to collect data re-use in a more efficient way, to better measure the impact. They, for example, created an inventory of data that needs to be opened up, are developing a web page to display the information, and will organise a workshop to establish a dialogue between stakeholders.

In preparation of the release of the list with high-value datasets for the Open Data Directive, the Swedish National Geological Survey Agency¹⁸⁰ calculated the value of geological and geospatial data. Geological data was valued at 800 million SEK/year and geospatial data was valued at 5400 million SEK/year, where both types of data consist for a large quantity of environmental information.¹⁸¹

2.4.2 Raising awareness on water and air quality

Several initiatives across Europe have been set up to provide insights into the quality of air and water. The data and visualisations made available have made environmental phenomena more easily understandable and help to increase awareness amongst European citizens of the quality differences in a given area, as well as the impact humans have on the environment. In 2021, 70% of the Member States indicate that open data had a high impact on raising awareness on the water or air quality, 22% of the countries indicated a medium impact, and 4% a low impact.

The BelAIR app indicates via a score, from 'very good' to 'extremely bad', how the current air quality is at each location in Belgium.¹⁸² The app also makes a forecast of the air quality for the next few days and gives an idea of the evolution of the air quality in the long term. The app is based on open data from the Belgian Interregional Environment Agency.¹⁸³

The Finnish Meteorological Institute has made its global and local air quality datasets freely available for public use and are available in machine-readable, digital format.¹⁸⁴

The Pegel-Online app¹⁸⁵ is an open data-based online platform offered by the German Federal Waterways and Shipping Administration¹⁸⁶ that provides information on the water level of more than 7300 km rivers and canals in Germany. It is used as decision-making input by citizens living nearby and by public agencies and officials working on water-related issues in Germany such as construction, flooding emergency response, etc.

2.4.3 Raising awareness on noise levels in cities

Noise pollution from roads, railways, airports, and industry can have negative effects on the well-being of citizens and wildlife. Long-term exposure to noise can lead to a variety of health issues such as sleep

¹⁷⁹ <https://www.iea.org/policies/8509-climate-and-energy-strategy-mission-2030>

¹⁸⁰ Geological Survey Agency: <https://www.sgu.se/en/>

¹⁸¹ <https://www.lantmateriet.se/contentassets/e16a59e08cb744149c878776256560e6/slutrapport---tillgangliggorande-av-sarskilt-vardefulla-datamangder.pdf>

¹⁸² <https://play.google.com/store/apps/details?id=be.irceline.aqmobile>

¹⁸³ Belgian Interregional Environment Agency: <https://www.irceline.be/en>

¹⁸⁴ <https://en.ilmatieteenlaitos.fi/open-data>

¹⁸⁵ <http://pegelonline.wsv.de/gast/start>

¹⁸⁶ Federal Waterways and Shipping Administration: https://www.gdws.wsv.bund.de/DE/startseite/startseite_node.html

disturbance and mental health problems.¹⁸⁷ Noise problems can be assessed when countries, regions, and cities measure and collect the relevant data and document and communicate the phenomenon in ways accessible to citizens.

Many countries communicate information on noise pollution via interactive maps. Great examples can be found in Croatia and Hungary who offer strategic noise maps. The Croatian strategic noise map forms a basis for the development of spatial plans and play a role in the process of strategic assessment of the impact of the plan and program on the environment.¹⁸⁸ The Hungarian strategic noise map is an information database produced by model calculations, considering parameters that determine the noise emissions of road, rail, aviation and IPPC plants.¹⁸⁹ In both cases is the data used to create the maps freely available for public use.

2.4.4 Waste management

Open data can be used to reduce waste and improve waste management, for example, by enabling citizens to recycle more and supporting local services such as garbage collection and disposal. In 2021, a slight reduction was observed compared to last year, did 67% of Member States indicate that open data has a high impact on dealing with waste management. 11% of the countries indicate the impact to be medium, and 15% to be low.

In Austria, the 'Müll-Checker' uses open data on waste collection points in Salzburg, to stimulate waste separation. With the waste free regulation in Salzburg, it can become financially rewarding to separate or avoid waste, the app explains how to save money.¹⁹⁰

In the Czech Republic, the application 'Kam s nim?' (where to put it?) is a non-profit project of Czech Association Let's Clean¹⁹¹. It is an interactive map that allows to find locations where people can legally dispose of unwanted goods and waste, such as expired medicines, tires, batteries, lamps, bulk waste, or hazardous waste.¹⁹²

In Ireland, the Environment Protection Agency¹⁹³ offers national waste statistics and reports about waste management. These are used for reporting on Ireland's performance in meeting its legal obligations, for policy and waste management planning purposes and to inform the public.

2.4.5 Environmental-friendly transport systems

To promote and support environmentally friendly transport systems, numerous applications, services, and platforms based on open data are available that aim to raise awareness on the different sustainable mobility offers. In 2021, 78% of Member States indicated a high impact of open data on enabling more environmental-friendly transport systems in their countries. This is an increase of 12% compared to last year. 15% of the countries estimated the impact as medium, and 4% as low.

In France, as a response to the Mobility Orientation Law (Loi d'orientation des mobilités)¹⁹⁴, a national transport data access point has been created, 'transport.data.gouv.fr', in order to provide a centralised

¹⁸⁷ <https://www.eea.europa.eu/articles/noise-pollution-is-a-major>

¹⁸⁸ <http://buka.azo.hr/>

¹⁸⁹ <https://zajterkepek.hu/index.html>

¹⁹⁰ <https://www.data.gv.at/anwendungen/muell-checker/>

¹⁹¹ Czech Association Let's Clean: <https://www.kamsnim.cz/en/organization>

¹⁹² <https://www.kamsnim.cz/en>

¹⁹³ Environment Protection Agency: <https://www.epa.ie/>

¹⁹⁴ https://www.ecologie.gouv.fr/sites/default/files/lom_mesures_cles_2019_v2.pdf

point for publishing such data.¹⁹⁵ Data providers from different administrations are accompanied to easily publish their transport data.

From this centralised transport data platform, mobility applications can integrate this data into their system and thus propose a complete sustainable mobility service offer.

Dublin Bikes¹⁹⁶ is a shared bike scheme with stations distributed throughout the city centre to enable easy access and optimal use. Dublin Bikes publishes an API to provide real-time information on the availability of bikes.¹⁹⁷ The open data unit has developed an impact story showing the use of Dublin Bikes over a period of time.¹⁹⁸

The Slovenian portal "Gremo na pot" (Lets go) provides information on the paths for walking, cycling, and jogging. The goal of the portal is to encourage people to go hiking and cycling as part of sustainable mobility, both for daily activities and healthy lifestyles in general and to make them aware of the need for environmental protection.¹⁹⁹

2.5 Economic impact

Quantifying and showcasing the economic impact of open data is a key element for countries to rally support for open data and to trigger publication and re-use. Economic impact can be measured using different approaches and indicators and go beyond the re-users' financial saving of not having to purchase specific data or produce it themselves. Indirect benefits can also be identified, for example through jobs created, resources saved, or productivity gained.

The economic indicator considers aspects such as macro- and micro economic impact, economic benefits for public administrations, and the extent to which the impact of open data on these aspects are monitored. In figure 13, an overview is presented of the perceived level of impact of the EU27 Member States. The figure shows that, relative to the already discussed indicators, the economic impact of open data is less often perceived as high. The majority of the Member States indicate the economic impact is medium, low, or there is no clear understanding of the economic impact yet.

¹⁹⁵ <https://transport.data.gouv.fr/>

¹⁹⁶ Dublin Bikes: <https://www.dublinbikes.ie/>

¹⁹⁷ <https://data.gov.ie/showcase/dublin-bike-real-time-information>

¹⁹⁸ <https://data.gov.ie/impact/dublinbikes>. The Dundalk Institute of Technology also performed an analysis on the bike sharing service:

[https://www.researchgate.net/publication/350133458 Analysis on the demand of Bike-Sharing Service in Dublin](https://www.researchgate.net/publication/350133458_Analysis_on_the_demand_of_Bike-Sharing_Service_in_Dublin)

¹⁹⁹ <http://www.gremonapot.si/>

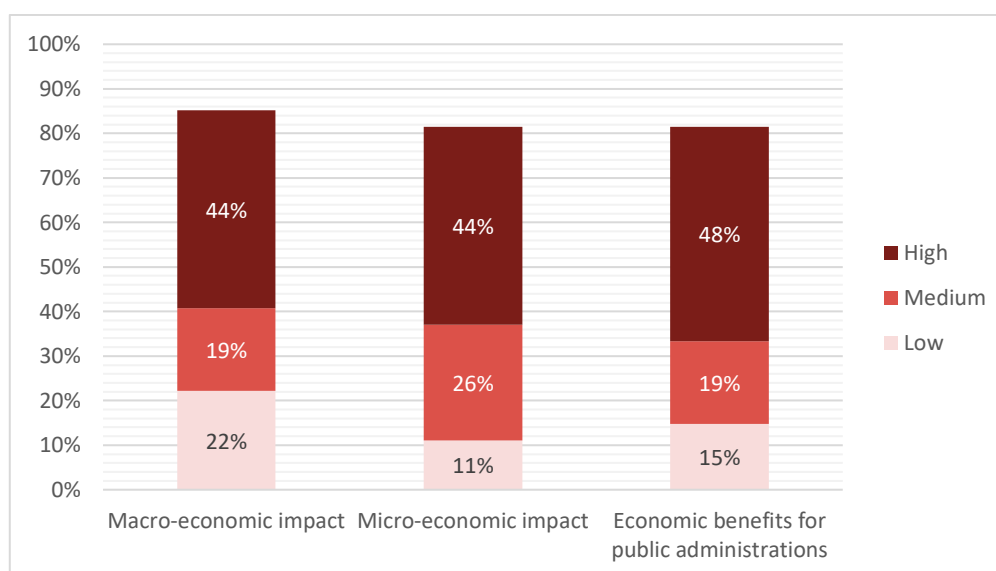


Figure 13: Level of economic impact of open data in the EU27 Member States

2.5.1 Monitoring the economic impact of open data

Measuring the economic benefit is, due to its complexity, challenging. Nevertheless, most of the Member States (74%) reported activities in the past year to monitor the economic impact of open data. Most activities consist of studies on economic aspects of open data related topics, such as strategy, impact, or digitalisation.

The German Federal Ministry for Economic Affairs and Energy²⁰⁰ conducted a study to give an overview of the impact of open data. The study explores the conditions and potential for provision and re-use of public sector data.²⁰¹

In Poland, a report on open data impact on businesses has been created by conducting a nationwide survey on a sample of 600 company representatives. The report estimates the size of the market for the re-use of public data, determines the level of business interest in access to open public data, researches the market trends in this area, and identifies barriers limiting the re-use of public data.²⁰²

Recently, a report on the economic impact of open data in Slovenia was published.²⁰³ The main objective of the report is to quantitatively estimate the economic-social impact of open data in Slovenia in all those fields, where relevant data for Slovenia is currently available. The analysis is based on a direct application of data.europa.eu's report, "The Economic Impact of Open Data".²⁰⁴

2.5.2 The macro-economic impact of open data

Opening up essential databases enables economic growth at the macro-economic level. In 2021, 44% of the EU27 Member States indicate that open data had a high impact at macro-economic level.

²⁰⁰ Federal Ministry for Economic Affairs and Energy: <https://www.bmwi.de/Navigation/EN/Home/home.html>

²⁰¹ https://www.digitale-technologien.de/DT/Redaktion/DE/Downloads/Publikation/SSW/2020/SSW_Open_Public_Data_in_Deutschland.pdf?blob=publicationFile&v=11

²⁰² <https://dane.gov.pl/pl/knowledgebase/useful-materials/raport-z-badania-wsrod-przedsiębiorców-na-temat-wielkości-i-charakterystyki-ryнку-ponownego-wykorzystania-danych-publicznych-w-polsce>

²⁰³ <https://podatki.gov.si/sites/default/files/reports/Economic-social%20impact%20of%20open%20data%20in%20Slovenia.pdf>

²⁰⁴ <https://data.europa.eu/en/impact-studies/open-data-impact>

Furthermore, in 19% of the countries open data had a medium impact and in 22% of the countries the impact was low.

Statistic Estonia created an application, in cooperation with the Ministry of Social Affairs²⁰⁵, which visualises labour policy indicators between 2005-2020. The data used to calculate the indicators is gathered by the Estonian Labour Force Survey²⁰⁶, and available for download from the application's website.²⁰⁷

Ireland, the Dublin Economic Monitor offers the data accompanies their quarterly economic reports. The Dublin Economic Monitor is a joint initiative on behalf of the four Dublin local authorities to track developments in the capital's economy. A key objective of the initiative is to develop and publish new data series each quarter to increase our understanding of the performance of the Dublin economy.²⁰⁸

In Italy, 'Osservatori.net' organised an event aimed to present the results of the research conducted by the eGovernment Observatory on all local public administrations and on Italian companies. The survey carried out by Unioncamere²⁰⁹ on 222 manufacturing companies reveals a strong prospective interest in the use of open data from public administrations' sources in the business sector, even if the ability to use the important amount of data open that the public administrations make usable is only at the beginning.²¹⁰

In Lithuania, the State Social Insurance Fund opened up its data. The statistical data website containing the data is aimed at observing and analysing income and expenses of the fund, the tendencies of fluctuation of the number of insurers, average amounts of benefits, as well as structural changes. The detailed and aggregate data is updated on a regular basis.²¹¹

2.5.3 The micro-economic impact of open data

To explore the benefits of open data on a micro-economic level, several projects and studies are set up in various sectors, such as transport, forestry, and tourism, or in terms of specific data, such as geospatial. In 2021, 44% of the Member States indicate that open data had a high impact at micro-economic level. This is an increase of 11% compared to last year. Furthermore, 26% indicate that open data had a medium impact, and 11% indicate that the impact on micro-economic level was low. Re-use examples with micro-economic impact often target SMEs and start-ups. Company information is collected and shared to support entrepreneurs in finding their feet in the business world.

A Belgian start-up created the online tool "Open-The-Box", which let you discover your business network. The tool is created using a combination of open datasets about mandates, addresses, company info and annual accounts. It allows you to look inside the web of connections between companies, individuals, and politicians in Belgium.²¹²

²⁰⁵ Ministry of Social Affairs: <https://www.sm.ee/en>

²⁰⁶ Labour Force Survey: <https://www.stat.ee/en/find-statistics/methodology-and-quality/esms-metadata/40701>

²⁰⁷ <https://arhiivtooturg.stat.ee/>

²⁰⁸ <https://www.dublineconomy.ie/>

²⁰⁹ Unioncamere: <https://www.unioncamere.gov.it/>

²¹⁰ https://www.osservatori.net/it_it/evento-approfondimento-open-data

²¹¹ <https://atvira.sodra.lt/en-eur/>

²¹² <https://openthebox.be/>

In France, using open data on companies, Etalab has developed “The Business Directory” (Annuaire des entreprises). This directory provides an easy way to access public data on any company registered in France.²¹³

Associations in the tourism industry in Germany have joined forces to open up data and to re-use open data strategically for the entire German tourism industry. The objective is to efficiently use the possibilities of digital technologies, for example AI, in tourism marketing.

2.5.4 Economic benefits for public administrations

Some examples of open data re-use focus specifically on creating economic impact for the public sector. 48% of the EU27 Member States indicate that open data has a high economic benefit for public administrations within their country. 19% of the Member States claim that the impact is medium, and 15% that impact is low.

In Cyprus, a COVID-19 platform was developed, which is called the “Emergency Management System for Handling Emergency Covid-19 Cases”. This platform is currently being utilised by the health professionals at the Ministry of Health, doctors, clinical labs, and the 1420 hotline for recording and analysing all incidents and managing the virus spread situation in Cyprus.²¹⁴

In France, one of the main rationales for opening public sector information is the efficiency it brings to the government. France's administrative organisation is complex, making data circulation between actors timely and costly, especially before the Digital Republic Bill²¹⁵, when administrations could charge for access to their data. Therefore, open data resulted in considerable economic savings for public finances.

In Sweden, research on open data in the traffic data domain reports that several public organisations have increased their own efficiency by starting to re-use their own open data. As a result, a Stockholm public transport company increased their capacity to locate faults, thereby lowering costs and improving their SLA-work (service level agreements). Another result of the research shows that the Swedish Transport Administration (Trafikverket) has improved their SLA-levels towards external data users due to the re-use of their own data.

2.6 Overall performance

In this final section, the overall performance of the EU27 Member States is evaluated based on the indicators of the impact dimension discussed throughout the chapter. In 2021, the performance of the EU27 Member States experienced the highest level of growth compared all other dimensions. On average in 2021, the maturity level of the impact dimension of the EU27 is 78%, which is an increase of 6 percentage points compared to last year (see figure 14). Recent years impact was often measured by monitoring user analytics of national open data portals or by keeping a list of use cases. This year, a clear trend towards conducting in-depth research such as desk research or surveys is observed. This

²¹³ <https://annuaire-entreprises.data.gouv.fr/>

²¹⁴ <https://www.kios.ncy.ac.cy/news-a-events/latest-news/615-the-kios-center-of-excellence-contributes-significantly-to-the-efforts-of-the-republic-of-cyprus-to-tackle-covid-19-in-cyprus.html>

²¹⁵ <https://www.republique-numerique.fr/pages/in-english>

will, in the long-term, result in a structured approach on measuring open data impact and more accurate estimations of the impact on the society as a whole.

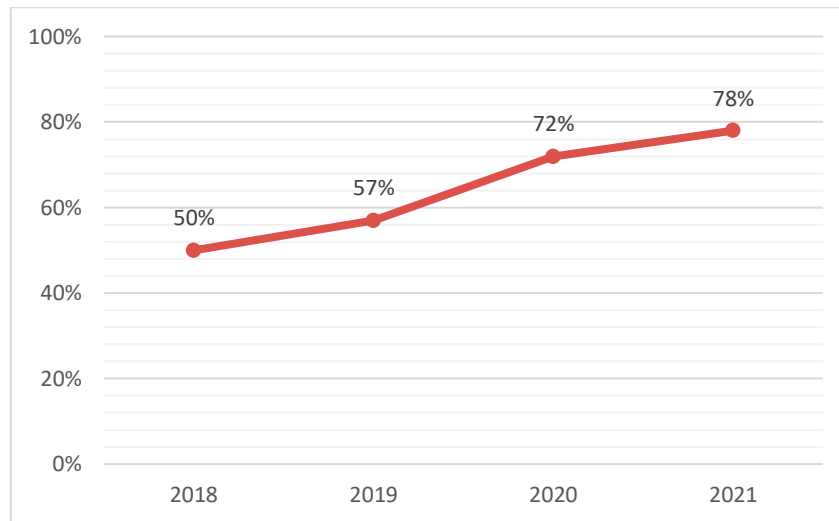


Figure 14: Development in maturity of the impact dimension over the last years

In figure 15, the average scores on each of the indicators of the impact dimension are shown for 2020 and 2021. The EU27 Member States show increasing scores on most indicators, only the indicator for the economic impact of open data shows a small decline. Overall, the countries show a greater strategic awareness to monitor the re-use of open data and the impact that is created as a result. In several countries, studies were commissioned to assess the impact of open data in general or specific to a certain area, for example the political and environmental. The biggest improvement is observed for the social impact indicator. This is likely attributed to this year’s addition of assessing the open impact on health and well-being. Last year, data on COVID-19 was systematically made available and re-used to create a better understanding of the pandemic by means of dashboards and other initiatives. The high social impact of these dashboards led countries to continue to improve these initiatives and often complement it with recent developments in terms of national vaccination rates.

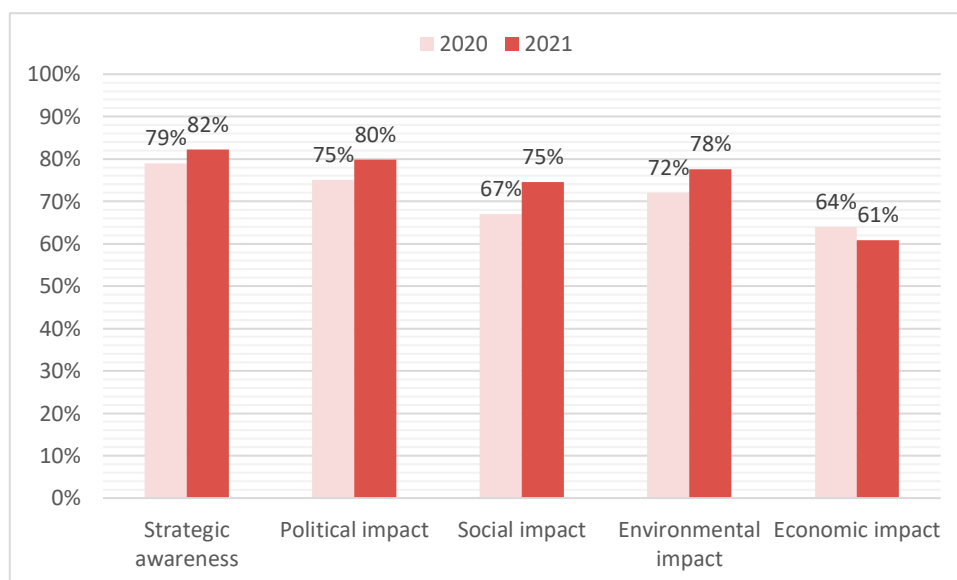


Figure 15: Maturity score per impact indicator compared to last year

Figure 16 shows the country ranking of the impact dimension. It shows that the majority of Member States score above the EU27 average of 78%. Also, seven countries indicated that open data highly impacts all aforementioned indicators, therefore scoring full points for this dimension. This shows that the focus on monitoring and estimating open data re-use and open data impact is becoming increasingly important for Member States.

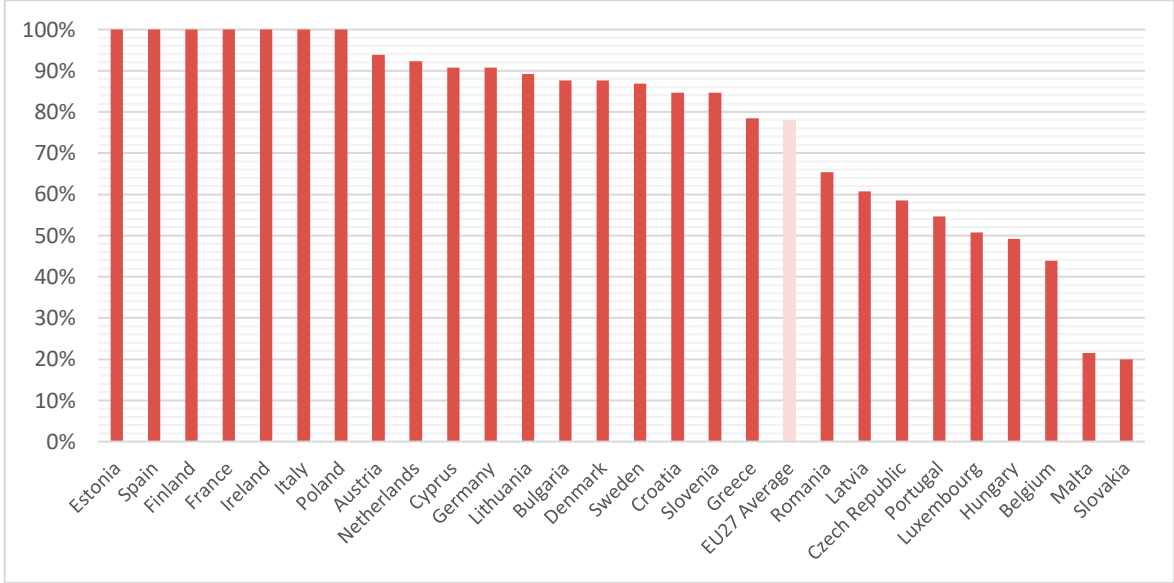


Figure 16: Country ranking for the impact dimension

Chapter 3: Open Data Portal

To enable people to easily find openly available datasets, European countries have national data portals in place. EU Member States offer open data at all levels of government, through numerous and heterogeneous data sources, publication points and arrangements in general. Though this is not always optimal, it is also a natural consequence of how rich and varying the spectrum of government bodies and agencies producing and offering data are. The complexity of making data available and discoverable often grows with the size of government or the levels of it, for example, states in a federation are highly autonomous in dealing with their own data. National open data portals address this complexity and ensure that the richness and diversity of this data is discoverable from the original source and via a single, coherent central gateway. The third dimension of this study, “open data portal”, focuses on the level of maturity of the national open data portals, including considerations around their functionality, usage (user analytics), variety of data featured, and the approach to ensuring the portal’s sustainability. The following key elements are explored as part of the portal dimension:

Metric	Key elements
Portal features	Portal features ensure access to datasets and relevant content, including more advanced features such as SPARQL search, discussion forum, rating of datasets, requesting datasets, and providing transparency on the progress status of requested datasets.
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	The majority of data publishers can contribute data and its metadata to the national portal and actions are taken to enable publication from data publishers. In addition, access to real-time data is enabled via the portal and data that does not stem from official sources can be uploaded.
Portal sustainability	A sustainability strategy for the portal has been defined and activities are conducted to ensure the portal’s visibility, including social media presence. In addition, user surveys are conducted regularly, and feed into reviewing process of improving the portal.

All EU27 countries have a national data portal in place, and all of them are suitable to be used from both desktop computers and mobile devices. A few interesting developments were discovered this year. In June 2021, Hungary launched a new open data portal. As introduced last year, Estonia launched their new open data portal by the end of 2020 and their latest insights are included in this year’s assessment. Finally, in Greece, a new open data portal was published in December 2020. However, the answers to this assessment still reflect the previous implementation.

Similar to last year, all countries have one centralised national data portal, with the exception of Denmark. Aside from a central open government data portal that provides the most essential data, the Danish government offers a variety of smaller, specialised portals that focus on different areas. There is for instance an environment portal, a portal that provides geodata, and a portal for the country’s official statistics.

3.1 Portal features

This first indicator evaluates the functionalities on the national open data portals and investigates both basic features as well as more advanced features. Basic portal features include, for instance, search functions that enable filtering, searching by one of the many characteristics of datasets described in their metadata, or by data domain, such as “agriculture” or “economy”. The more advanced portals also enable users to search data via more complex tools such as SPARQL queries. Furthermore, this indicator examines portal features, such as the possibility for visitors to request and rate datasets, and studies whether portals offer use cases, whether originated by research performed by the national open data teams’ research or submitted by the users themselves. More advanced portals often additionally provide a higher degree of transparency towards visitors by presenting the progress status of data requests. The indicator also examines whether portals have features in place that foster the online interaction between publishers and re-users, such as discussion forums, feedback channels, and the possibility of notifications when new datasets become available.

3.1.1 Searching for datasets

All EU27 Member States have a national portal that makes open data available. These national portals offer advanced data search functions with features such as filter options, and multiple field search, and allow users to download datasets from the portal. With the exception of Malta, all national portals enable users to search for datasets by file format. For Hungary and Estonia this is a new feature this year. In addition, all but the Slovakian national portal, enable users to search by data domain.

In order to address more advanced search needs, the presence of a SPARQL search query function was examined. SPARQL is a semantic query language for databases that enable the more advanced users to search deeply and precisely in the metadata offered - whether from the original source portals or data.europa.eu itself. Moreover, it can enable access to metadata that is not directly visible to users by using the website interactively. Users can also use SPARQL as an API and embed the query into their own software to automatically interrogate the data portal, for example, to identify the availability of new datasets. Compared to last year, this year marks a significant improvement in terms of the availability of a SPARQL search query feature. In 2020, 33 % of the national portals reported to having a SPARQL endpoint in place, now that number rose to 78 %, which translates to 21 portals. This demonstrates that overall, the Member States have made substantial progress in terms of data searchability.

High-value datasets

As mentioned in chapter 1.1 Open data policy, the Open Data Directive requires the adoption by the European Commission, via a future implementing regulation, of a list of high-value datasets (i.e., datasets whose re-use can have major benefits for society and the economy). Nearly all (93 %) national portals indicate they aim to promote in the future or are already promoting high-value datasets (HVD), often in the form of labelling datasets to enable filtering or by providing editorial content regarding high-value datasets.

The Cypriot open data portal team plans to develop a dedicated section on the portal for HVDs, have extensive editorial content on HVDs, and employ tags to filter for HVDs.

In Estonia, there will be separate filtering options on the national portal to distinguish high-value datasets and there will be separate blog posts. Additionally, the topic will be covered during group meetings concentrating on raising awareness on such datasets.

In Finland, plans to promote HVDs on the portal include:

- *Adding a graphical symbol to identify a dataset as HVD*
- *Incorporating the option to manually tag a dataset as HVD as part of meta-data*
- *In the future, adjust the data opener's guide with information about high-value datasets*
- *In the future, identify harvested datasets that are HVDs, but this requires national coordination.*

In Luxembourg, the team plans to start with displaying high-value datasets in the section "Featured datasets" and promoting them via their social media accounts. In a second step, as an update to their search function, corresponding filtering features can be added.

The Dutch portal already attached their implementation of a searchable "high-value" label to datasets.²¹⁶ Stakeholders are consulted in sessions to identify these high-value datasets. The outcome is cross checked with the site statistics to define which datasets are visited and used most in applications. A yearly update cycle is implemented to update the high-value dataset lists for each government level. The Netherlands has 3 levels of high value data: national, regional, and local (communities).

3.1.2 Requesting datasets

The search functions discussed above support users in finding what they are looking for. When a specific dataset is not (yet) published on the national portal, users can send in a request. With the exception of Germany, all national portals offer the possibility for users to request a dataset. Most of the requests (37%) come in on a monthly basis. For a full overview of the frequency of incoming data requests, see figure 16. The approach on how users can place their request differs per portal. Nevertheless, the most common way is by using a designated request form. Another frequently used method is by responding to the portals' general contact information.

26 national portals that offer the data request functionality, also monitor the extent to which these requests result, down the line, in the publication of data. For 10 national portals (37%) this occurs roughly half of the time. For 7 national portals (26 %) more than half of the requests are honoured. Only one portal reports to publish all requests, Slovenia. The proportion of datasets from incoming data request that are eventually published are illustrated in figure 17.

Austria for example has a landing page "Frag den Staat" where requests and statuses of the requests can be monitored, and users can be notified of updates through RSS and ATOM feeds²¹⁷.

France provides a user-centric example of monitoring user feedback. Via an interactive support form²¹⁸, the portal assesses to which target audience the user belongs and how they can best offer support.

On the Latvian national portal users can, apart from adding their own requests, also vote for existing requests from other users. This creates a list of "trending" topics. On the one hand this is beneficial for those who manage the portal to keep track of what users need, on the other hand it also inspires users to bring forward their questions or ideas.

²¹⁶ https://data.overheid.nl/datasets?sort=score%20desc%2Csys_modified%20desc&facet_classification%5B0%5D=high_value

²¹⁷ <https://fragdenstaat.at/anfragen/?q=&status=erfolgreich&jurisdiction=&campaign=&category=&publicbody=&tag=>

²¹⁸ <https://support.data.gouv.fr/>

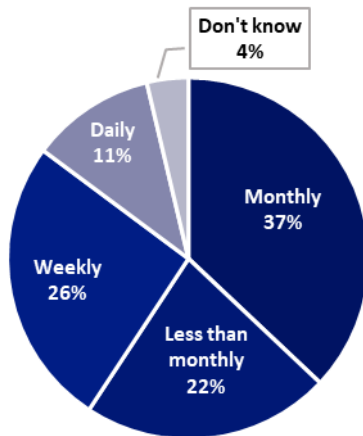


Figure 17: Frequency of user requests across the EU27 Member States

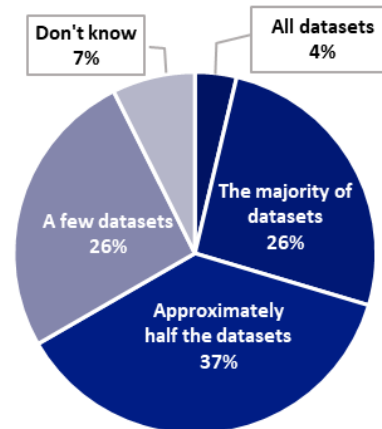


Figure 18: Amount of user-requested datasets that are published on the respective national portals

3.1.3 Providing transparency

From the 26 national portals that offer a data request functionality, 18 portals showcase these requests in a transparent way on their portal.

Spain for example offers an elaborate overview²¹⁹ of user requests, responses, and statuses. Their national portal provides an overview of the incoming request, organised by category and status of the request, see figure 1918. Users can monitor data requests by other users, and these requests are allocated to the public body responsible for publishing this dataset. That body will respond to the request and update its status, which is all visible to the user.

datos.gob.es
reutiliza la información pública

English

APORTA INICIATIVE DATA CATALOG IMPACT SECTORS CURRENT NEWS INNOVATION INTERACT

REPORT ON ADVICE AND SUPPORT DATA AVAILABILITY DOCUMENTATION

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.

Category

- Public sector(41)
- Treasury(36)
- Economy(33)
- Environment(29)
- Culture and leisure(28)
- Science and technology(26)
- Transport(26)
- Legislation and justice(24)
- Rural environment(21)
- Healthcare(20)

SEARCH

Received (3) → Assigned (267) → Under Study (7) → Programmed (2) → Published (54)

Not Feasible (20) → Partially published (3)

356 data availability found

Sort by: Date descending

DIRECTORIO MUNICIPIOS ESPAÑOLES 0 requesters
28-10-2021
Se echa en falta una información esencial: un directorio de los municipios españoles con sus datos de contacto, incluido el correo electrónico.

RPT de la Junta de Andalucía 0 requesters
18-10-2021
Solicitó el listado de la relación de puestos de trabajo de la Junta de Andalucía, incluyendo datos de situación

Figure 19: Data request section of the Spanish open data portal

²¹⁹ <https://datos.gob.es/es/peticiones-datos>

Additionally, in order to enhance transparency, 17 national portals (63 %) allow users to see which data exists but cannot be made available as open data for reasons of confidentiality or privacy for example.

Spain for example, provides a “not feasible” label in their data availability section for those datasets that cannot be published due restrictions or unavailability²²⁰. The reasons why the data cannot be made available are detailed in the response to each request.

3.1.4 Enabling interaction

In order to meaningfully interact with their users, Member States often offer tools for collecting feedback, or input from their users. Interaction between re-users and data publishers is highly valued by the national portals. Rather than establishing a direct connection between the data re-user and its source, it can be useful for the national portals to be involved in support as an intermediary, as it enables them to monitor the feedback that comes in, identify patterns, and develop a better understanding of their users’ and the general open data community’s needs.

Feedback

In most cases providing feedback can be done in one of two ways. Either by using a contact form or by responding to a dedicated commenting section at the bottom of the dataset information page. Especially the latter allows users to express their opinions about the published dataset and make it possible to report areas for improvement to the data provider.

With the exception of the Czech Republic, all portals provide a general feedback mechanism for users. Additionally, the majority (89%) of Member States, i.e., 24 national portals, have a mechanism in place that allows for feedback on a specific dataset.

Many portals even go a step further regarding opportunities to respond to datasets by allowing users to rate datasets. This can be through likes (thumbs up or down), or numerical ratings. 12 national portals (44 %) offer such a functionality. In addition to ratings and commentary, 24 portals (89 %) allow user to link documentation and supporting materials to a given data set.

An example is offered by the French national portal, which enables users to provide qualitative input. That is, a discussion module where users can express their opinion on the published dataset, both positive and negative. This discussion module not only provides the user with an option to share their input, it also makes it easier to find anomalies or areas for improvement for the producer.

Community engagement

To engage with the open data community and interact with the portal users, 21 Member States offer a general forum where users can discuss a variety of topics and express their opinions that are not related to a specific dataset.

The German data portal offers an open discussion forum on GitHub²²¹.

The Lithuanian national portal has an open data discussion group²²² that allows users to interact with each other via Google docs. Users can comment on a given dataset but also express their views and exchange ideas.

²²⁰ https://datos.gob.es/en/peticiones-datos?f%5B0%5D=field_request_tx_status%3A1977

²²¹ <https://github.com/GovDataOfficial/DCAT-AP.de>

²²² https://docs.google.com/forms/d/e/1FAIpQLSdhN96KdzhwGszTc2E3Ubc_JgscrctmbUE_OHA--7U7C_hbQ/viewform

Additionally, to increase user interaction, 25 national portals offer the possibility for users to receive notifications when new datasets are made available using, for example, RSS, ATOM feeds, or e-mail notifications. In most cases users can follow datasets or data publishers and receive notifications whenever new data is published, or existing data is updated.

Some portals are also developing tools for publishers to support them in entering, validating, and publishing quality data. This is the case for the French national portal²²³, as well as the Irish portal. The latter launched the Data Audit Tool²²⁴ this year, guiding open data publisher through the publication process and ensuring the required metadata is completed.

3.1.5 Providing examples of open data re-use

All national data portals promote and support open data re-use. 25 of the EU27 national portals have a designated section to promote applications that make use of open data. Additionally, 23 Member States provide the possibility for users to submit their own use case examples. In most instances (85%), those portals that have a dedicated use case section on the portal also reference the datasets that the use cases are based on.

Last year, we already observed that more and more portals had implemented a dedicated page for users to add their use cases rather than referring them to a general contact form. In 2021, 16 national portals (59 %) have such a dedicated page in place.

In terms of more advanced previewing features and data viewing options, 22 portals (81%) have a preview feature for tabular data, and 19 portals (70 %) also have a preview function for geospatial data, typically in the form of a map. This is an important feature as it allows all users, experts, and non-experts alike, to visualise the data and get an initial understanding of it. Through previewing and visualisations users can experience and explore the data interactively.

The French national portal offers the possibility to preview CSV-files, and Etalab, the French open data portal team, is currently working on a prototype for previewing a data analysis report from the URL of the file.

3.2 Portal usage

Portal managers need to regularly assess if the portal design and features, as well as the available data, meet the user's need. The feedback received directly by users is valuable, though anecdotal. Deeper insight is created by observing systematically the usage of the portal to better understand users' behaviour. The analysis to the needs of the users is enabled by monitoring the number of unique visitors, the typical user profiles, the most consulted datasets, the most popular data domains, or traffic generated via the portal's API. The effort spent in this direction is what is examined by this second indicator.

3.2.1 User analytics

All national portals except the Slovak portal, monitor the portal's usage through analytical tools such as Matomo or Google Analytics. In 2021, some portals also indicated to use the analytics provided by social media platforms such as Twitter and LinkedIn. The majority of them (89%) indicate that these insights are used to improve the portal. Some countries found interesting insights from these analyses.

²²³ <https://publier.etalab.studio/>

²²⁴ <http://audit.data.gov.ie/>

The Dutch data portal team noticed that there is a growing need for a more interactive data community platform and is investigating how best to tailor to that need.

Spain reports using advanced tools like “Talkwalker”²²⁵ to measure social impact, “Hotjar”²²⁶ for web analytics and usability, and “SEMrush”²²⁷ for monitoring their SEO positioning.

3.2.2 Portal visitors

When trying to capture portal usage, the number of unique visitors²²⁸ per month is one of the most common measures used. Apart from the Czech Republic and Slovakia, national data portals keep track of the average unique visitors per month.

The Member States are vastly different when it comes to the number of visitors on the portals. In absolute numbers, the French national portal has the highest number of unique visitors (1 million), the Lithuanian national portal records the lowest number (1.4 k). Though this is an interesting finding for drawing cross-country comparisons, the indicator is more meaningful when taking population numbers into account. If we correct for population, we find the numbers as shown in figure 19. Similar to last year, France records the highest number of unique visitors relative to the population size. Last year’s second position: Cyprus, dropped one position to the 3rd place, and Austria came in second this year, whilst being 6th last year.

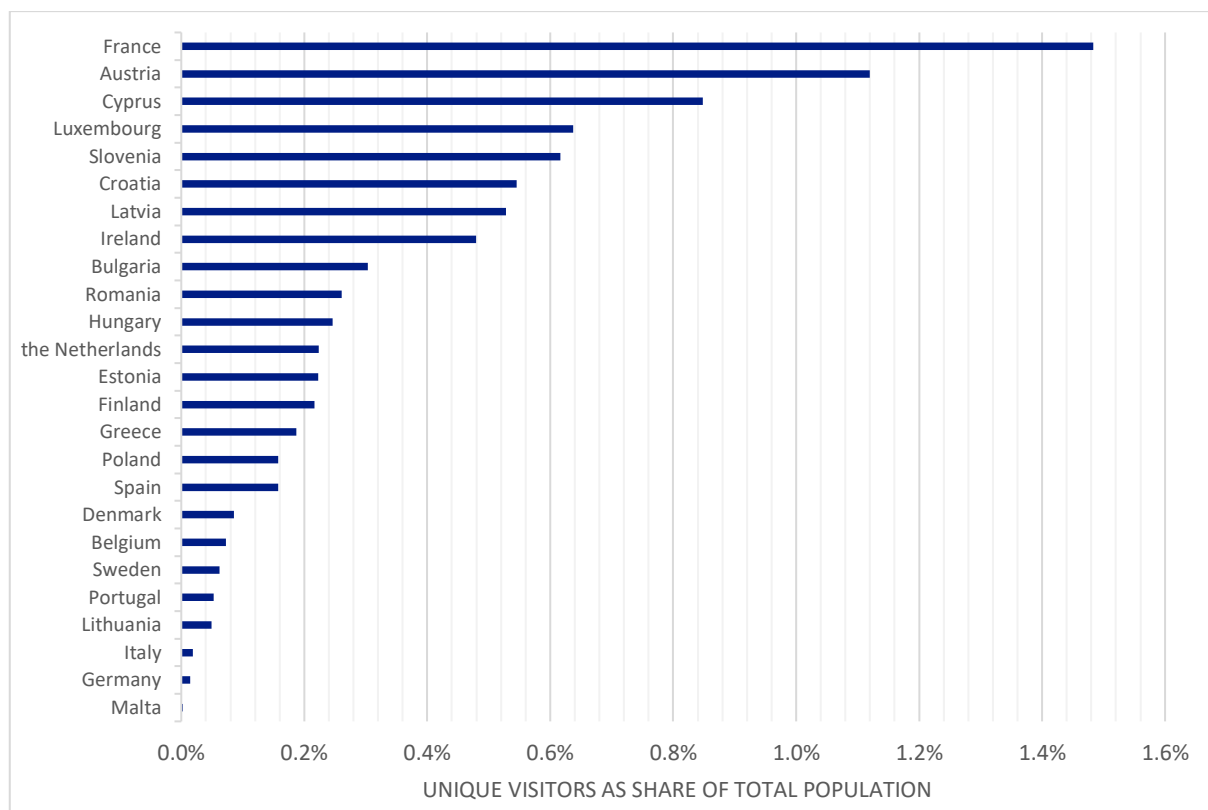


Figure 20: The share of unique visitors per month reported as percentage of total population

²²⁵ <https://www.talkwalker.com/>

²²⁶ <https://www.hotjar.com/>

²²⁷ <https://www.semrush.com/>

²²⁸ ‘Unique visitors’ refer to the number of distinct individuals accessing pages of a website during a given period, regardless of how often they visit that website in the given period.

Additionally, 26 Member States monitor the share of portal visits²²⁹ that come in from abroad. Usage from abroad shows how advanced and entrepreneurial data re-users take the opportunity to discover data internationally and seek to gather datasets as close to the sources as they can reasonably get.

In figure 20, the full overview of the proportion of foreign visits is displayed. Similar to last year, Austria reports a very high share of foreign visitors (50%). Estonia witnessed a serious drop in the number of foreign visits (from 51% to 17.5%). Lithuania and Denmark report the lowest number of foreign visits (< 2%).

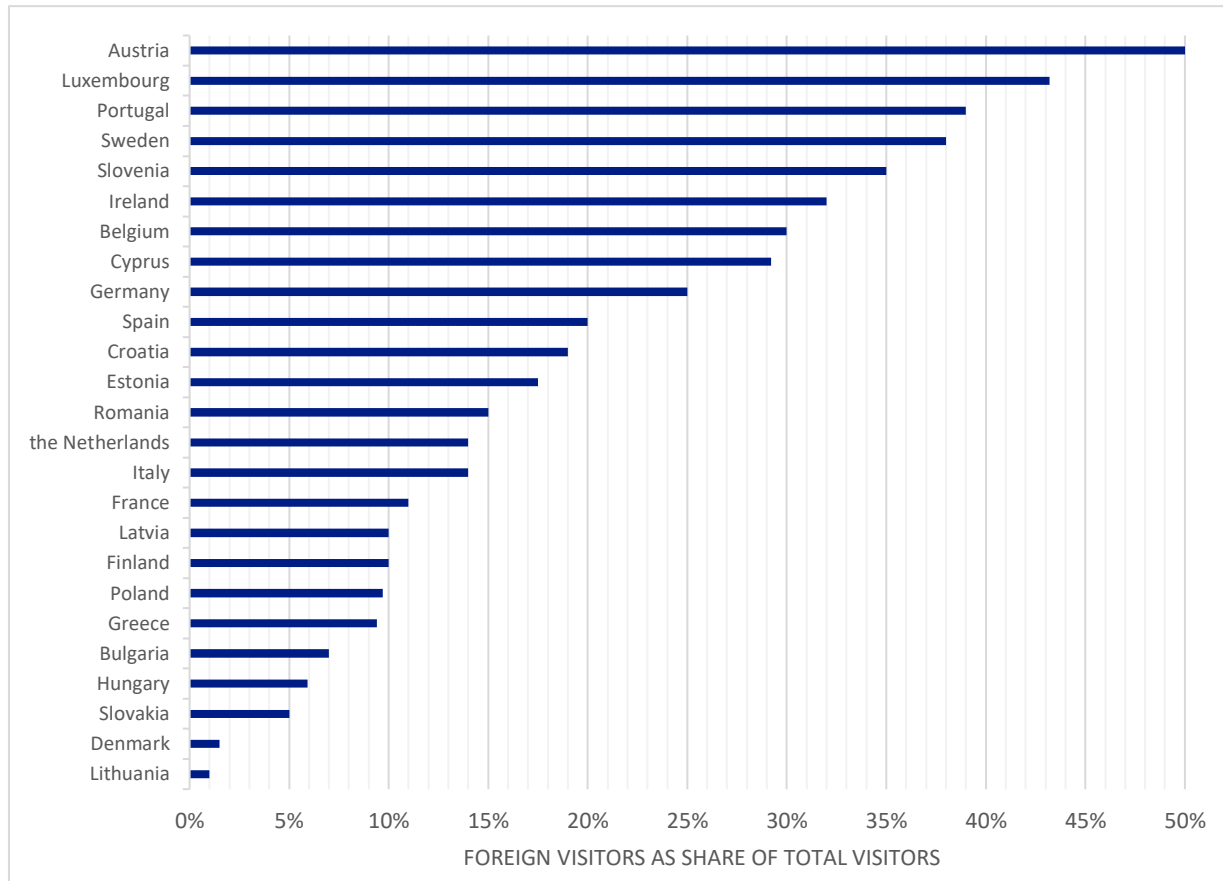


Figure 21: The proportion of open data portal visitors from abroad

Most portals (93%) indicate that they are aware of the background of their users and indicate that the audience is diverse. This is in line with their target group in most cases, as many portals indicate the aim to cater to citizens, businesses, and administrations but also scientists, journalists, NGOs, and developers. For example, the Maltese national portal is predominantly used by users from the public sector, similar to the Estonian national portal. The latter also indicates that they wish to attract more interest from the business sector as well as NGOs as they can add significant social and economic value through the reuse of data.

3.2.3 Most popular data domains

Of the EU27 countries, 22 national portals (81%) monitor which keywords are used to search data and content, and 24 portals (89%) also take measures to optimise the search and discoverability of content.

²²⁹ 'Visits' refer to the number of times a website is visited, independent of the numbers of visitors that access the website.

Some do so via modules on the portal itself, for instance through Google Dataset Search indexing²³⁰ in Bulgaria or through search engine optimisation (SEO), while others use dedicated training sessions on the basis of user feedback.

In 2021, Croatia has implemented a fuzzy-search mechanism for search results and the option to search via API. Fuzzy search is a mechanism that finds results that are likely to be relevant to a search argument, even when the argument is not entirely identical.

The Irish open data portal featured datasets that are deemed to be particularly relevant, for example about COVID-19.

In Spain, key datasets are highlighted through editorial content (e.g., articles and newsletters) to optimise the search and discoverability of content. The Spanish portal has incorporated methods to improve the sorting of data catalogue results and will give special attention to high-value datasets (HVDs) through a new future section of the portal.

23 national portals (85%) report to monitor the most and least consulted pages. In order to assess the most popular data domains, the assessment asked countries to provide the top 5 data categories consulted on the portal. The categories are the ones specified in the DCAT-AP standard. In 2021, the number 1 category of visited datasets was 'Health'. 9 national portals (33 %) reported this as the most popular category. As last year "Environment" was the number 1 category for 16 national portals, this change is most likely the result of the current pandemic. Together, "Population & society", and "Government & public sector" are the number 1 category for 8 of the portals (30 %). Only Croatia, Portugal, and Sweden list the category "Environment" as their most popular category.

It is important to note that there is no way to discern whether one category is "unpopular" because the portals' audience is uninterested in it, or because the countries are not in condition to offer enough relevant and valuable data on those topics.

For those portals who report "Health" as the most popular category, COVID-19 related datasets make up most of the top-five popular datasets. Other popular datasets across Europe include traffic information, cadastral plans and postal code registers, commercial registers, water quantities, population statistics, road and street (infrastructure), housing, and financial indicators.

What is noteworthy is that in Spain, the top-five of most popular datasets is quite diverse. After the evolution of COVID-19, datasets on fuel prices, lottery ticket kiosks, the operational fisheries fleet census, and the commercial registry are the most popular datasets. Another interesting finding is that in Lithuania, the number 2 dataset is data of gambling business bodies.

3.2.4 Application Programming Interface (API)

On 25 of the EU27 national portals (93%) is the metadata available in clear plain language, as to allow humans to read it as well, in addition to machines. Portugal and Bulgaria indicate that this is not possible on their portals. Additionally, 21 (78 %) of the open data teams monitor API usage, for instance by running analytics on the respective log files. The API enables advanced users to access the metadata programmatically, for example by writing software that performs searches automatically, to identify new datasets.

API usage can increase the traffic on the portal, and 15 national portals monitor if this is indeed the case. Poland reports the highest number of outgoing portal traffic, Spain the lowest. The full overview of portal traffic resulting from API usage is displayed in figure 21. Poland reports the highest number

²³⁰ <https://developers.google.com/search/docs/advanced/structured-data/dataset>

of outgoing portal traffic, Spain the lowest. For Poland, Luxembourg, and Denmark, at least half of the portal traffic results from API usage alone. This suggests that substantial open data re-use is taking place programmatically.

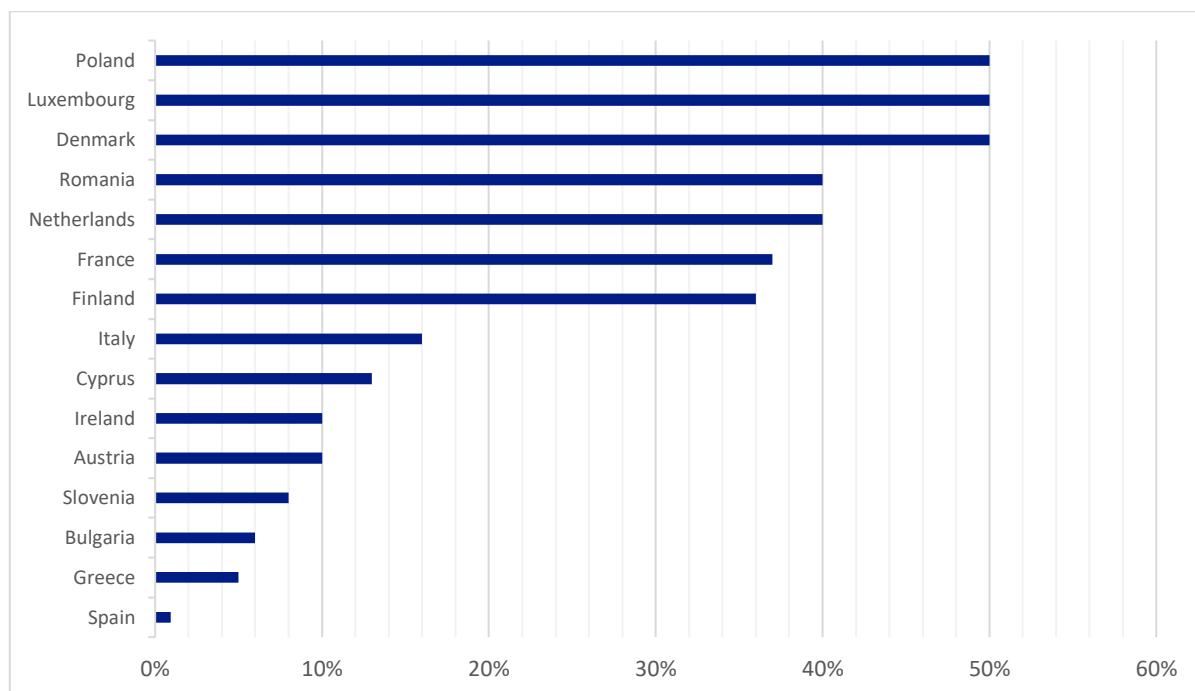


Figure 22: Percentage of outgoing portal traffic generated by API usage

Estonia states that they are undertaking efforts to provide a detailed overview of different API usage. Currently, they gather information through Google Analytics and find that API usage is still very low, but relevant for mobility and geodata in particular. To improve and encourage API usage they are currently creating guidelines for APIs, for example Postman²³¹, and investigating how to use it to add datasets to the portal.

3.3 Data provision

This indicator analyses the extent to which data publishers contribute to the national open data portals and which actions are taken to foster their contribution. This indicator looks at challenges that countries face in order to harvest all national open data and the methods they use overcome these challenges.

3.3.1 Data publishers

In terms of the share of data publishers that make their data discoverable via the national portal - be it by harvesting of the metadata or direct upload mechanisms - only 7 countries of EU27 (26%) report that all data publishers in the country contribute to the portal. This is a significant drop from the 12 portals that reported this last year. The spread of data publishers contributing the national data portals is shown in figure 22. Most portals find that the majority of data publishers in their country contribute to the portal and these publishers cover a wide spectrum of public administration (state, regional, local), but also research institutes like universities. Czech Republic, Malta, and Portugal indicate that

²³¹ <https://www.postman.com/>

only few data publishers do so. In many countries, data publishers are not obligated to publish their data on the national portal but are encouraged to do so.

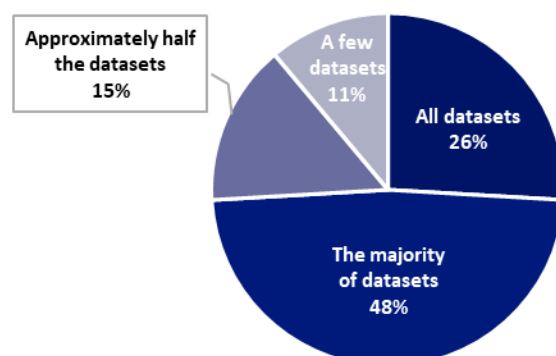


Figure 23: Number of data publishers that contribute to the national portals

Non-official data publishers

Additionally, 14 (52 %) of the EU27 Member States offer the possibility to publish non-official data – that is data that does not stem from official sources, for instance crowdsourced or community-contributed data. Most of these national portals have a separate section where, for example, private enterprises or NGO's can publish their data.

The countries that do not offer this possibility argue that the publication of data from public sources guarantees that the information is correct and objective. They want to make sure that the user knows that all data is provided by official government organisations, because that type of agreement does not include non-official or non-government data.

3.3.2 Challenges in data provision

Many countries report that the difficulties in publishing data stem from a lack of time or resources, knowledge funds, governance structure, or awareness. Especially smaller public bodies and institutions often lack the capacity to invest in open data publication. Aside from these issues, technical difficulties are also often reported by the Member States, for example by Malta.

Czech Republic indicates that there are roughly 10.000 public sector data providers but there are only 45 of them on the portal, as most of them are small municipalities who do not have the resources to deal with publishing open data.

In Germany, data from nearly all regional states is available, the two missing portals have difficulties publishing data for political reasons. Moreover, not all public sector bodies and institutions prioritise or are willing to prioritise open data publication.

With the exception of Belgium, all national portals identify which data providers are not yet publishing data on the national portal. To assist these data providers with their publication process, Member States offer a variety of solutions. For example, providing documentation such as a handbook, through individual support, tailored workshops and trainings, technical integration, or events that promote open data and its re-use.

The German data portal team developed an experimental tool, ‘the Open Data Process Guide (GUIDO)’. This minimal viable product of a guided processing tool for publishing open data was developed by a project team within the framework of the Tech4Germany initiative.²³²

In Ireland, most public service bodies do publish their data and the few who do not, might not have the capacity to publish yet or have little data to release due to GDPR concerns. They are actively working with them to address these issues. There is a network of open data liaison officers across public service organisations and their Open Data Unit is in regular contact with this network to support them and encourage them to publish their data in open format.

In Portugal, an approach is used that includes the creation of a governance structure, the implementation an ‘Open Data National Strategy’, the creation of data catalogues detailing which data cannot be opened, and which data can be opened but is not yet published. Moreover, they survey data maturity, set-up webinars to raise awareness on the concept of open data concept and its benefits, define methodologies to monitor and evaluate the impact of open data, and design a user satisfaction survey.

The Swedish PSI law states that all public actors have to publish a catalogue for PSI and open data that is publicly available for re-use, though this is not strictly enforced. In some cases, public actors have open data on their website, but they have not published metadata to the national portal in DCAT-AP. Ultimately, the aim is that all open data and PSI is harvested by the portal.

3.3.3 Access to real-time and dynamic data

Another aspect assessed under this dimension is the level at which the national open data infrastructure also provides access to real-time and dynamic data. 25 (85%) of the EU27 Member States offer real-time or dynamic data on their portal. This can include for example air quality data, weather data, traffic information, or even data of recently born babies (Latvia). The only two countries for which this is not yet the case are Hungary and Portugal.

The 25 portals that offer real-time and dynamic data were asked what percentage of the metadata on their portal links to such data, the results can be found in figure 23. The figure shows that, similar to last year, most countries have <10 % of the metadata linked to real-time or dynamic data. Only Denmark, Latvia, and the Netherlands report having more than 30% of the metadata linked to real-time or dynamic data.

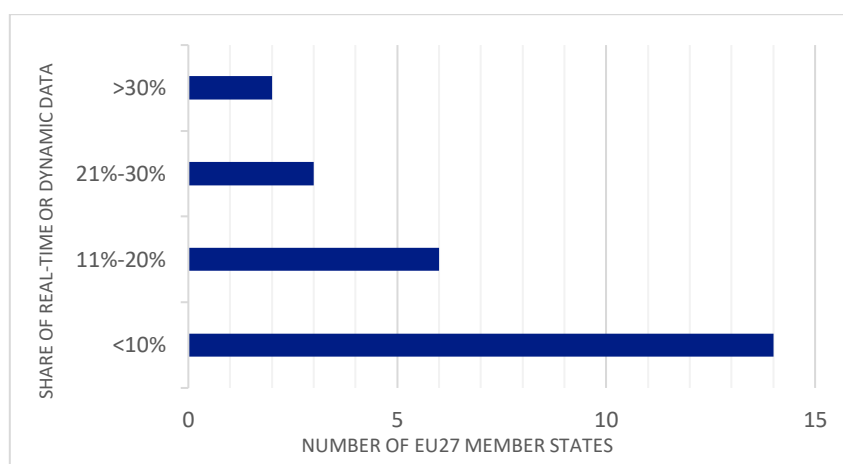


Figure 24: Share of real-time or dynamic data as share of total metadata

²³² <https://tech.4germany.org/project/open-data-portal>

3.4 Portal sustainability

This indicator analyses the extent to which the national open data teams have set up a strategy to ensure the long-term sustainability of the portal, and the measures in place to ensure that the portal caters to the needs and brings an added value to the main audience. In 2021, all Member States except Belgium report to have a strategy in place that ensures the portal's sustainability. Hungary, Portugal, and Romania all implemented this over the past year. Of those, 21 (78 %) include a description of the portal's target audience and measures to reach this audience.

3.4.1 Enhancing visibility

To ensure sustainability of the national portals, it is important to attract new visitors, and engage them to make sure the portal stays relevant and interesting for them. All portals indicate to take action to enhance the visibility of the portal by promoting their available features and data.

Mostly these activities include events such as conferences, webinars, interviews, hackathons, and working groups, but also through editorial content such as news pieces, newsletters, promotion campaigns, success stories, press releases, and social media. Slovenia, for instance, hosted several hackathons²³³. France also hosted several events, for example, a hackathon on non-profit data²³⁴, the "DataFin hackathon"²³⁵, and the "RenovAction hackathon"²³⁶. Poland hosted the online conference "The Future is Data"²³⁷ last year focusing on data management and data sharing in the context of EU initiatives. Lithuania created a channel for open data enthusiasts on MS Teams.

In terms of social media, all national data portals, apart from Hungary, Malta, and Greece have an active social media account to assist with communication and awareness-raising. Belgium, Lithuania, and Portugal engage with their audience on social media through alternative accounts, for instance via personal accounts of the project team, or via a government account for digitalisation.

The most widely used channel is Twitter, mentioned by 16 Member States. Some portals also mention to use Facebook, LinkedIn, and YouTube. Spain additionally uses Flickr²³⁸, and image and video hosting service and online community. France mentions to use Mastodon²³⁹, an open source decentralised social network.

25 of the EU27 national portals also enhance the visibility of their work through publishing source code, and other relevant documentation and artifacts. 23 of those countries use sharing platforms such as GitLab or GitHub to publish the contents and get in touch with developers in the field. The Irish national portal for example publishes the source-code on a CKAN platform²⁴⁰.

3.4.2 User satisfaction

To understand user's needs and gauge satisfaction with the portal, 16 of the EU27 portals conducted a satisfaction survey. These are slightly less portals than last year (20). Though we cannot be certain,

²³³ See <https://www.tp-lj.si/sl/novice/horizon4-so-zmagovalci-podnebnega-hackathona-2020-11-09> or <https://transformation-lighthouse.com/hackathon-zivljenje-s-podnebnimi-spremembami/vec-o-hackathonu/>

²³⁴ <https://www.data.gouv.fr/fr/posts/les-jeux-de-donnees-des-associations/>

²³⁵ <https://www.etalab.gouv.fr/hackathon-datafin-participez-a-lexploitation-des-donnees-financieres-des-collectivites-locales>

²³⁶ <https://www.hackathon-renovaction.fr/program/hackathon>

²³⁷ <https://thefutureisdata.pl/en/>

²³⁸ <https://www.flickr.com/>

²³⁹ <https://joinmastodon.org/>

²⁴⁰ <https://data.gov.ie/developer>

we assume this has to do with the pandemic. The popularity of COVID-19 related content might indicate that data publication has had a higher priority than gauging user satisfaction.

From the surveys, it appears that some portals do well in terms of user-friendliness, for instance through providing intuitive search (Spain), while others might improve this (Slovakia). Spain found that, on their portal, the most useful opportunities for promoting the reuse of data are the competitions and challenge they offer.

The Dutch portal noticed, from their survey, that users would appreciate a stronger focus on specific data domains and topics, both on the portal and in their regular user meetings. They are currently working to improve this by explicitly relating datasets to data requests, applications, organisations, and impact stories.

Apart from surveys, gauging satisfaction can also be achieved through interviews, contact forms, or mailboxes, an option which Estonia for instance makes use of.

Some Member States provide the option for users to give continuous feedback. In Denmark for example, the Agency for Data Supply and Efficiency (SDFE)²⁴¹, who administers Danish basic data, continually assesses user demands through a business analytics-setup²⁴², for instance in the user forum for the data distribution service Datafordeleren.²⁴³

A way to make sure portals cater the user's need is by reviewing and continuously improve the portal and its functionality. 25 Member States indicate to have a process in place for reviewing and improving the portal. Figure 24 shows the frequency that countries review and improve their national portal. It shows that more than half of the countries review their portal quarterly, while other review annually or bi-annually. Only Luxembourg indicates to review their national portal less frequently than once a year.

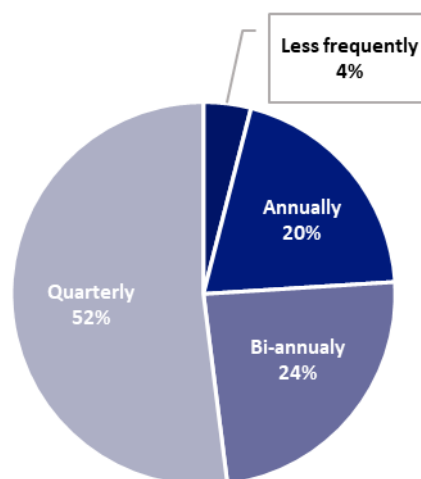


Figure 25: Frequency of that the EU27 review their national portal

Many Member States review their portal through working-group meetings or sessions. Those can be both strategic and focus on general improvements, or more pragmatic and focus on issues raised by

²⁴¹ Agency for Data Supply and Efficiency (SDFE): <https://eng.sdfe.dk/about-us/organisation/data-bank/>

²⁴² <https://sdfe.dk/data-skaber-vaerdi/nyheder/nyhedsarkiv/2018/jan/sdfe-skal-taettere-paa-brugerne/>

²⁴³ <https://datafordeler.dk/vejledning/grunddata/>

users. In many cases, they are a combination of both. In addition, safety tests, accessibility tests and general maintenance are also in place to optimise and refine the portals.

Italy specifically mentions that they update the portal every two years, and a new release came out in February. A new revision is planned after the release of the implementing regulation regarding the high-value datasets.

Lithuania provides an example of an open-source approach to implementing feedback. User feedback and comments on the portal's functionality are collected and recorded in GitLab, where they are reviewed and submitted to the portal's maintainers on a weekly basis.

3.4.3 Monitoring performance

The awareness of the portal's performance and usage can be used to prove the importance of the continuity of activities. Portal teams can use that information to ensure a continuous flow of sufficient funding from their governments to continue their efforts. In order to monitor the portals' performance, 22 (81%) of EU27 portals offer a monitoring tool such as a dashboard to showcase the main key performance indexes related to, for example, the number of datasets published, the distribution across categories, the number of visitors or how these numbers change over time. In some cases, elaborated dashboards are created showcasing results on various levels such as increase in metadata over time, broken links, metadata formats and distribution of licences.

The Irish data portal has, in addition to the statistics overview page, implemented a KPI tool²⁴⁴ this year which allows further analysis of datasets.

In Luxembourg a back-office tool for data providers is developed showing the detail of its datasets and resources, as well as the number of views and downloads, and metadata quality.

Going one step further, 22 (71%) of EU27 national portals offer additional features that also allow data publishers to monitor their own activity on the portal, which is two more than last year. This type of monitoring tools can create "positive competition" amongst public bodies and nudge the lesser performers to improve the volume and quality of their publication. At the same time, such features can also help identify data providers that are top performers and enable the creation of channels for knowledge transfer between them and other publishers. In some cases, such features also enable publishers to see the popularity of their own datasets and inform them about the applications that are based on their data. Many portals offering this feature requires the users to log-in before they can see the statistics.

Germany has a dashboard using the SHACL Validator²⁴⁵ which gives the data providers links how to improve their metadata quality and their performance on the national portal.

The Italian portal has a validator in place to let the data providers to know the metadata quality.

Sweden also offers a nice example. On the admin tool for the portal publishers, in-depth statistics are offered²⁴⁶. Each data producer now has as "metadata health checker" to check status, information, and statistics. Statistics on metadata quality and completeness is also offered by the public agency "The Swedish Energy Markets Inspector"²⁴⁷.

²⁴⁴ <https://data.gov.ie/kpi-report>

²⁴⁵ <https://www.itb.ec.europa.eu/shacl/dcat-ap.de/upload>

²⁴⁶ <https://admin.dataportal.se/status/overview>

²⁴⁷ <https://admin.dataportal.se/organization/174/statistics>

3.5 Overall performance

In this final section, the overall performance of the EU27 Member States is evaluated based on the indicators of the open data portal dimension discussed throughout the chapter. On average in 2021, the maturity level of the impact dimension of the EU27 is 83%, which is an increase of 4 percentage points compared to last year (see figure 25). Last year, it was presumed that the desire to respond to the open data demand related to the COVID-19 pandemic stimulated and accelerated development. Although a steep increase like last year is not observed in 2021, continuous developments show with new and redesigned portal being launched, the ongoing preparations for the list of high-value datasets, and the increased offering of real-time and dynamic data.

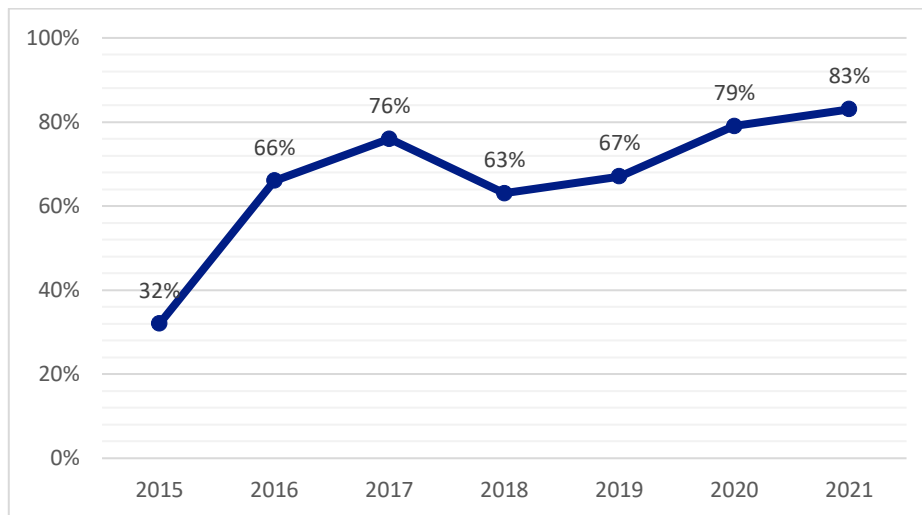


Figure 26: Development in maturity of the portal dimension over the last years

Figure 26 shows the EU27 average maturity score on each of the 4 indicators of the open data portal dimension. All indicators show an improvement compared to last year, where data provision showed the highest increase in score (+7 percentage points). This underlines the focus to ensure all public sector bodies publish their data on the portal and the increased focus on offering real-time and dynamic data. Similar to last year, the most mature indicator within the portal dimension is deriving insights into portal usage (88%).

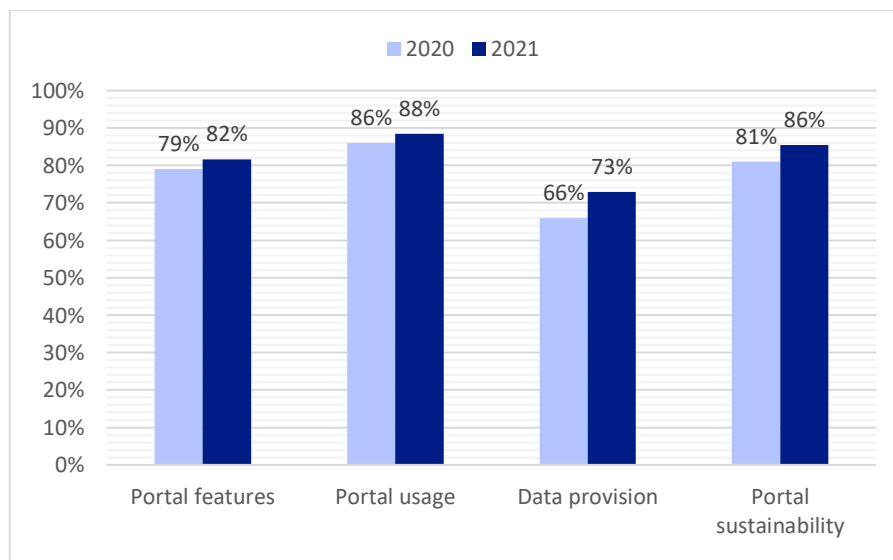


Figure 27: Maturity score per portal indicator compared to last year

Finally, the country ranking of the portal dimension can be observed in figure 27. The figure shows that the majority of 17 Member States score above the EU27 average of 83% and 10 Member States scored below. The countries with the highest maturity levels on the portal dimension are France (98%), Poland (97%), and the Netherlands (96%), where the Netherlands showed an increase of 8 percentage points, jumping from 14th to 3rd place in the ranking. Also, the new portals of Estonia and Hungary resulted in great improvements in their score, +7% and +25% respectively.

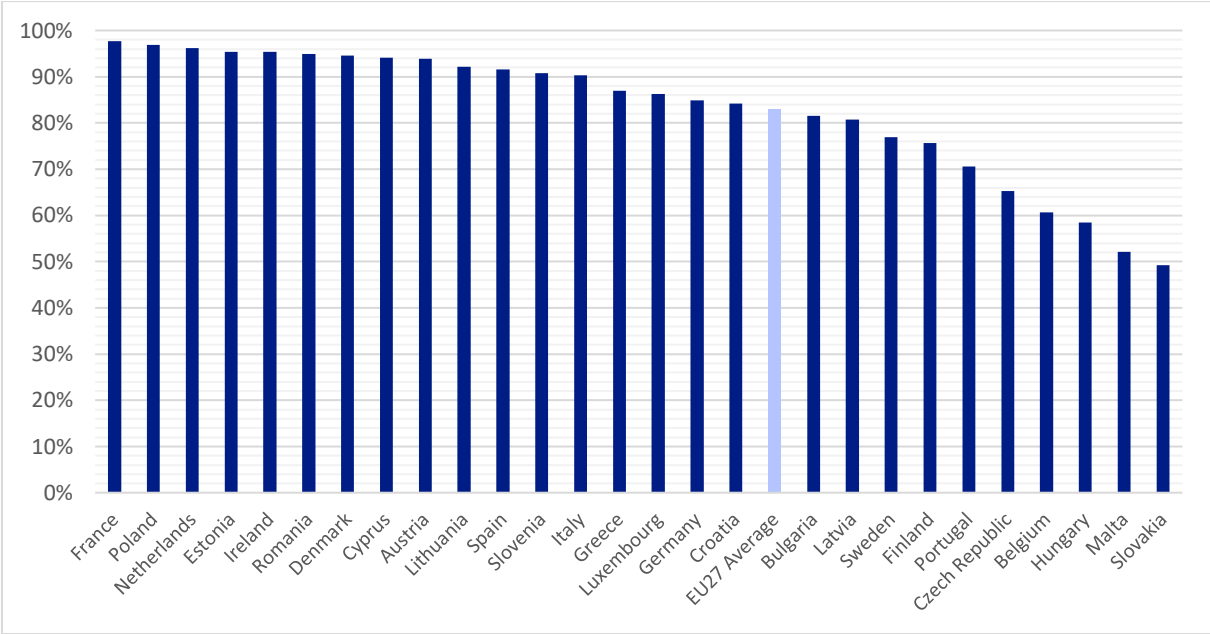


Figure 28: Country ranking for the portal dimension

Chapter 4: Open Data Quality

The quality of data and metadata has been gaining importance for some time now. The key focus area in many European countries is no longer the sheer quantity of data that is being made publicly available. It is rather the quality of that data which is a crucial focus area to enable proper application and re-use of data to enable the distillation of insights and creation of new services. The fourth assessment dimension “open data quality” focuses on measures and monitoring mechanisms adopted to ensure the quality of data and metadata. This includes the measures adopted to ensure the systematic and timely harvesting of metadata as well as monitoring mechanisms that are in place to ensure high-quality publication of metadata, compliant with the DCAT-AP standard and compliant with several deployment quality requirements. Deployment quality refers to using open data licences, open and machine-readable data formats, using Unique Resource Identifiers, and enabling a linked data approach.

The following key elements are explored as part of the quality dimension:

Metric	Key elements
(Meta)data currency and completeness	A systematic approach in place to ensure that metadata is up to date. Harvesters are programmed to ensure that changes at the source are reflected with the least amount of delay on the national portal.
Monitoring and measures	Mechanisms are in place to monitor the quality of the metadata and the compliance level in terms of correct licensing information. Measures are in place to assist publishers in publishing in high-quality metadata and choosing the right type of licence for their data.
DCAT-AP compliance	Compliance to the DCAT-AP standard in terms of mandatory, recommended and optional classes is monitored. Guidelines and learning materials help publishers in ensuring compliance with DCAT-AP.
Deployment and linked data	An open data model is used to assess the quality of data deployment. Percentage of published open data that complies with certain deployment quality requirements.

4.1 (Meta)data currency and completeness

This indicator analyses to what extent countries have a systematic approach in place to ensure that metadata, and where applicable the actual data, is up to date. The indicator looks specifically at automatic harvesting processes to ensure that changes at the source of the data are reflected with the least amount of delay on the national portal.

4.1.1 Up-to-date metadata

In 2021, 74% of Member States indicate that on average, the metadata describing the datasets available on the national portal is updated within one day from the moment its primary source is updated. The other 26% indicates that this is on average updated within one week. This is ensured by having a pre-defined approach for updating metadata and aided by automatic harvesting processes.

85% of Member States have a pre-defined approach in place to ensure that the metadata is kept up to date. Up-to-date metadata on the national portals is critical for users to obtain correct information about the data. Some countries indicate that it is the responsibility of the original sources and providers

of datasets – government bodies institutions at all levels – to ensure up-to-date metadata and the national teams support them to do so.

In the Netherlands, there is a clearly defined approach to ensure that metadata conforms to DCAT standards. The data management team of the portal checks if the metadata is correct and in case any datasets are missing, the team contacts the data providers. The data providers can also check if the metadata is up to date conform the standard. The documentation is published for anyone to validate against the Dutch DCAT application profile.²⁴⁸

In Sweden, each data provider has a “metadata health checker dashboard”²⁴⁹ to check statistics such as quality and completeness. This data is also aggregated to give portal administrators at the Agency for Digital Government²⁵⁰ a general, aggregated view. Complementary to the dashboard, the agency also gets quarterly reports on qualitative and quantitative status on the portal including metadata status, new publishers, errors etc. Data providers have the possibility to get automatic notifications in case there is a metadata harvesting error or if there are any broken links.

Automatic metadata sourcing

The ability to keep the metadata up to date depends, among others, on the extent to which metadata is obtained from its source automatically.

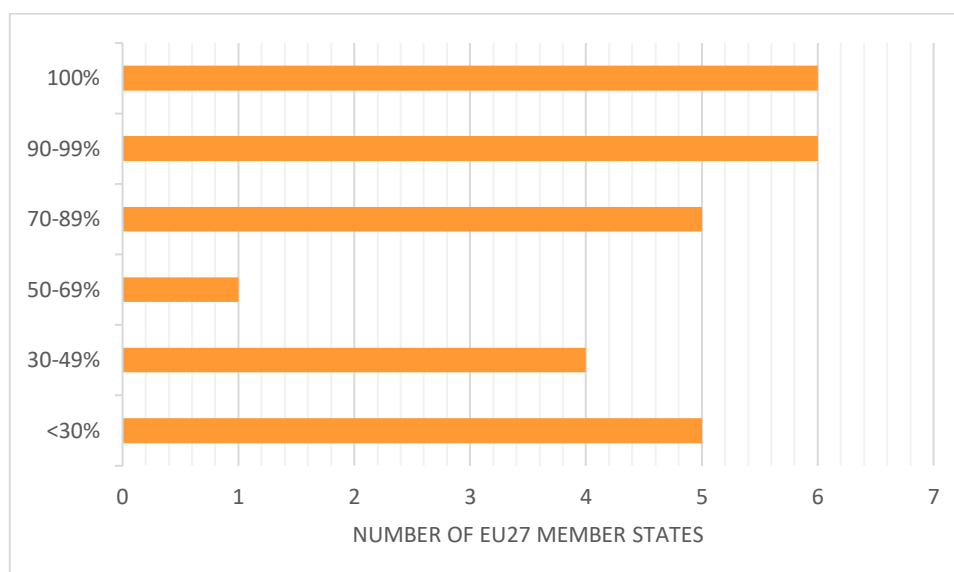


Figure 29: Percentage of metadata obtained automatically by the EU27

Figure 29 shows the percentage of the metadata that is obtained from its source automatically for the Member States. In 6 countries (22%)– Belgium, Croatia, Denmark, Italy, Malta and Sweden – all metadata is uploaded in an automated way to the national portal. Additionally, 6 countries (22%) obtain between 90% and 99% of their metadata from the source automatically. It is also shown that 5 countries (19%) obtain less than 30% of their metadata from its source automatically. The distribution clearly shows two clusters of countries: the ones who are investing significantly in automation and the ones that – for any reason, whether it is lack of funding, skills, etc. – are lagging behind. This means that most of the metadata in the latter group is edited manually to some degree, which is more time

²⁴⁸ <https://data.overheid.nl/en/ondersteuning/open-data/dcat>

²⁴⁹ For more information see <https://registrera.oppnadata.se/organization/174/statistics>

²⁵⁰ Agency for Digital Government: <https://www.government.se/government-agencies/the-agency-for-digital-government/>

consuming and may create friction to scale up as the amount and complexity of data grows. Moreover, manual editing of metadata easily allows for human error.

4.1.2 Up-to-date datasets

Together with the metadata, the currency of the data itself is critical for re-users. Ideally, datasets are up to date if they represent fairly *in time* the phenomenon they are intended to describe and enable application. For example, data describing live weather or traffic needs to be updated in real-time, by the hour – possibly by the minute or by the second – to enable complex applications such as forecasting. On the other side, data from a population census that is run every 10 years needs to be updated only following completion, or when mistakes are discovered, and corrections issued.

Also, gaps in the time series significantly compromise its usability. In case of annual data, for example, the dataset is considered up to date in case it contains data until last year. In case of daily data, a dataset is up to date in case it included data until yesterday.

Figure 30 shows the degree to which datasets cover the full period from when they were first published until today. Only 2 Member States indicated that all datasets on their portal cover the full period from when they were first published until today – Greece and Slovenia. 13 Member States indicate the majority of datasets and 7 Member States indicate approximately half of the datasets, whereas 5 say only few datasets available on their portal are up to date.

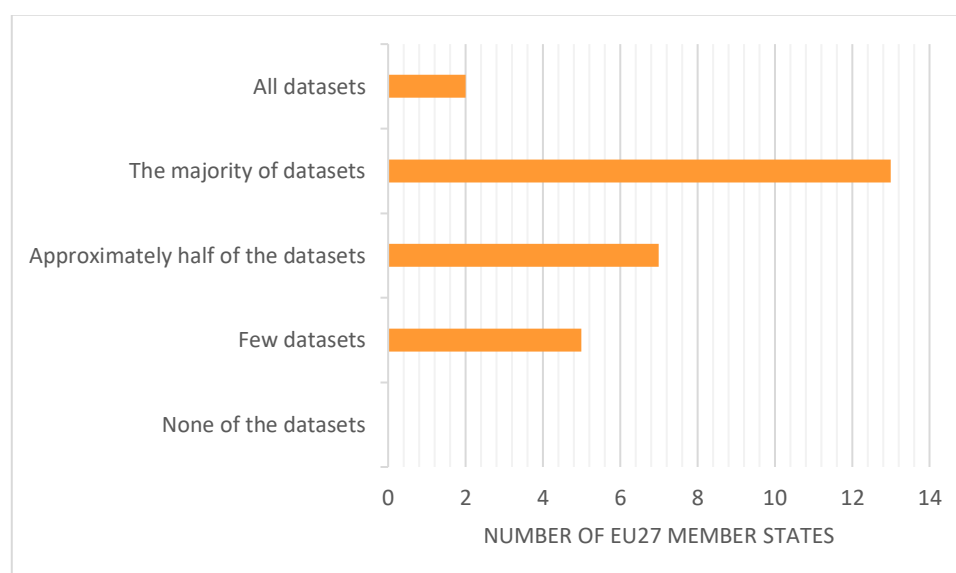


Figure 30: The extent to which datasets are up to date

4.2 Monitoring and measures

This indicator analyses the extent to which mechanisms are in place to assess and boost the quality of metadata and the compliance level in terms of correct licensing information. In addition, the indicator looks at support, guidelines, and tools available to assist data publishers in publishing high-quality metadata and in choosing the right type of licence for their data.

4.2.1 Monitoring the quality of metadata

96% of Member States monitor the quality of metadata on their national portals – only Malta indicates that metadata quality is not monitored. The great majority (70%) of Member States also publishes

information on the quality of the metadata on their portal. Countries indicate using a variety of tools to monitor and validate the metadata.

In Austria, data quality checks are possible via platform tools such as bulk exports. An updated ADEQUATE (Analytics & Data Enrichment to improve the QUALITY of Open Data) data quality checking instrument for metadata is envisaged for the future.

In Cyprus, public sector bodies are required to provide a number of mandatory metadata items when publishing data on the national open data portal. The internal mechanics of the portal are set in such a way that no dataset can be submitted for publication on the portal unless the mandatory metadata fields are completed. The submitted dataset and the related metadata then undergo a quality review for format compliance and metadata completeness before being published on the portal.

In Germany, a dashboard is available which provides information about the published data, such as compliance with the DCAT-AP.de standard, broken links, etc. The dashboard is currently in a trial period and available to registered users.

In Spain, the quality of the metadata is checked at the time of registration and when updates take place. Datasets that do not meet the quality standards established in the “Technical Interoperability Standard for Reuse of Information Resources”²⁵¹ are not accepted. Data providers receive warnings when they do not comply with these standards so that the metadata can be adjusted accordingly, and changes are not saved until they are correct. In the last year a process of individualised auditing of publishers on the quality of metadata currently published on the portal by each organisation²⁵² has been initiated. This audit follows the methodological approach of the Metadata Quality Assessment (MQA) proposed by data.europa.eu²⁵³, assessing metadata quality based on three complementary dimensions: discovery, interoperability and context. In addition, distribution URLs are evaluated on a weekly basis to inform data managers of possible broken links. This analysis generates a report on the portal for the managing users and is also sent monthly by email to the data providers.

In Lithuania, data providers are obligated to ensure data accuracy and completeness. Also, portal users’ comments on the accuracy and errors of the data must be reviewed and, if justified, adjusted. The implementation of DCAT requirements is ensured by setting mandatory fields, keeping the consistency and completeness of their completion. A dataset is given the status “open data” only when the required metadata is fully completed.

4.2.2 Licences

In order for data to be open, it should be accessible and licensed for anyone to access, use, and share. An open data licence provides users with certainty that the data can be used and shared for a wide range of purposes. Without a licence, data may be publicly available, but users will not have clarity around what permission they have to access, use, and share it under copyright or database laws.

In 2021, 85% of Member States indicate that more than 90% of open data available on the national portal is accompanied by licensing information. Member States are aware of the importance of providing licensing information, as all Member States assist publishers in choosing appropriate licences by publishing guidelines. In the vast majority of Member States (89%), the guidelines provide recommendations for the use of standard licences, such as the Creative Commons (CC) ones.

²⁵¹ <https://joinup.ec.europa.eu/collection/egovernment/document/es-technical-interoperability-standard-public-sector-information-reuse>

²⁵² https://datos.gob.es/sites/default/files/datosgobes/dimension1_evidenciapregunta13.jpg

²⁵³ <https://data.europa.eu/mqa/?locale=en>

The spectrum of licence choices varies significantly between countries. The focus of this assessment in evaluating the countries' maturity is on the effort spent on promoting licence *standardisation*, rather than on the choice of a licence rather than another. The objective is streamlining open data re-use, without the added complication of non-standard licences that need to be investigated by re-users on a case-by-case basis. In some countries, the use of standard licences is prescribed by law, while in others it is just a recommendation.

In several countries, such as Croatia, Italy, Luxembourg, the use of CC licences is not prescribed by law but recommended.

In Belgium, the law does not impose CC licences explicitly, but the law describes a set of rules that makes CC licences fit in naturally.

In Latvia, only CC-0 licence is available.

In the Netherlands, CC licences are used and the default license is CC-0. It is mandatory to set the licence for a dataset for publication on the national portal.

In Poland, it is required to select a CC licence for each dataset. Most datasets are available on the portal without any conditions, CC-0, or under minimum conditions and such information is always provided for a given dataset.

Some countries (26%) have introduced national licences such as Czech Republic and Germany.

In Germany, in cooperation with the Federal Government, the Länder and local associations, a recommendation on uniform usage rules for administrative data in Germany is developed, which is now available in version 2.0 of the "data licence for Germany"²⁵⁴. This national licence is recommended to be used by public bodies. This version is also officially recognised as an open licence by the Open Definition Expert Council.

Even though countries may have introduced national licences, some have also started promoting the use of CC licences more recently.

In Italy, a national licence, IODL²⁵⁵ (Italian Open Data Licence), was developed. More recently, in line with the recommendations of the European Commission, the use of CC licences is promoted.

Similarly, in Spain, a national licence²⁵⁶ was developed based on a decree published in 2011²⁵⁷, when the use of CC licences was not yet common practice for data. Therefore, simple conditions of use were designed for reusing public sector information. The conditions of the national licence are similar to CC-BY 4.0. Currently, the use of CC licences for public sector information is promoted in the publishing guidelines, though these provide information about both the Spanish and the CC licences, so that data managers can establish the most suitable option.

Support activities

In addition to providing guidelines, 96% of Member States conduct regular activities to incentivise and assist data providers in the publication of data accompanied by high-quality metadata. These include

²⁵⁴ <https://www.govdata.de/dl-de/by-2-0>

²⁵⁵ <https://www.dati.gov.it/content/italian-open-data-license-v20>

²⁵⁶ <https://datos.gob.es/es/avisolegal>

²⁵⁷ https://www.boe.es/diario_boe/txt.php?id=BOE-A-2011-17560

among others, regular meetings, training sessions, workshops, or other events to establish a common understanding on the importance of high-quality data publication.

In France, various activities are carried out to assist data providers. Since 2021, Etalab – the French open data team – provides a tool called “publier.etalab.studio”²⁵⁸ to help portal users generate their data in a structured way. This tool helps to get better quality of the data published on the French open data portal. In addition, Etalab is making special efforts to better support data producers in their publication procedures through quality guides²⁵⁹. The guides cover legal, technical, or organisational themes and are conceived in an iterative and open manner. The guides insist on the publication of high-quality metadata²⁶⁰, and complements the portal’s comprehensive documentation²⁶¹.

In Ireland, the Irish Open Data Technical Framework was revised in 2021 and the new “Open Data Publication Guidelines”²⁶² document was published. In the revised guidelines, the focus is on recommending best practices that will:

- *Ensure the discoverability and accessibility of data,*
- *Empower people to understand and use data,*
- *Support increased public-service transparency,*
- *Drive evidence-based decision making and innovation, and*
- *Enable measurable impact.*

Additionally, events are held to assist data providers in the publication of high-quality metadata. For example, in March 2021 a webinar for data providers was held focusing on “Preparing for the Open Data and Reuse of PSI Directive”²⁶³ and in December 2020 an Open Data Conference for publishers was held, focusing on data quality and impact.

4.3 DCAT-AP compliance

DCAT is a W3C standard designed to facilitate interoperability between data catalogues published on the web.²⁶⁴ DCAT-AP is an extension to DCAT – an “application profile” – that was developed by the European Commission specifically to improve interoperability and foster discoverability and re-use of open data across European catalogues.²⁶⁵ Compliance to DCAT-AP is increasingly recognised among the Member States. The DCAT-AP compliance indicator examines the extent to which metadata complies with the DCAT-AP standard for describing public sector datasets and what efforts are taken

²⁵⁸ <https://publier.etalab.studio>

²⁵⁹ <https://guides.etalab.gouv.fr/qualite/>

²⁶⁰ <https://guides.etalab.gouv.fr/qualite/documenter-les-donnees/#description-du-mode-de-production-des-donnees>

²⁶¹ <https://doc.data.gouv.fr/jeux-de-donnees/publier-un-jeu-de-donnees/>

²⁶² https://data.gov.ie/uploads/page_images/2021-05-11-144708.586537Open-Data-Publication-Guidelines-2021.pdf

²⁶³ <https://www.eventbrite.co.uk/e/its-time-to-open-preparing-for-new-open-data-and-reuse-of-psi-directive-tickets-143034131939>

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

²⁶⁵ For more information see <https://joinup.ec.europa.eu/collection/semantic-interoperability-community-semic/solution/dcat-application-profile-data-portals-europe> and data.europa.eu’s (formerly European Data Portal) Open Data Goldbook for Data Managers and Data Holders at <https://data.europa.eu/en/training/data-providers-guide>

to assist data publishers in ensuring compliance with DCAT-AP. Also, it considers the availability of recommended and optional classes.

4.3.1 Assisting data providers to be DCAT-AP compliant

85% of Member States provide their data suppliers with documentation on DCAT-AP. Documentation can consist of Member States' own developed documentation, factsheets provided by data.europa.eu, or materials published on websites hosted by the European Commission, such as the JoinUp Platform²⁶⁶.

In Sweden, a new website²⁶⁷ was launched last year to summarise the collection of available documentation. Specifically, it contains documentation such as "Harvesting specifications"²⁶⁸, "DCAT-AP-SE RDF examples"²⁶⁹, and "DCAT-AP recommendations per field"²⁷⁰.

In Spain, the metadata audits carried out for public bodies are based on the Metadata Quality Assessment (MQA) proposed by data.europa.eu²⁷¹. In the last year, several articles with relevant links to DCAT-AP have been published, such as "DCAT-AP 2.0.1: How has the European reference specification for the description of open data catalogues evolved?"²⁷², "Why are data vocabularies important?"²⁷³ and "The importance of data cataloguing"²⁷⁴ in addition to the other documentation²⁷⁵ that assists data providers to be DCAT-AP compliant.

4.3.2 Investigating causes for a lack of DCAT-AP compliance

The importance of DCAT-AP for national data portals is also evident from the efforts taken to investigate the most common causes for lack of compliance. 78% of Member States investigate this and some examples of the main causes are included below.

Some countries, such as Croatia and Slovenia, indicate that more than 90% of metadata is compliant with DCAT-AP, so these countries do not see the urgency of having a detailed research into the lack of compliance.

In Germany, some of the causes mentioned are a general lack of knowledge about Linked-Open-Data, problems in using correct URLs, difficulties with mapping the right themes on the datasets, a lack of upgrading on newer versions of DCAT-AP and DCAT-AP.de as well as problems with limitations according to the software, for example CKAN.

In Spain, the main discrepancies in DCAT-AP compliance are due to the fact that the "Technical Interoperability Standard for the Reuse of Information Resources"²⁷⁶ is developed prior to the DCAT-AP specification. This standard does not derive from the use of metadata but from the controlled

²⁶⁶ <https://joinup.ec.europa.eu/>

²⁶⁷ <https://docs.dataportal.se/>

²⁶⁸ <https://docs.dataportal.se/dcat/docs/harvesting/>

²⁶⁹ <https://docs.dataportal.se/dcat/docs/examples/>

²⁷⁰ <https://docs.dataportal.se/dcat/docs/recommendations/>

²⁷¹ <https://data.europa.eu/mqa/?locale=en>

²⁷² <https://datos.gob.es/es/blog/dcat-ap-201-como-ha-evolucionado-la-especificacion-de-referencia-europea-para-la-descripcion-de>

²⁷³ <https://datos.gob.es/es/blog/vocabularios-de-datos-por-que-son-importantes>

²⁷⁴ <https://datos.gob.es/es/blog/importancia-de-la-catalogacion-de-datos>

²⁷⁵ <https://datos.gob.es/es/documentacion/recursos-disponibles-para-conocer-mas-sobre-dcat-ap>

²⁷⁶ <https://joinup.ec.europa.eu/collection/egovernment/document/es-technical-interoperability-standard-public-sector-information-reuse>

vocabularies used to identify data subjects, publishing entities, and geographical coverage. A level of detail is required at the national level that is not addressed in DCAT-AP.

In Sweden, the most common causes for a lack of DCAT-AP compliance are lack of technical skills and understanding to set up the RDF catalogue including the metadata harvesting. This is the prime reason why the Swedish team has updated the national DCAT-AP-SE and invested resources the last year to establish the technical framework and all the technical documentation, recommendations, and sandbox environment.

4.3.3 Compliance with DCAT-AP mandatory, recommended, and optional classes

In 70% of Member States, it is declared that more than 90% of the metadata is compliant to mandatory DCAT-AP classes (agent, catalogue, dataset, literal, resource). In 56% of Member States, more than 90% of the metadata is assumed to meet the standards of recommended classes (category, category scheme, distribution, license document), and in 41% of Member States, more than 90% of the metadata meets the standards of optional classes (catalogue record, checksum, document, frequency). Similar to last years, countries are focusing on compliance by providing metadata for the mandatory classes but invest less effort in recommended and optional classes. Figure 31 shows the percentage of metadata on national data portals in Europe declared to be DCAT-AP compliant as well as the recommended and optional classes.

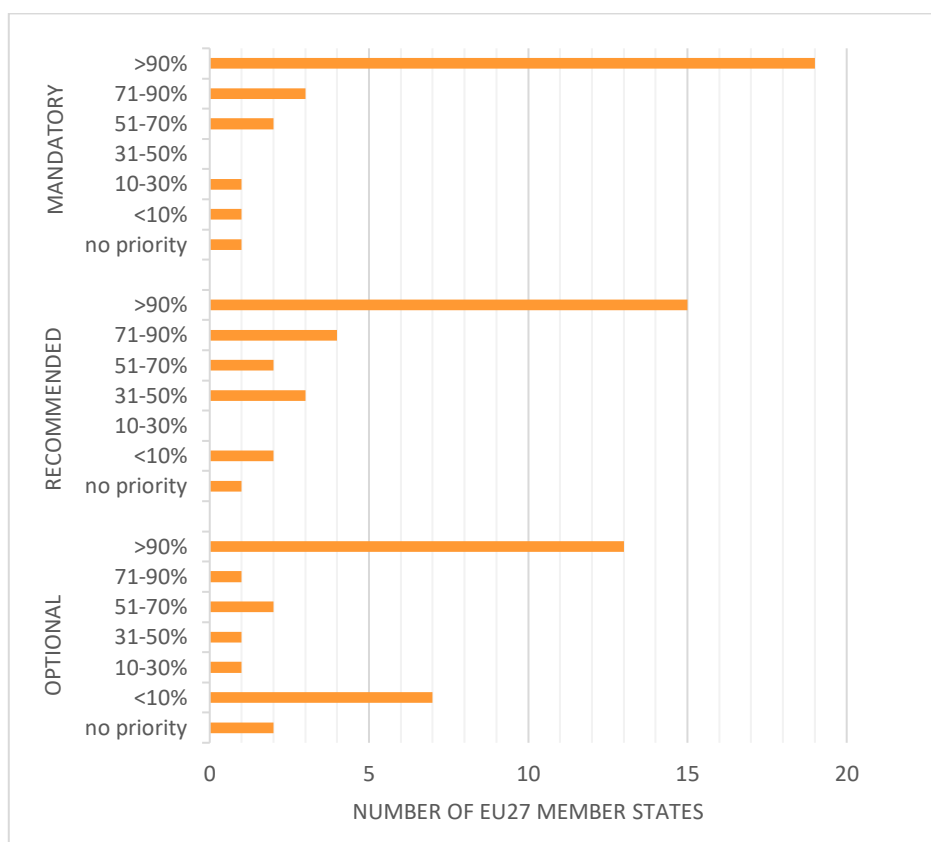


Figure 31: Percentage of metadata compliant with DCAT-AP and using recommended or optional classes

4.4 Deployment quality and linked data

This indicator examines the extent to which countries use a model, for example the “5-Star Open Data”²⁷⁷ or the “FAIR Principles”²⁷⁸, to assess the quality of data deployment. This indicator assesses to what extent data is available under an open licence, in the form of structured data, machine-readable, using Uniform Resource Identifiers (URIs), and including links to other data sources.

4.4.1 Deployment quality models

78% of Member States use a model to assess the quality of data deployment. Most countries mention using the 5-Star Open Data model to the point of occasionally using it as a decision-making tool to determine which datasets are allowed to be published on their portal. Even more Member States (83%) also conducts activities to promote and familiarise data providers with ways to ensure higher quality data, such as promoting their chosen model.

Most countries, such as Austria, Cyprus, Italy, Malta, Romania, and Slovenia, use the 5-Star Open Data model.

In Lithuania, the 5-Star Open Data model is used as well. At the dataset level, the stars are assigned based on distribution format used. At individual data field level, however, stars from 0 to 3 are assigned manually, and 4 and 5 are detected automatically by checking if a data model has a reference to another data model and if an association with external vocabulary is provided. This way, first at dataset level, Lithuania has a very approximate rating, but on data fields level, there is a very precise rating.

In Sweden, the Swedish Research Council²⁷⁹ coordinates Swedish efforts regarding open access to research data and publications and have established criteria for evaluating that data publication are according to the FAIR principles.²⁸⁰ Good data management is a key component of open access to research data, and a cornerstone for FAIR. Using a Data Management Plan (DMP), researchers can describe how data are collected and/or created, how they will be handled during the course of the research, and how they will be taken care of afterwards. As from 2019, all those awarded grants by the Swedish Research Council need to produce such a plan. The national principles for data re-use from public sector bodies are developed in line with FAIR principles but are established on a more practical level.²⁸¹

4.4.2 Deployment quality

Below, an overview is given on the extent to which data is available under an open licence, in the form of structured data, machine-readable, using URIs, and including links to other data sources.

²⁷⁷ For more information: <http://5stardata.info/en/> or <https://joinup.ec.europa.eu/sites/default/files/inline-files/W3C04.pdf>

²⁷⁸ <https://www.go-fair.org/fair-principles/>

²⁷⁹ The Swedish Research Council is Sweden’s largest governmental research funding body, and supports research of the highest quality within all scientific fields, see <https://www.vr.se/english.html>

²⁸⁰ <https://www.vr.se/english/mandates/open-science/open-access-to-research-data/faq-on-open-access-to-research-data.html>

²⁸¹ <https://www.digg.se/utveckling-av-digital-forvaltning/oppna-och-delade-data/offentliga-aktorer/nationella-principer>

Open licence

This indicator examines if data is accompanied by open licensing information. The majority of Member States (81%) have more than 90% of the published data made available under an open licence. In figure 32, the percentage of data available under an open licence is shown.

In some countries, the national portal does not only make open data available, but also documents the availability of more “closed” data - pursuing a more holistic approach to data sharing. The data may be available to citizens and organisations under more restrictive terms that need to be assessed on a case-by-case basis. Countries such as the Netherlands also document the existence of datasets that are completely confidential, to help re-users understand that the data does exist but simply cannot be made available, for any reason.

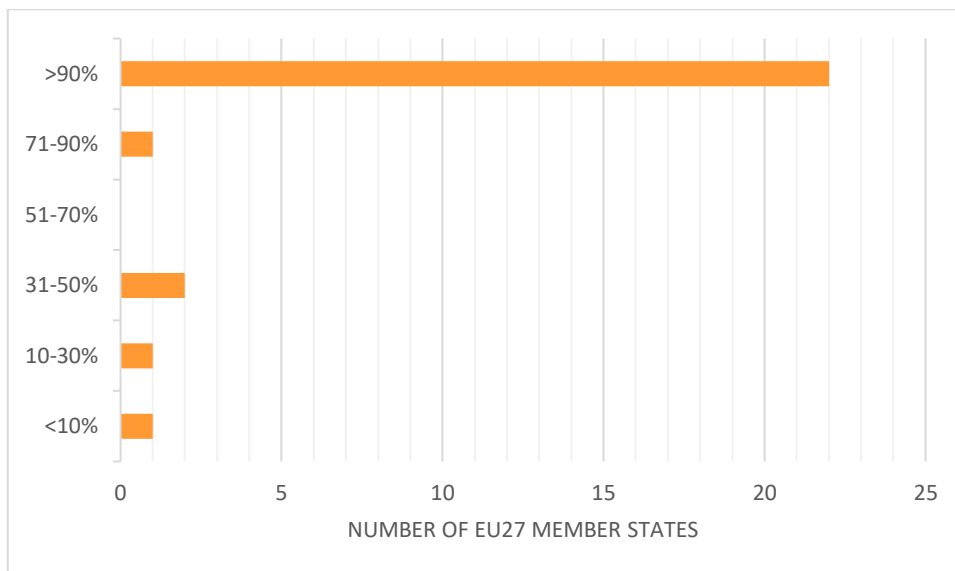


Figure 32: Percentage of datasets available with open license

Structured format

56% of Member States offer more than 90% of the published data available in a structured format in addition to having an open licence. In figure 33, the distribution of the percentages of published data available in a structured format is shown.

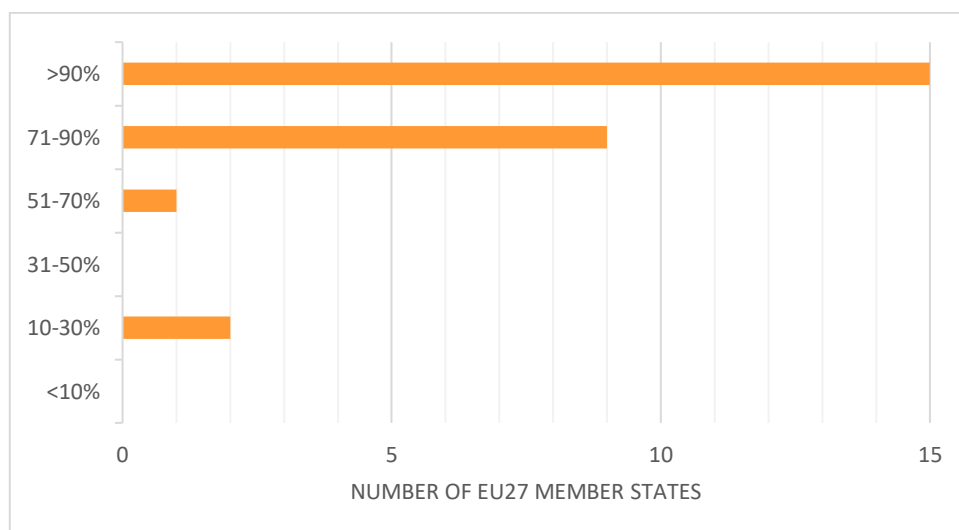


Figure 33: Percentage of datasets available in a structured format

Machine-readable format

In figure 34, the distribution of the percentage of published data available in a machine-readable format is shown. 44% of Member States offer more than 90% of the published data available in a machine-readable format in addition to having a structured format and an open licence.

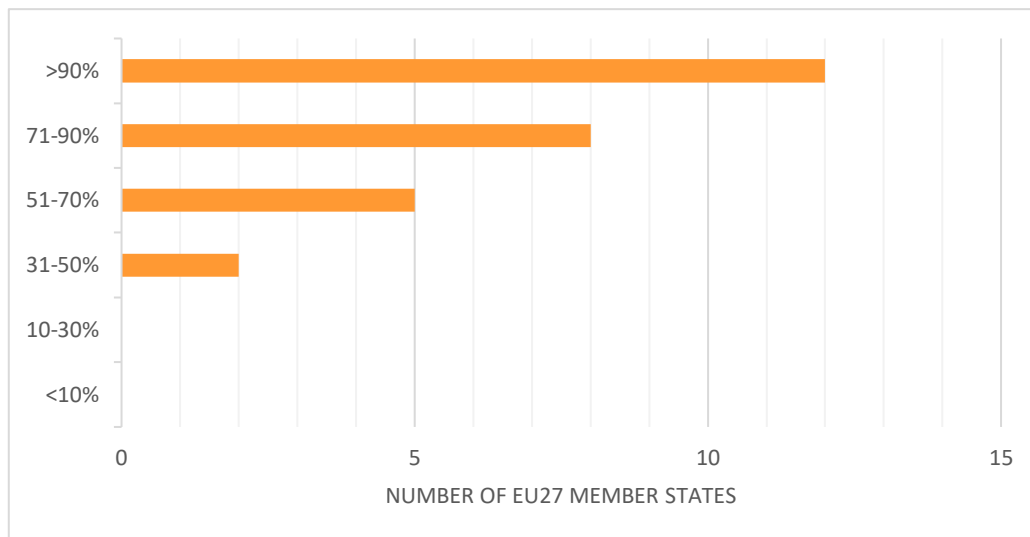


Figure 34: Percentage of datasets available in machine-readable format

Uniform Resource Identifiers (URIs)

In figure 35, the distribution of the percentage of published data available using Unique Resource Identifiers (URIs) is shown. 22% of Member States offer more than 90% of the published data available that consistently use URIs in addition to being in a machine-readable, structured format with an open licence.

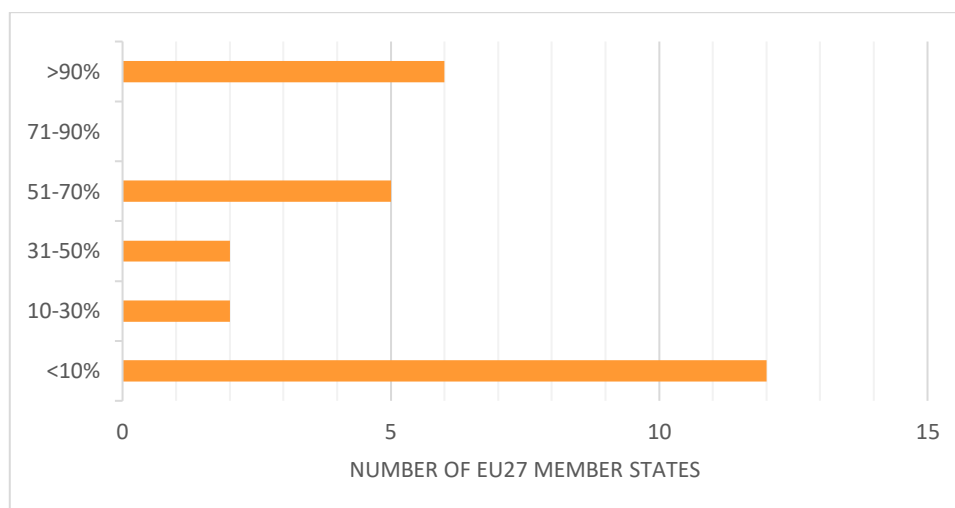


Figure 35: Percentage of datasets available using URIs

Linked data

Finally, figure 36, shows the distribution of the percentage of published data that is also linked to other renowned sources. Only 2 (7%) Member States have more than 90% of the published data available that as linked data in addition to consistently using URIs, in a machine-readable, structured format, and with an open licence.

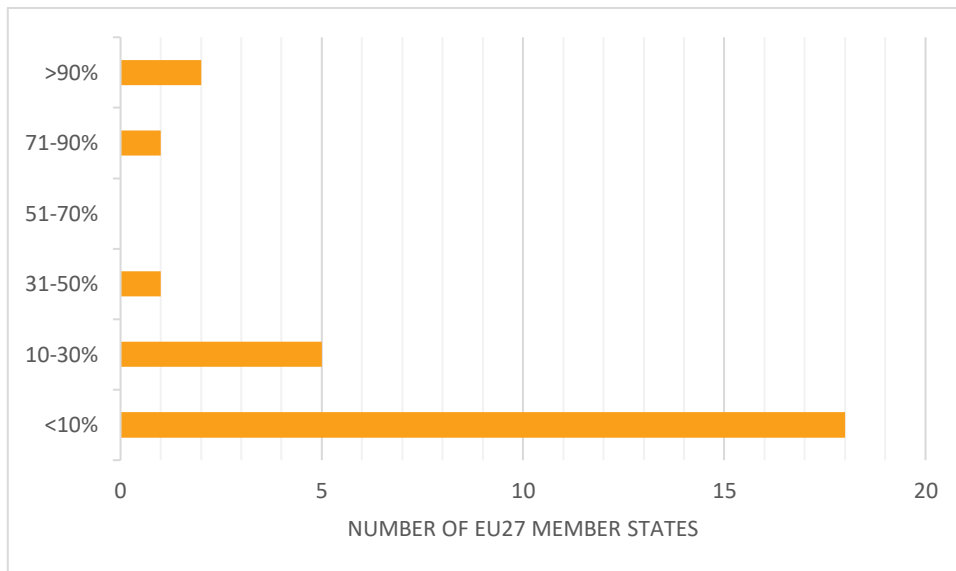


Figure 36: Percentage of datasets available as linked data

4.5 Overall performance

Since a steep increase in last year’s assessment, the average maturity score on the quality dimension has not increased significantly in 2021, see figure 37. With an average score of 77% the Member States show a continued desire to not just consider the quantity of open data that is made available, but also to focus on the quality of the data that is published, though there is still plenty of room for improvement.

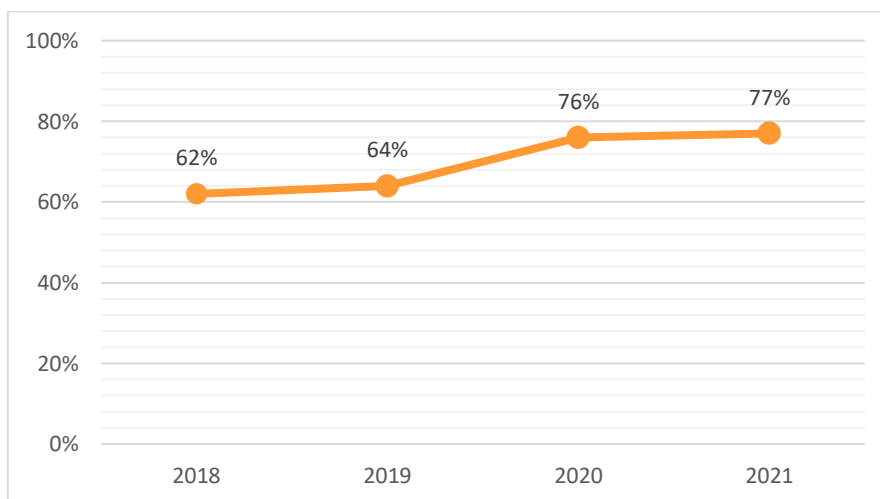


Figure 37: Development in maturity of the quality dimension over the last years

Figure 38 shows the score per indicator of the quality dimension compared to 2020. The first three indicators show an increase compared to last year. It is becoming more important to ensure timely and complete data and metadata. This is emphasised by the increasing focus on monitoring and measuring the quality of open data by the Member States’ national open data team. They also provide guidance on licensing and assist data providers in the publication of high-quality metadata. Information on the importance of DCAT-AP compliance is provided to data publishers and several countries have developed their own national extensions of the DCAT-AP standard. Countries also often investigate

what the common causes are for lack of compliance and take action where necessary. The indicator deployment quality and linked data shows a decreased average score compared to last year.

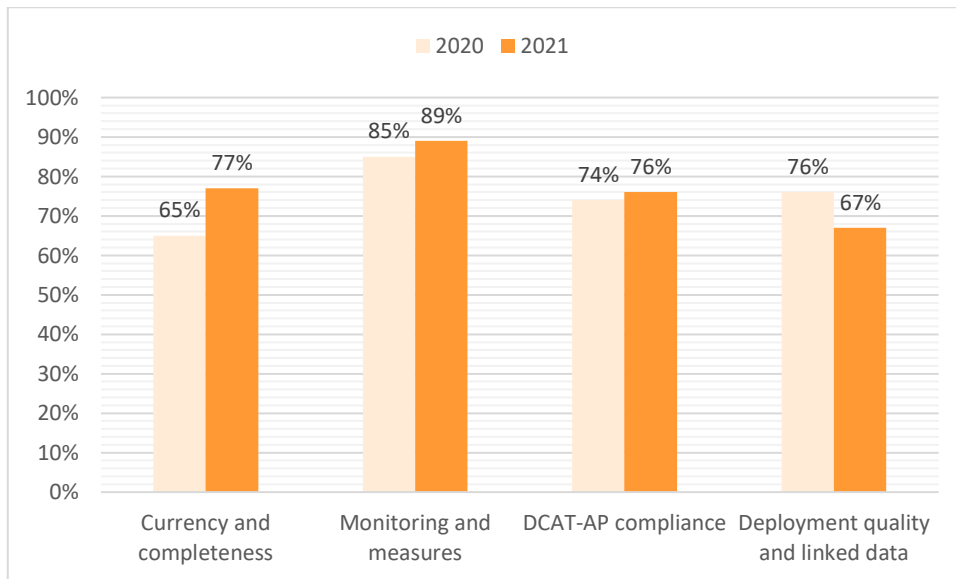


Figure 38: Maturity score per quality indicator compared to last year

The country ranking of the quality dimension can be observed in Figure 39. The figure shows that 17 Member States score above the EU27 average of 77% and 10 Member States scored below. The countries with the highest maturity levels on the portal dimension are France (94%), Ireland (92%), and Slovenia (92%).

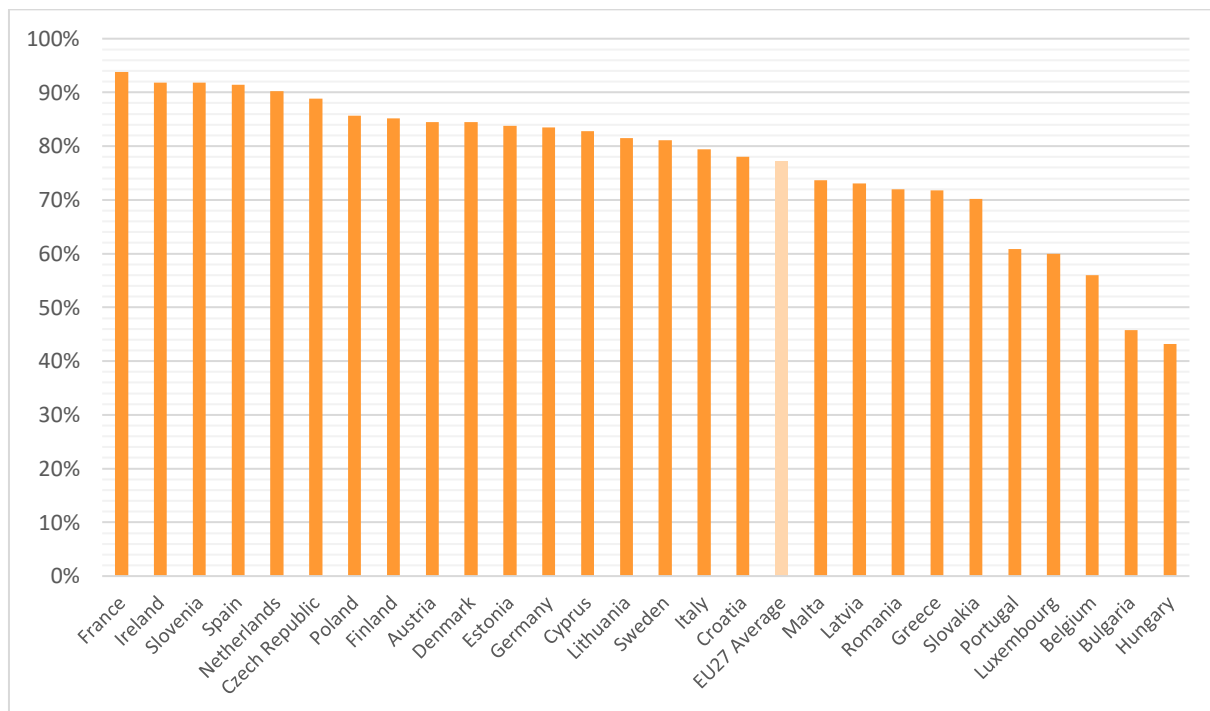


Figure 39: Country ranking for the quality dimension

Chapter 5: Open Data Maturity in the EFTA and Other Countries

Similar to previous years, the open data landscaping exercise also assesses the open data maturity in European countries outside the EU27.

This chapter provides a brief overview on the open data maturity of two groups of countries outside the EU27. The first group focuses on the European Free Trade Association (EFTA) and the three countries that participated this year: Iceland, Norway, and Switzerland. The second group is made of two “Eastern Partnership” countries (EaP): Georgia and Ukraine, and additionally includes Montenegro and the United Kingdom (UK). This chapter follows the same structure of the four open data maturity dimensions: policy, impact, portal, and quality.

5.1 Open data policy

5.1.1 EFTA countries

Policy framework

In 2021, two of the participating EFTA countries have an open data policy in place: Iceland and Norway. Nevertheless, all EFTA countries implemented an open data strategy including an action plan. Additionally, all EFTA countries indicate that their open data policy or strategy outlines measures to support the re-use of open data by both the public and the private sector. Finally, in all EFTA countries have high-value domains or datasets been identified and prioritised for publication, where Norway and Switzerland have measures in place to involve relevant stakeholders in this prioritisation process.

In Iceland, the “Act on the reuse of public information”²⁸² outlines the country’s open data legislation. Also, open data is a fundamental topic in the “Digital Services Policy” which was published in May 2021²⁸³. Finally, the in 2020 published innovation strategy includes an action plan to increase the re-use of open data²⁸⁴.

As already explained in last year’s assessments, the Norwegian open data policy is captured in the available guidelines for making public data available.²⁸⁵ Their national open data strategy is spread over several documents, among which the newly published “National Strategy for Artificial Intelligence”²⁸⁶ or “Data as a resource: Data-driven economy and innovation”²⁸⁷.

In Switzerland, the “Open Government Data Strategy” provides a detailed description of the plan for the years 2019–2023.²⁸⁸ The annex of the document includes an action plan with five defined objectives to reach their strategic goals, such as supporting and encouraging the re-use of open data and creating an overview of the open data inventories.

²⁸² <https://www.althingi.is/lagas/nuna/2018045.html>

²⁸³ [https://samradsgatt.island.is/oll-mal/\\$Cases/Details/?id=2968](https://samradsgatt.island.is/oll-mal/$Cases/Details/?id=2968)

²⁸⁴ <https://opinbernyskopun.island.is/wp-content/uploads/2020/03/A%C3%B0ger%C3%B0a%C3%A1%C3%A6tlun-um-opinbera-n%C3%BDsk%C3%B6pun.pdf>

²⁸⁵ <https://www.regjeringen.no/no/dokumenter/retningslinjer-ved-tilgjengeliggjoring-av-offentlige-data/id2536870/>

²⁸⁶ <https://www.regjeringen.no/en/dokumenter/nasjonal-strategi-for-kunstig-intelligens/id2685594/?ch=4#id0020>

²⁸⁷ <https://www.regjeringen.no/no/dokumenter/meld.-st.-22-20202021/id2841118/>

²⁸⁸ <https://www.fedlex.admin.ch/eli/fga/2019/125/de>

Governance of open data

In 2021, not only Switzerland, but also Norway indicates to have an open data governance structure in place to enable the inclusion of open data stakeholders. The governance structures apply a hybrid approach between bottom-up and top-down approaches. In both countries, the governance structure assists data providers in their publication process. Only in Switzerland official open data roles are appointed in the form of “data coordinators”.

*In Norway, several governance structures co-exist for different data sharing areas. These governance structures, on its turn, are implemented by various stakeholders from both the public and private sector.*²⁸⁹

*Although Iceland does not have a governance structure in place, their open data policy explains how to re-use open data according to the law. Also, “Digital Iceland” appoints civil servants to support with opening data via their national portal.*²⁹⁰

Furthermore, in all EFTA countries a regular exchange of knowledge or experiences takes place both among public sector bodies, as well as between public sector bodies and open data re-users. In order to promote open data, multiple events are being organised in the countries by mixture of local, regional, national public and private sector bodies.

Open data implementation

All three EFTA countries have a document or tool at the national level to assist data providers in their publication process. In Iceland a best practice guide for API development has been created²⁹¹, in Norway a guide for making open data available is offered²⁹², and in Switzerland an open data handbook has been established²⁹³. Additionally, all countries have processes in place to monitor the implementation of the open data plans, such as monitoring and recurring gatherings. As a result, all countries consider the status of their open data implementation satisfactory.

All EFTA countries harvest local or regional data sources on their national open data portal. Where in Iceland a few existing local or regional sources are harvested, are the majority of local and regional datasets harvested in Norway and Switzerland.

Finally, Norway and Switzerland offer professional development or a training plan for civil servants working with open data. In Switzerland the trainings activities are integrated in some of the universities’ curriculum and therefore receive a publicly recognised certificate after completion.

*The Norwegian Directorate for ICT and Joint Services in Higher Education & Research²⁹⁴ has together with Digital Norway²⁹⁵ launched a digital learning platform, which also covers data and related topics.*²⁹⁶

²⁸⁹ See <https://www.digdir.no/digitalisering-og-samordning/sentralt-styringsdokument-prosjekt-deling-av-data/2598> and <https://www.digdir.no/digitalisering-og-samordning/mandat-skate/1261>

²⁹⁰ More information can be found at [https://joinup.ec.europa.eu/sites/default/files/inline-files/Digital Public Administration Factsheets Iceland vFINAL.pdf](https://joinup.ec.europa.eu/sites/default/files/inline-files/Digital%20Public%20Administration%20Factsheets%20Iceland%20vFINAL.pdf)

²⁹¹ <https://docs.devland.is/technical-overview/api-design-guide>

²⁹² <https://data.norge.no/guide/veileder-apne-data/>

²⁹³ <https://handbook.opendata.swiss>

²⁹⁴ Directorate for ICT and Joint Services in Higher Education & Research: <https://www.unit.no/en/about-unit-0>

²⁹⁵ Digital Norway: <https://digitalnorway.com/>

²⁹⁶ <https://digitalnorway.com/kurs/>

5.1.2 EaP countries, Montenegro, and the United Kingdom

Policy framework

Of the remaining participating countries, Montenegro, Ukraine, and the UK have an open data policy in place including an action plan with measures to be implemented in the field of open data. Ukraine and the UK also implemented an open data strategy. Montenegro, Ukraine, and the UK indicate that their open data policy or strategy outlines measures to support the re-use of open data by both the public and the private sector.

In Montenegro, the “Law on Free Access to Information from 2017” prescribes the obligation of public authorities to publish data in an open format on the open data.²⁹⁷ Furthermore, a new strategy for public administration reform 2022-2026 is being developed as the previous strategy expired. One of the strategic goals is a transparent and inclusive public administration that explicitly includes open data.

In Ukraine, a new “Open Data Strategy 2021-2025” is being developed and is expected to be adopted late 2021.²⁹⁸ The strategy will include definitions of fundamental terms (such as public information, information provider, open data impact, etc.), aims and goals to be reached, instruments of the open data policy, and a description of the current situation including opportunities and challenges in the field of open data.

In the UK, since the introduction of open data in the 2012 White Paper, ‘Unleashing the Potential’²⁹⁹, the government has adopted the policy of ‘Open by Default’ for public sector data across all departments. In December 2020, the UK adopted the “National Data Strategy”³⁰⁰ with the aim to improve data use in government. In the field of open data, the strategy aims to review the open data publication and decision-making processes to ensure their consistency and to continue the implementation of the “Energy Data Taskforce”³⁰¹.

Furthermore, in Georgia, Montenegro, and Ukraine high value domains or datasets have been identified and prioritised for publication and measures are in place to assist other stakeholders’ involvement in this prioritisation process.

Governance of open data

All countries have a governance structure in place that enables the participation and inclusion of various open data stakeholders. Except from Georgia, all countries published the governance structure online. In Montenegro a top-down approach is used to govern open data, while in the other countries a hybrid model between a top-down and bottom-up approach is used. In all countries, assistance is being provided to support data providers with their data publication process. In Montenegro, Ukraine, and the UK the governance structure appoints official roles in civil service dedicated to open data.

In Georgia, the “Digital Governance Agency”³⁰² is responsible to define the unified standard for data publishing and to ensure the availability of open data through the national open data portal.

²⁹⁷ https://www.ombudsman.co.me/spi/1613568996_zakon-o-slobodnom-pristupu-informacijama-1.pdf

²⁹⁸ The draft is published for discussion:

https://docs.google.com/document/d/1r8KK3_GqEbfYkIPrBiQGmEuJ8CaMqQnvfgEXlvAXK0I/edit?usp=sharing

²⁹⁹ <https://www.gov.uk/government/publications/open-data-white-paper-unleashing-the-potential>

³⁰⁰ See section 6.1.3, available at <https://www.gov.uk/government/publications/uk-national-data-strategy/national-data-strategy>

³⁰¹ <https://innovateuk.blog.gov.uk/2020/05/29/modernising-energy-data-access-and-the-winners-are/>

³⁰² <https://www.facebook.com/dga.gov.ge/>

In Ukraine, the Ministry of Digital Transformation³⁰³ is the body responsible for the developments in the field of open data. Since the creation of the Ministry in 2019, the position of the “Chief Digital Transformation Officer” was introduced, who is responsible for the coordination of the open data sphere. Furthermore, each public body must appoint the person responsible for providing support in the open data publication process.

In all countries the exchange of knowledge and experiences takes place between different public sector bodies. In Montenegro and Ukraine this exchange takes also place between public sector bodies and open data re-users. In all countries open data is being promoted at events, which are organised by a mixture of local, regional, national public and private sector bodies.

Open data implementation

In Montenegro, Ukraine, and the UK a document, such as a guidebook, is in place at the national level to assist data providers in their publication process, including publication plans at local, regional, or national level. In Ukraine and the UK processes are run to ensure that the open data plans are implemented, such as quarterly or monthly reporting. As a result, in Ukraine the implementation of the publication plans can be described as satisfactory, and in the UK as neutral.

The national open data portals of Ukraine and the UK harvest all datasets from local and regional data sources. In Montenegro data providers can manually post data on the portal, but the harvesting has not started yet.

Furthermore, in Montenegro, Ukraine, and the UK a professional development or training plan is offered to civil servants working with data. After completing these plans or training activities, certification is offered which is recognised within public bodies.

In Ukraine, a certified advanced training programme was launched, the “Open Data for Civil Servants: A Practical Course.” The programme aims to increase the competency of officials from public authorities and local governments who are responsible for the disclosure of public information in the form of open data and covers 18 different topics.³⁰⁴ As a measure to develop professional skills of civil servants working with data is the online course “Open Data for Civil Servants” created.³⁰⁵ The course was launched in September 2020 and, at the moment of filling in the questionnaire, 16 thousand government officials completed the course.

5.2 Open data impact

5.2.1 EFTA countries

Strategic awareness

All participating EFTA countries observe a focus on understanding the level of re-use of their country’s open data at the national level. Although this focus is limited in Iceland and Switzerland, in Norway there is a strong focus on understanding the level of open data re-use. Both Norway and Switzerland run processes at the national level to estimate the level of re-use in the form of, among others, the

³⁰³ Ministry of Digital Transformation: <https://www.kmu.gov.ua/en/yevropejska-integraciya/coordination/cifrova-transformaciya>

³⁰⁴ <https://pdp.nacs.gov.ua/courses/vidkryti-dani-dlia-derzhsluzhbovtsiv-praktychnyi-kurs>

³⁰⁵ <https://osvita.dia.gov.ua/courses/open-data>

use of web analytics on their national portal. None of the EFTA countries have incentives in place for public bodies or civil servants to estimate the level of re-use of their own open data.

Norway and Switzerland have defined within their country what ‘impact of open data’ means. Norway is the only country to have a methodology in place to estimate the open data impact, and to have conducted studies in the past year to estimate the level of open data impact.

The Norwegian Institute of Transport Economics (TØI) ³⁰⁶ has been responsible for a research on the impact of open science in the European “BE OPEN” project³⁰⁷. The report includes open data impact on social, environmental, and economic areas.³⁰⁸ In Norway, they are investigating whether this method can be the starting point for a national framework.

Furthermore, all EFTA countries indicate to have civil society initiatives in place that are open data driven and aim to create impact, such as hackathons. Also, in all EFTA countries there is collaboration between government and civil society or academia to create open data impact.

Political impact

In 2021, Norway was the only EFTA country who performed activities to assess the political impact of open data. They launched ‘data as a resource’, which aims to develop a common methodology for measuring and demonstrating the benefits and effects of public data, based on the work done in the EU and the OECD in this area.³⁰⁹

The table below represents the components that influenced the level of political impact of open data in the EFTA countries.

Level of Political Impact			
	Iceland	Norway	Switzerland
Increasing government effectiveness	Medium	High	--
Increasing government efficiency	--	High	Medium
Increasing transparency and accountability	High	High	Medium

In Norway, the open data impact on increasing government effectiveness improved from medium to high in 2021. This is related to all invoicing having better quality due to the availability of a company register information about private organisations and public bodies. ³¹⁰

Social impact

Norway is the only participating EFTA country to perform activities in 2021 to monitor the social impact of open data. Remarkable is the effort that all the EFTA countries put in creating value from open data in the fight against the current COVID-19 pandemic. The table below represents the components that influenced the level of social impact of open data in the EFTA countries. As can be seen, all countries indicate that open data has a high impact on raising awareness on health and well-being related issues.

³⁰⁶ Institute of Transport Economics (TØI): <https://www.toi.no/about-toi/category26.html>

³⁰⁷ <https://beopen-project.eu/>

³⁰⁸ <https://beopen-project.eu/storage/files/beopen-d53-impact-assessment-of-open-science-in-transport.pdf>

³⁰⁹ <https://www.regjeringen.no/no/dokumenter/meld.-st.-22-20202021/id2841118/?ch=5#kap5-7>

³¹⁰ See for example <https://data.norge.no/datasets/5a5374c3-c6a7-49f8-b9cc-0a9e48c1acd7> or <https://data.norge.no/datasets/68d08f28-a16d-4fab-a953-ed4ab08ce2e2>

Level of Social Impact			
	Iceland	Norway	Switzerland
Inclusion of marginalised groups	--	High	--
Raising awareness concerning housing in the city	High	High	--
Raising awareness on health and well-being	High	High	High

All EFTA countries created a COVID-19 dashboard to visualise the latest numbers on the spread of the virus.^{311,312,313} In Norway, open data has been used throughout the pandemic, both by central government and by local authorities. An example is the municipalities' dashboard for infection tracking. The municipalities also have more advanced dashboards for internal use, such as planning, quarantines etc.

Environmental impact

Norway was the only participating EFTA country who performed activities in the past year to monitor the level of environmental impact of open data. The Norwegian Environment Agency³¹⁴ is systematically monitoring the environmental impact by publishing and producing studies.³¹⁵ The table below represents the components that influenced the level of environmental impact of open data in the EFTA countries.

Level of Environmental Impact			
	Iceland	Norway	Switzerland
Raising awareness on water and/or air quality	High	High	Medium
Raising awareness on noise levels in cities	Medium	Medium	--
Waste management	High	High	Medium
Environmental-friendly transport systems in cities	Medium	High	Medium

In Norway, different initiatives have been set up to raise awareness on noise levels in cities. The Norwegian Environment Agency has developed a map that allows the public to investigate the noise level in the cities.³¹⁶ Also, the municipality of Stavanger has published open datasets that allows the public to check out different noise levels.³¹⁷

Economic impact

Norway is the only participating performed activities to monitor the economic impact of open data. Menon Economic conducted a study, on behalf of the Confederation of Norwegian Enterprise (NHO)³¹⁸,

³¹¹ COVID-19 dashboard Switzerland: <https://www.covid19.admin.ch/de/overview>.

³¹² COVID-19 dashboard Iceland: <https://www.covid.is>.

³¹³ COVID-19 dashboard Norway:

<https://experience.arcgis.com/experience/742a281a0fa74ab79147a76e6b52833b>

³¹⁴ Environment Agency: <https://www.environmentagency.no/>

³¹⁵ <https://cmsapi-data.miljodirektoratet.no/var-datapolitikk/>

³¹⁶ <https://miljostatus.miljodirektoratet.no/tema/forurensning/stoy/>

³¹⁷ <https://open.stavanger.kommune.no/dataset/stoy-jernbane>

³¹⁸ Confederation of Norwegian Enterprise (NHO): <https://www.nho.no/en/>

to monitor the economic impact of open data.³¹⁹ The table below represents the components that influenced the level of economic impact of open data in the EFTA countries.

Level of Economic Impact			
	Iceland	Norway	Switzerland
Macro-economic impact of open data	High	High	--
Micro-economic impact of open data	Medium	High	--
Economic benefits for public administrations	High	High	--

In Iceland, the majority of government economic research is on the macroeconomic level and relies on open data. These studies form the basis for macroeconomic policy making and facilitates a healthy public debate on the government's economic policy. Examples of the usage of open data in economic research and analysis can be seen in working papers and regular publications by the Central Bank of Iceland and the government's fiscal plans and budgets.³²⁰

5.2.2 EaP countries, Montenegro and the United Kingdom

Strategic awareness

Montenegro, Ukraine and the UK indicate that they observe a strong focus on understanding the level of re-use of their country's open data. Only Georgia did not observe this focus and is also the only country to not have processes running to estimate the level of re-use in their country. Ukraine and the UK have incentives or obligations in place for public bodies or civil servants to estimate the level of re-use in their own open data.

For example, in Ukraine, a yearly survey for users is conducted by the Ministry of digital Transformation³²¹. The analysis of the most recently conducted survey was published in May 2021.³²² The results of the survey, in which more than 500 respondents took part, showed that the Ukrainian data portal, data.gov.ua, is a useful entry point into the world of open data for representatives of various spheres of employment, from business representatives to civil servants and academia.

Only in the UK has the government defined what 'impact of open data' means in their national data strategy.³²³ Ukraine is the only country where a methodology is developed to estimate the impact of open data. In Ukraine and Montenegro are studies conducted in the past year to assess the impact of open data.

³¹⁹ <https://www.nho.no/publikasjoner/veikart/er-verdiskaping-med-data-noe-norge-kan-leve-av/2019-88-Verdiskaping-med-data.pdf>

³²⁰ For example, <https://www.cb.is/publications/publications/publications-all-archive/?all=1> or <https://www.cb.is/publications/publications/publications-all-archive/?all=1&newscat=0b5b3895-35dc-11e5-93ff-005056bc2afe>

³²¹ Ministry of digital Transformation: <https://thedigital.gov.ua/>

³²² The survey: <https://diia.data.gov.ua/news/do-uvahy-korystuvachiv-datagovua>, and the report: <https://diia.data.gov.ua/news/provedeno-opituvannya-koristuvaciv-jedinogo-derzavnogo-veb-portalu-vidkritix-danix>

³²³ <https://www.gov.uk/government/publications/uk-national-data-strategy/national-data-strategy>

The Ministry of Digital Transformation³²⁴ and Transparency and Accountability in Public Administration and Services (TAPAS)³²⁵ developed a qualitative approach by utilising international best practices. They launched a series of research on anti-corruption and social impact of open data in different sectors of Ukraine.³²⁶

Finally, in all countries is there a collaboration between government and civil society or academia to create open data impact. Montenegro is the only country to not have civil society initiatives to create open data impact that are open data driven.

Political impact

Ukraine is the only country where public bodies launched activities in the past year to assess the political impact of open data, such as the aforementioned research. Ukraine and the UK are the only countries where open data is used in policy-making processes and in decision-making processes. The table below represents the components that influenced the level of political impact of open data in the EaP countries, Montenegro, and the UK.

Level of Political Impact				
	Georgia	Montenegro	Ukraine	The UK
Increasing government effectiveness	--	Low	High	Medium
Increasing government efficiency	--	--	High	Medium
Increasing transparency and accountability	--	--	High	Medium

For example, in the UK a project to catalogue, standardise and make available data pertaining to local services for sufferers of loneliness was funded and delivered in 2021. The aim of the project is to connect citizens in need of specific services to the respective providers, and to better understand how to reach those in need.³²⁷

Social impact

In Montenegro, Ukraine and the UK have public sector stakeholders active in the open data field performed activities to monitor the social impact of open data, either in the form of conducting research or by incorporating the social impact of open data into their data strategy document. The table below represents the components that influenced the level of social impact of open data in the EaP countries, Montenegro, and the UK.

Level of Social Impact				
	Georgia	Montenegro	Ukraine	The UK
Inclusion of marginalised groups	--	--	High	Medium
Raising awareness concerning housing in the city	--	--	High	Medium
Raising awareness on health and well-being	--	Medium	High	High

Similar to other participating countries in the 2021 landscaping exercises do the EaP countries, Montenegro and the UK observe a high social impact of open data on raising awareness on health and

³²⁴ Ministry of digital Transformation: <https://thedigital.gov.ua/>

³²⁵ Transparency and Accountability in Public Administration and Services (TAPAS): https://www.eurasia.org/Programs/ukraine_TAPAS

³²⁶ https://tapas.org.ua/wp-content/uploads/2021/01/OD-Research-DABI_ed.pdf

³²⁷ <https://about.esd.org.uk/news/lga-place-based-directory-services-loneliness-pilots>

well-being. This is shown by, for example, the publication of COVID-19 data in Montenegro³²⁸, a vaccination map launched in Ukraine³²⁹, or the COVID-19 dashboard published in the UK³³⁰.

Environmental impact

In Montenegro, Ukraine and the UK have public sector stakeholders active in the open data field performed activities to monitor the environmental impact of open data, for example, by conducting research or having their national environment agency publish and monitor the re-use of their data. The table below represents the components that influenced the level of environmental impact of open data in the EaP countries, Montenegro, and the UK.

Level of Environmental Impact				
	Georgia	Montenegro	Ukraine	The UK
Raising awareness on water and/or air quality	--	Medium	High	High
Raising awareness on noise levels in cities	--	--	Low	--
Waste management	--	Medium	High	--
Environmental-friendly transport systems in cities	--	Medium	High	High

EcolInfo is a Ukrainian initiative that offers an interactive map for citizens to avoid being outdoors during hazardous air pollution or to choose housing in an area with less polluted air.³³¹ The map integrates open data of the Ministry of Environmental Protection and Natural Resources³³² with data from public monitoring networks on air pollution.

Economic impact

In Montenegro, Ukraine and the UK have public sector stakeholders active in the open data field performed activities to monitor the economic impact of open data, either in the form of conducting research or by incorporating the social impact of open data into their data strategy document. The table below represents the components that influenced the level of social impact of open data in the EaP countries, Montenegro, and the UK.

Level of Economic Impact				
	Georgia	Montenegro	Ukraine	The UK
Macro-economic impact of open data	--	--	High	Medium
Micro-economic impact of open data	--	Low	High	Medium
Economic benefits for public administrations	--	--	High	Medium

In the UK, a positive micro-economic effect comes from the publication of open data on flooding. This data has helped to influence the decision-making of planners and builders when seeking plots for new housing, business, etc.³³³

³²⁸ <https://www.ijzcg.me/me/covid19-kumulativne-stope-po-opstinama>

³²⁹ <https://vac.shtab.net/>

³³⁰ <https://coronavirus.data.gov.uk/>

³³¹ https://ecoinfo.pro/site/any_points

³³² Ministry of Environmental Protection and Natural Resources: <http://eng.menr.gov.ua/>

³³³ <https://flood-warning-information.service.gov.uk/long-term-flood-risk>

5.3 Open data portal

5.3.1 EFTA countries

All participating EFTA countries, Iceland, Norway and Switzerland have a national open data portal in place. Iceland launched a new open data portal in April 2021, for which they are in the process of merging the old data portal and a portal for geographical information into one.

Portal features

In 2021, all participating EFTA countries offer on their national data portal an advanced data search function, the possibility to download datasets, and the possibility to search by file format or data domain. Additionally, all EFTA countries offer a way to programmatically query the metadata. Norway and Switzerland offer a preview function for geospatial data, and Switzerland also offers a preview function for tabular data.

Iceland and Norway offer both a general feedback mechanism as well as a feedback mechanism at dataset level. All EFTA countries offer the possibility for users to request datasets, but Norway is the only country that presents the requests in a transparent manner on the national portal. Norway recently launched a new website for the open data community to submit data requests and share feedback.³³⁴ This new website makes Norway the only EFTA country to include a discussion form for users.

Norway and Switzerland have a dedicated section on their portal to showcase use cases, but only the Swiss portal reference the dataset that the use case is based on. Both countries offer the possibility for users to submit their own use case.

Portal usage

All participating EFTA countries perform activities to gain insight into the national portal's usage, and Iceland and Norway use these insights to improve the portal. In Iceland and Norway Google Analytics are used and in Switzerland Matomo is used. The Icelandic national portal has, on average, 500 unique visitors per month, the Norwegian portal has more than 4000 unique visitors per months, and the Swiss portal hosts approximately 15 000 unique visitors per month.

The national portal teams of Norway and Switzerland monitor what keywords are used to search for data and content and what the most and least consulted pages are. The Icelandic national portal recently launched their open data portal; therefore, the monitoring mechanisms will provide more insights in next year's assessment.

On the open data portals of all EFTA countries, the metadata is available in clear plain language as well as to enable both humans and machines to read and understand it. Also, all countries run analytics on API usage if applicable. Of the Icelandic portal traffic, 100% is generated by API usage only. For the Swiss data portal, the traffic generated by API usage is less than 1%.

Data provision

In Norway and Switzerland, approximately half of the public sector data providers contribute to the national data portal, but they identify the data providers that are not yet publishing their data on the portal. In Iceland only a few public sector data providers contribute. The new Icelandic open data portal is only recently launched, so the number of publishing public sector data providers is expected to steadily increase over time. All EFTA countries assist data providers with their publication process.

³³⁴ <http://datalandsbyen.norge.no/>

All EFTA countries' open data portals include datasets that are real-time or dynamic. In Iceland and Norway, more than 30% of the metadata links to such data. In Switzerland this number lies between 1%-10%.

Portal sustainability

All participating EFTA countries have a strategy in place to ensure the national portals' sustainability. The Icelandic and Norwegian strategy documents include a description of the portals' target audience group and how to reach this audience. All EFTA countries take actions to promote the national data portals' activities and the available open data, for example, by being active on social media. All countries also made their portal's source code and relevant documentations available to the public.

All EFTA countries have a process in place to review and improve their national open data portals on a regular basis. In Norway, for example, a user satisfaction survey was conducted in the past year. In Norway and Switzerland, the review activities take place on a quarterly basis, in Iceland this is performed twice a year.

5.3.2 EaP countries, Montenegro and the United Kingdom

All countries discussed in this paragraph, Georgia, Montenegro, Ukraine and the UK, have a national open data portal in place.

Portal features

All countries offer on their national data portal an advanced data search function, the possibility to download datasets, and the possibility to search by file format. Only Montenegro does not allow to search by data domain. Additionally, Montenegro, Ukraine and the UK offer a way to programmatically query the metadata, for example via an API or SPARQL access point.

All countries offer a feedback mechanism at the dataset level on their national open data portals. Georgia and Ukraine incorporated a mechanism on their national portals that allows user to rate datasets. Georgia, Ukraine, and the UK also offer a general feedback mechanism. In all countries it is possible to request a dataset, where only Ukraine presents the requests and its status in a transparent manner on the portal.³³⁵ Ukraine also allows users to see what data exists but cannot be made available as open data.

Montenegro and Ukraine have a designated area on their national portal to showcase use cases, also allowing users to submit their own use cases. Additionally, Ukraine offers a discussion forum where data providers and data re-users can interact with one another.³³⁶

Portal usage

All countries perform activities to gain insight into the portal's usage in the form of web analytics. Georgia, Ukraine and the UK use these insights to improve their portal. The Montenegrin data portal have, on average 100 unique visitors per month, the Ukrainian portal has between 110 000 - 115 000 unique monthly visitors, and the UK approximately 350 000.

Montenegro, Ukraine and the UK monitor what keywords are used to search for data on the portal as well as the most and least consulted pages. In all countries is the metadata on the national portals available in plain language as well to enable both humans and machines to read and understand it.

³³⁵ <https://diia.data.gov.ua/join/datasets>

³³⁶ <https://forum.data.gov.ua>

Montenegro, Ukraine and the UK run analytics on API usage. Around 50% of the Montenegrin portal traffic is generated by API usage, and approximately 77% of the Ukrainian portal traffic.

Data provision

In Montenegro and Ukraine do all public sector data providers contribute to the portal, in the UK the majority of public sector data providers contribute. In Georgia only a few public sector data providers contribute but they identified the parties that not yet contribute to the portal. All countries perform activities to support data providers with publication process. Only the Ukrainian data portal includes datasets that are real-time or dynamic, which concerns between 21-30% of the metadata on the portal.

Portal sustainability

In Ukraine and the UK, a strategy is in place to ensure the open data portal's sustainability. Montenegro and Ukraine perform activities to promote the available data on their portal. Only the Ukrainian data portal is active on social media.

Only in Ukraine a user satisfaction survey has been conducted in the past year. Nevertheless, Montenegro, Ukraine, and the UK indicate to have a process in place in which the portal is reviewed regularly. For the UK, the revision of the portal happens quarterly, while for Montenegro and Ukraine this is annually.

5.4 Open data quality

5.4.1 EFTA countries

Currency and completeness

All participating EFTA countries indicate to have a pre-defined approach in place to ensure that the metadata is kept up to date. In Iceland and Norway 100% of the metadata is obtained from the source automatically, rather than edited manually. In Switzerland, this percentage falls between 90-99%, showing an improvement compared to last year for both Norway and Switzerland. In all countries is the metadata on the national portals updated within one day in case the metadata at the source changes. In Norway all metadata is automatically harvested at least daily. Most catalogues are harvested every 1-6 hours. Finally, in Iceland all datasets cover the full period from when it was first published until today, in Norway this concerns the majority of datasets, and in Switzerland this only holds for a few datasets.

Monitoring and measures

Where last year only Switzerland monitored the quality of the metadata on their portal, this year also Norway started to monitor the metadata quality. The Norwegian data portal team also publishes an assessment of the metadata on their portal.³³⁷

All EFTA countries have guidelines in place to assist publishers in choosing an appropriate license for their data. In Norway and Switzerland an own licence has been developed to foster the publication of open data. All countries' guidelines provide recommendation for the use of either Creative Commons (CC) licences or their own licence. In 2021, all EFTA countries experienced an increase in the share of datasets that is accompanied by licencing information compared to last year, with the current share being more than 90% of the datasets.

³³⁷ <https://data.norge.no/guidance/metadata>

All EFTA countries conduct regular activities to incentivise or assist data providers in the publication of both machine-readable formats as well as high-quality metadata.

In Switzerland, a national programme to implement the "once only" principle has been launched.³³⁸ With the primary goal of enabling interoperability, the programme encourages and supports the production of high-quality metadata of their data providers.

DCAT-AP compliance

Norway and Switzerland offer documentation on DCAT-AP to their data providers on their national portal. In Iceland, DCAT-AP compliance is not yet a priority, but they are considering it for the future.

In Norway, the guide for describing a dataset is published by the Norwegian Digitalisation Agency.³³⁹ Currently more than 90% of the metadata is DCAT-AP compliant, more than 90% of the metadata uses recommended classes, and between 31%- 50% uses optional classes. The high level of DCAT-AP compliance is attributed to the fact that the Norwegian data portal does not allow registrations if mandatory classes are missing. For optional classes, metadata quality is measured, which is displayed for each individual dataset.

In Switzerland, all documentation related to DCAT-AP are summarised on a recently published dedicated page from the Swiss eGovernment initiative.³⁴⁰ In Switzerland, less than 10% of the portal's metadata is DCAT-AP compliant (contrary to the 71-90% of last year), more than 90% of the metadata uses recommended classes, and between 51%-70% uses optional classes. The lack of DCAT-AP compliance can be explained by the current version of DCAT-AP-CH, the swiss extension, which presents different incompatibilities to DCAT-AP. They are currently working on fixing this matter by updating the swiss specification.

Both countries developed a national extension of the DCAT-AP standard to better fit their national context. Norway extended the DCAT-AP standard to support the portal's scope that goes beyond open data. As mentioned, the Swiss DCAT-AP extension is currently being updated.

Deployment quality and linked data

In Norway and Switzerland, a model is implemented to assess the quality of deployment of data in their country, Norway uses the FAIR-principles³⁴¹, and Switzerland uses the 5-star model. This is different from last year, when only Switzerland had such a model in place. Both countries conduct activities to promote and familiarise data providers with ways to ensure higher quality data.

In Iceland, more than 90% of datasets is made available under an open licence. Out of this group, more than 90% of datasets is available in a structured data format. Norway shows similar results to last year, between 71%-90% of their datasets is available under an open licence, including text documents, which is a decrease compared to last year. More than 90% of Norwegian open datasets are also made available in a structured format. In Switzerland, more than 90% of datasets is available under an open licence. Out of this group, more than 90% also made available in a structured format, which is an improvement compared to last year.

³³⁸ <https://www.bfs.admin.ch/bfs/en/home/nadb/nadb.html>

³³⁹ <https://data.norge.no/specification/dcat-ap-no/>

³⁴⁰ <https://dcat-ap.ch/>

³⁴¹ For more information see: <https://data.norge.no/guidance/metadata>

5.4.2 EaP countries, Montenegro and the United Kingdom

Currency and completeness

Georgia, Ukraine and the UK indicate to have a pre-defined approach in place to ensure the metadata on their national open data portal is being kept up to date. In Georgia and Montenegro less than 30% of the portal's metadata is obtained from the source automatically, in Ukraine this number is between 50%-69%, and in the UK between 30%-49%. In Ukraine, metadata on the portal is updated within a day in case the metadata at the source changes, in Montenegro within a week, and in Georgia and the UK this can either take longer than one month, or they do not know the exact time it takes to update the metadata.

Finally, in Ukraine all published datasets covers the full period from when it was first published until today, in Montenegro this holds for approximately half of the datasets, in the UK for a few datasets, and in Georgia for none of the portal's datasets.

Monitoring and measures

Ukraine and the UK monitor the quality of their portal's metadata and share this information with the public. In Ukraine a Business Intelligence (BI) tool is available to monitor metadata.³⁴² The UK offers a broken links report to show its portal's quality.³⁴³

In Ukraine and the UK guidelines are offered to assist publishers in choosing an appropriate open data licence. Additionally, the UK developed their own licence to foster data publication.³⁴⁴ Both Ukraine and the UK included recommendations on which licences to use in the available guidelines. As a result, in both countries more than 90% of the open data on their national portal is accompanied by licensing information.

In Montenegro, Ukraine, and the UK regular activities are being conducted to incentivise data providers in the publication of data in machine-readable formats. Additionally, in Ukraine activities are conducted to support the publication of high-quality metadata.

DCAT-AP compliance

In Georgia, Montenegro, and the UK, DCAT-AP compliancy is not a priority at the moment. Ukraine is the only country where data providers are supplied with documentation on DCAT-AP. As a result, more than 90% of the metadata on the Ukrainian data portal is DCAT-AP compliant. More than 90% of its metadata uses DCAT-AP recommended classes, and between 71%-90% uses DCAT-AP optional classes. In case metadata lacks DCAT-AP compliancy this is often caused by the absence of support of DCAT in the software used by the open data providers. Additionally, more than 90% of the Ukrainian datasets provides a reference to where the data can be downloaded and a webpage from where it can be accessed.

Deployment quality and linked data

Montenegro and Ukraine use a 5-star model to assess the quality of deployment of data in their country. They both conduct activities to familiarise data providers with ways to ensure higher quality data. In Montenegro and Ukraine, more than 90% of the datasets is available under an open licence, including text documents. Out of this group, between 31%-50% of the Montenegrin open datasets and 51%-70% of the Ukrainian open datasets is also made available in a structured format. Finally, in

³⁴² <https://data.gov.ua/pages/analitika>

³⁴³ <https://data.gov.uk/data/report/broken-links>

³⁴⁴ <http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

the UK, between 71%-90% of the datasets is available under an open licence, including text documents, of which between 51%-70% also in a structured format.

5.5 Overall performance

5.5.1 EFTA countries

In figure 40 the scores of the EFTA countries are shown per dimension. Norway shows a major improvement in score in 2021, outperforming the other EFTA countries on all dimensions. Similar to last year, the most mature dimension of Switzerland is quality, while within impact they are falling behind compared to the others. Iceland did not participate in last year's assessment, but comparing their score to 2019, a massive step forward can be observed on all four dimensions.

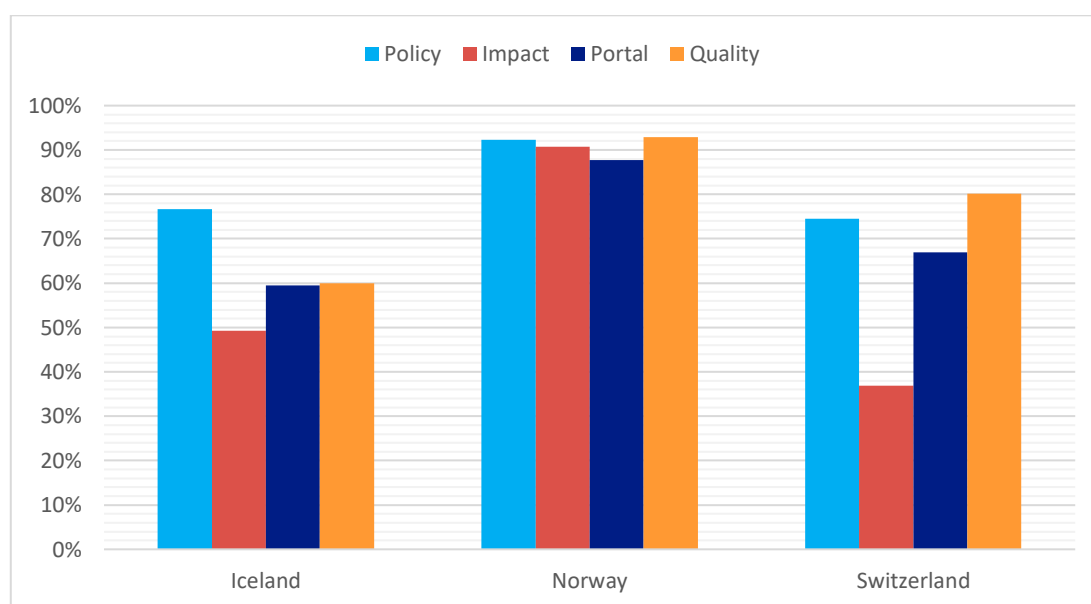


Figure 40: The EFTA countries' scores on the four open data maturity dimensions

To understand the remarkable improvements by the EFTA countries, the overall maturity scores of the last three years are shown in figure 41. Compared to 2019, Iceland's score increased from 8% to 61%. Iceland introduced new policy and strategy documentation over the last two years, structuring their open data practices and defining a path for the upcoming years. Also, recently new open data portal was launched improving Iceland's score on both portal and quality, therefore directly affecting the impact that is being created. Norway also shows major improvements in their open data maturity, with jumping from 51% in 2020 to 91% in 2021, they show the highest increase in score of this year's assessment. Finally, Switzerland's score steadily increases over the years, illustrating their continuous effort to improve.

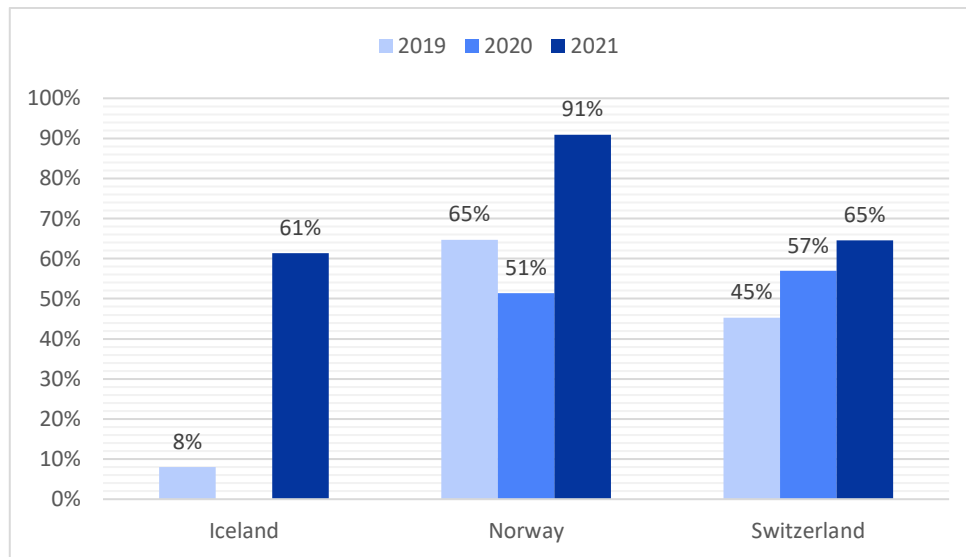


Figure 41: Open data maturity score of the EFTA countries between 2019-2021

5.5.2 EaP countries, Montenegro and the United Kingdom

Last year was the first year the Eastern Partnership countries participated in the landscaping exercise. Montenegro joined for the first time this year. The UK has been participating since the first edition but left the EU by 2020. In figure 42 the scores of the EaP countries, Montenegro, and the UK are shown per dimension. Ukraine, as being one of the top performing countries of the assessment outperforms the other countries on all dimensions. For all countries holds that, similar to last year, the policy dimension is the most mature dimension. The UK shows great improvement within the impact dimension, jumping from 48% in 2020 to 69% in 2021.

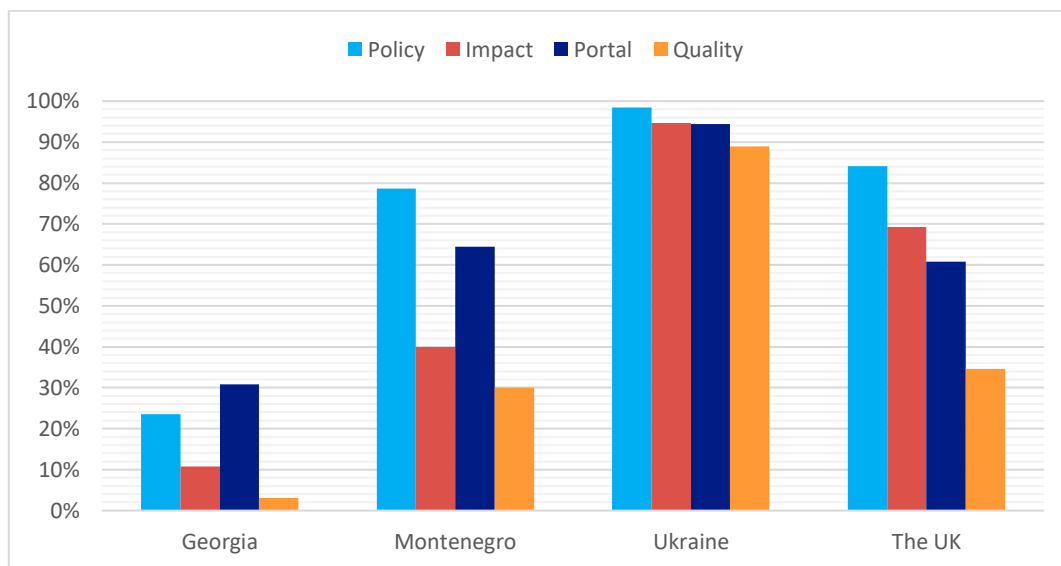


Figure 42: The EaP countries, Montenegro, and the UK's scores on the four open data maturity dimensions

Comparing this year's overall open data maturity score to last year (see figure 43), most countries increased in score and Georgia's score remained unchanged. Especially Ukraine shows great improvement in score, promoting to the trend-setter cluster as explained in the next chapter. As this

is only the first year that Montenegro participates in the assessment, it is difficult to provide a perspective on their results. Nevertheless, 53% is a promising score for Montenegro to enter the assessment with.

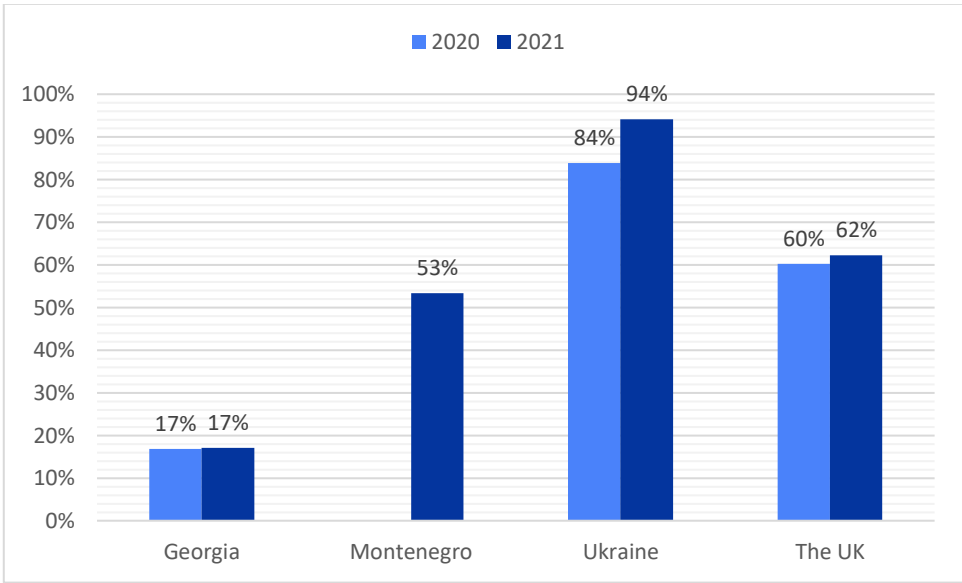


Figure 43: Open data maturity score of the EaP countries, Montenegro, and the UK between 2020-2021

Chapter 6: Clustering the Countries

As part of the landscaping exercise all participating countries are grouped into four clusters based on the 2021 open data maturity assessment. Clustering the countries based on their level of maturity helps to identify affinities between their progress and challenges. Countries in the same cluster can share and discuss strategies on how to overcome challenges they are facing and learn from the countries in more mature clusters. Clustering also enables us to provide more focused advice for each of the clusters.

From the lowest to the highest performing, these clusters are named: beginners, followers, fast-trackers, and trend-setters. Similar to last year, the country scores are concentrated around the highest performing clusters.

6.1 Clustering profiles

The indicative profiles that exemplify the level of maturity one may expect from the countries according to the cluster they belong to are specified below. The clustering profiles have not changed in recent years.

Note that the names of the clusters are an exemplification and do not intend to generalise nor to represent literally the achievements and history of open data developments in the respective countries, for example, you may find countries in the beginners cluster that have been investing in open data for years, though with less significant results emerging from the survey than others.

Trend-setter	The country has an advanced open data policy in place with a strong coordination of open data activities throughout at all levels of government. The national portal provides a wide range of features and caters for the needs of advanced users and publishers. The level of quality of open data in the country is very good, with various initiatives in place to ensure the publication of high-quality data and compliance with DCAT-AP. There are different open data ecosystems developed around data domains, with a high level of interaction and reuse within these domains. Activities to measure re-use are conducted, with methodologies in place to assess the impact in different domains. Little to no limitations to publication or re-use are observable.
Fast-tracker	The country shows a good level of maturity against all dimensions. Overall, the country showcases activities to boost data publication, with a strategic approach to increase the quality of published data and a high level of compliance with standards is achieved. The national portal provides a good level of functionalities to cover the needs of advanced and basic users. Limited efforts are made to monitor the impact of open data. However, a stronger focus is given to tracking and boosting re-use. Some issues can still be observed, but measures are in place to tackle them.
Follower	The country already has an open data policy in place and is conducting activities to ensure a fair level of coordination of open data activities. The portal showcases standard features, but also a limited number of features that cater for the needs of more advanced users. There are a few activities conducted to boost the publication of high-quality data from different providers, however, there is no systematic

	approach to ensure a higher quality of publication across the board. Only very limited activities to monitor re-use and measure the impact of open data are performed. A fair number of limitations in terms of data publication and re-use still exist.
Beginner	The country shows an early stage of maturity on the four dimensions or – alternatively – was not able to develop at the same pace as the countries in other, better performing clusters. Progress is more prominent in the open data policy dimension. There is no open data portal or, if existent, the portal showcases limited features or a limited number of datasets, compared to the country’s potential. None or very limited activities are performed to monitor the reuse of open data in the country and no monitoring is done to assess impact. In terms of data quality, the country is taking little action to enable the publication of data in higher quality, and little effort is spent to ensure the adoption of DCAT-AP. Visible limitations in terms of open data publication exist, with limited reuse examples.

6.2 The 2021 clustering

In order to cluster the countries, the scores are plotted on from low to high and groups are defined where a significant gap in the overall scores is found. Interestingly, all cluster intervals shifted upwards on the scale, meaning that a higher score is needed to belong to certain cluster. The intervals of the fast-trackers and followers clusters outperformed last year’s intervals as they do not overlap, showing the significant improvements made by the concerned countries. The results of the clustering can be found in figure 44.

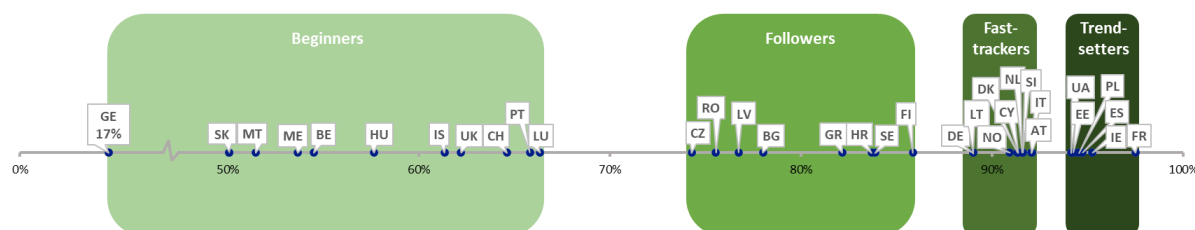


Figure 44: Clustering of the 2021 maturity score of the participating European countries

The results, including the cut-off points of the clusters, are listed below. Countries marked with an asterisk (*) are not part of the EU27.

- **Trend-setters (94%-98%):** France, Ireland, Spain, Poland, Estonia, and Ukraine*
- **Fast-trackers (89%-92%):** Austria, Italy, Slovenia, Netherlands, Cyprus, Denmark, Norway*, Lithuania, and Germany
- **Followers (74%-86%):** Finland, Sweden, Croatia, Greece, Bulgaria, Latvia, Romania, Czech Republic
- **Beginners (17%-66%):** Luxembourg, Portugal, Switzerland*, the UK*, Iceland*, Hungary, Belgium, Montenegro*, Malta, Slovakia, and Georgia*

Open Data Trend-setters

The trend-setters cluster consists of 6 countries who have an overall maturity score of 94% or higher. The interval of the trend-setter cluster shifted 4 percentage points upwards in 2021, as the scores range between 94%-98%, while in 2020 the scores ranged between 90%-96%.

In 2021, France recorded the highest score of 98% and took the lead in the assessment for the first time, with a relatively large gap towards the other trend-setters. The remaining 5 trend-setters' scores are extremely close and fall within a range of 1%. Ireland, Spain, Poland, all with a score of 95%, and Estonia with a score of 94% retained their trend-setter position. Finally, Ukraine entered the trend-setter cluster for the first time with a score of 94%. Each of these countries improved their score from last year. Ukraine showed the most significant improvement with an increase in score of 10 percentage points, jumping from fast-tracker to trend-setter.

Open Data Fast-trackers

In 2021, the fast-trackers cluster consists of 9 countries who have an overall maturity score between 89%-92%. The countries in the fast-tracker cluster showed remarkable improvements in this year's assessment, as the lower limit of the interval increased by 11 percentage points. Also, the scores as of the fast-trackers are much more concentrated on a smaller range compared to last year. The scores of the fast-trackers ranged between 78%-88% in 2020. This trend is also represented by the decline in countries included in the fast-tracker cluster from 13 countries in 2020 to 9 countries in 2021.

The fast-tracker countries' maturity scores are extremely close to each other. In 2021, 7 out of the 9 fast-trackers' scores fall within a range of 1,2%. The fast-trackers cluster consists of Austria, Italy, Slovenia, and the Netherlands with a score of 92%, Cyprus, Denmark, and Norway, with a score of 91%, and Lithuania and Germany with an identical score of 89%. Austria and Denmark moved from trend-setter to fast-tracker, as their score did not improve enough to match the higher trend-setters' maturity scores. Norway showed the highest improvement in score of the 2021 assessment, with an increase of 40 percentage points compared to last year, jumping from beginner to fast-tracker.

Open Data Followers

The followers cluster consists of 8 countries, with overall maturity scores ranging between 74%-86%. Similar to the fast-trackers, show countries included in this cluster significant improvements compared to last year. The lower limit of the interval increased by 17 percentage points, not even overlapping last year's interval of 57%-72%.

Most countries within this cluster, 5 out of 7, moved down from the fast-trackers cluster as their improvements did not follow the high growth rate of this cluster. Finland (86%), Sweden (84%), Croatia (84%), Greece (82%), Bulgaria (78%), and Latvia (77%) moved from the fast-tracker to the followers cluster. Romania (76%) and Czech Republic (74%) retained their position in this cluster by showing an increase in score of 7% and 2% respectively.

Open Data Beginners

The beginners cluster is the most numerous cluster of the 2021 assessment, consisting of 11 countries with an overall maturity score below 66%. This threshold is 13% higher than for last year's beginner's cluster.

Ranked from the highest to lowest scores, the beginners are: Luxembourg (66%), Portugal (66%), Switzerland (65%), the UK (60%), Iceland (61%), Hungary (58%), Belgium (55%), Montenegro (54%), Malta (51%), Slovakia (50%), and Georgia (17%). Luxembourg, Switzerland, the UK, and Belgium moved from the followers to the beginners cluster. Due to the speed of open data transformation in other countries and the corresponding increases in the overall open data maturity scores, most countries

remain in the beginners cluster even when they have showed improvement, because they are not progressing as fast as others. For example, Hungary improved from 34% to 58% and Portugal improved from 48% to 66%. Montenegro and Iceland did not participate in last year's assessment and entered this year in the beginners cluster.

6.3 Development of the clusters 2015-2021

The development of the share of countries included per clusters can be seen in figure 45. The figure shows that the trend-setter cluster did not change significantly in growth. The fast-tracker cluster is the most volatile cluster in terms of group size. Where last year the group increase drastically, this year a decline is visible. The opposite trend holds for the followers cluster, where last year a steep decline was observed and this year a slight increase. Finally, the beginners cluster shows an increasing trend since 2018. Mainly due to the inclusion of countries outside the EU27 and the peak performances in maturity scores of recent years.

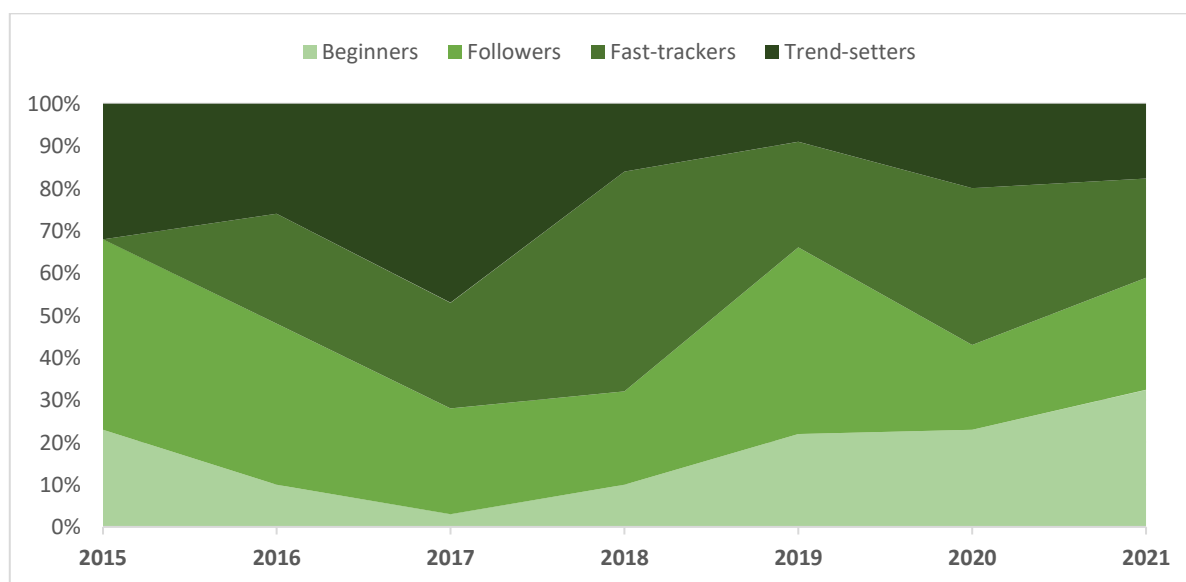


Figure 45: EU27 average open data maturity per dimension for the period 2015-2021

The significant progress from 2019 onwards, also suggests the need for a re-calibration of the methodology. That would incentivise the countries to perform even better, highlight and reward appropriately their achievements, and enable better observing and learning from the choices that make them different.

Chapter 7: Recommendations for the Countries

The researchers' recommendations for the countries, by cluster, are collected in this section. These have not changed substantially from the previous year, as the clusters' profile have not changed, and the trends observed last year were confirmed.

7.1 Trend-setters

Maintain the ecosystem, experiment, and share the knowledge

1. Enhance and consolidate the open data ecosystems you support by developing thematic communities of providers and re-users. Continue to prioritise the categories specified for the high-value datasets in the Open Data Directive. Particularly in this time of pandemic, invest into online channels and tools that enable continuing the exchange of knowledge and experience, such as periodic videoconference meetings, wikis on topics of interest etc.
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, that will gain prominence over time.
3. Define and/or develop a strategy to ensure the sustainability of the national and local open data portal infrastructure. Experiment with alternative funding models beyond state funding, e.g. pay for value-added services on the portal. Share the outcome of your experimentation with the other countries.
4. Collaborate with other national open data teams, universities, and research institutions, and data.europa.eu to develop an experimental impact assessment framework. Also, start developing country-specific metrics to measure impact. Operationalise monitoring the metrics and assessing 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, etc.) to ensure a variety of insights. Improve the method iteratively over time.
5. Continue to conduct research to assess the economic impact of open data, at both micro and macro levels.³⁴⁵ Iterate annually or biannually to observe change and refine activities and goals. Leverage the momentum created by showcasing the results and rally stronger political support.
6. Harness the wisdom of the crowd by enabling the broader open data community to contribute more to the national open data programmes. Enable re-users 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 re-users' feedback and ratings.
7. Continue the work on improving the quality of both metadata and data by boosting the use of tools on your portal (e.g. for the validation of metadata). Enable automated notifications to

³⁴⁵ For example, by following the methodology of data.europa.eu's report "Economic Impact of Open Data: Opportunities for value creation in Europe" (2020). Available at <https://data.europa.eu/sites/default/files/the-economic-impact-of-open-data.pdf>

publishers to notify them of issues. Provide tools to enable data conversion into alternative formats, possibly replacing non-machine-readable, proprietary formats. Invest into the portal to use new workflows and tools that enable the best understanding of your re-users' profiles and needs, while preserving their privacy.

8. As the Open Data Directive is implemented in your country, adapt the national portal to give clear visibility of the datasets. Particularly with regards to real-time data, link to a variety of 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 curriculum to involve more advanced topics. Make such courses formally recognised and provide certification upon successful completion.
10. Share your knowledge and results of your experimentation with other countries and enable them to learn from your best practices and contribute to your research, e.g. in areas of focus you share, or where you experience similar barriers. Reach out and cooperate with other countries on developing solutions to common challenges, including basic, re-usable elements such as open source software that your platforms share (e.g. portal extensions).

7.2 Fast-trackers

Graduate from traction to impact

1. Assist the development of open data initiatives at local and regional level and coordinate more with the local and regional open data teams.
2. Activate the network of open data officers and enable them to set up monitoring activities within their organisation (e.g., develop plans for data publication and monitor charging practice). Track progress against these plans and assist open data officers to alleviate 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 to be 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 privilege enabling business opportunities for medium- to long-term engagement (e.g. data challenges). Ensure funding and political sponsorship (e.g. an organisation as 'patron') for winning ideas.
5. Promote and follow-up on the performance of products and services built on open data. Develop strategic awareness of re-use and impact. Focus resources on a relevant field or sector, to start demonstrating impact, and use the 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 between providers and re-users. Increase your knowledge on the publication and re-use of data in that domain and start thinking of a definition of impact in that field that can be operationalised into metrics.

6. As the Open Data Directive is implemented in your country, adapt the national portal to give clear visibility of the datasets. Update the portal to better engage your audience. Include features that enable online interaction between data publishers and re-users. Showcase re-use examples prominently on the national portal and promote the datasets used to develop those use cases. Consider the opportunity to promote the developers as well.
7. Monitor access and usage of the portal and enhance knowledge in your team around the profiles of your portal's typical users. Ensure the re-users' privacy in doing web analytics and be explicit with them about how that insight will be used. Enable such insights to flow into improving the portals features, the access to data and improve the variety of data published in your country.
8. Address the requirements of the implementation of the Open Data Directive in your country by revising and enhancing the portal's support for real-time data sources. Identify the main real-time data holders and promote the publication of their data beyond the minimum requirements specified by law. Understand the concerns and costs of publication and work together with publishers to enable the data publication process.
9. Think of ways to ensure the portal's sustainability by enabling more contributions from the open data community (e.g. submitted datasets, developed use cases, news and blog items written by the community), by providing value-added features, and by exploring additional funding options.
10. Enforce minimum standards to the quality of metadata and data by using analytics tools to monitor data publication – at both metadata (compliance with the DCAT-AP schema) and data (formats of publication) level. 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, both in terms of metadata and data.

7.3 Followers

Strengthen governance, boost engagement

1. Update the national strategy for open data to reflect technical and policy developments at 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 and free whenever possible. Support publication through legislation where suitable.
2. Set up a governance structure that accounts for the characteristics of your country. Engage potential re-use groups (e.g. data companies, research institutions, NGO's) into the open data governance in your country. This will enable a co-ownership around a common vision and buy-in on the actions for each sector.
3. Develop a yearly plan for online activities (e.g. events, conferences...) to promote open data. Focus on formats that promote publication as well as re-use by both public and private sector. Experiment with formats that both leverage creativity (e.g. hackathons) and enable the development of business opportunities on medium- to long-term engagements (e.g. data challenges). Ensure funding and political sponsorship for the winning ideas. Promote and follow up on the performance of developed products and/or services.
4. Analyse user behaviour on the data portals responsibly, ensuring their privacy and being explicit about how that insight will be used. Identify communities of re-users and conduct awareness-

raising activities around open data within these groups (e.g. universities, data start-ups and data companies, research institutes, NGOs, 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 monitor charging practices within their organisation and exchange within the network on practices to alleviate such barriers. Deepen the understanding within the network of open data officers of the benefits of open data re-use by the public sector.
6. Ensure that pre-existing open data courses and training materials are used 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 re-users and publishers. Develop a deeper understanding of open data demand side and work together with data publishers to prioritise data publication in line with this demand. Focus on fostering open data reuse by both public and private sector 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 homepage.
8. As the Open Data Directive is implemented in your country, adapt the national portal to give clear visibility of the datasets. Conduct regular updates to the portal to reflect the users' needs. Include features such as feedback and interaction mechanisms at dataset level, designated login areas for users, access via SPARQL query or/and API in general. Consider integrating data visualisation and analytics tools to allow portal visitors to gain insights from data via interactive charts and other visualisation tools. Monitor access and usage of the portal. Draw insights from this data and enhance awareness around it within your team.
9. Increase understanding of the variety of data that your portal features (historical vs. current data) and work towards improving it. Identify data holders that do not publish their data or do not reach to their full potential, understand what friction they are experiencing and plan to address it. Think of the future and on enabling publication of real-time data in your country.
10. Provide trainings and online materials that focus on metadata and data quality. Promote the DCAT-AP standard and existing guidelines to foster compliance. Create understanding around the importance of publishing data in machine-readable, non-proprietary formats as well as regarding the licensing of data. Develop knowledge around existing open source tools to clean up data and validators for metadata compliance.

7.4 Beginners

Think big, act small

1. Develop a national strategy for open data and align it with broader strategies at national level (e.g. digital strategies, strategies for the modernisation of public sector etc.)

2. Rally support to the open data programme and political leadership from top level of government. Showcase international research around the value of open data, to emphasise economic benefits of data exploitation.³⁴⁶
3. Set up a team at national level in charge of open data to ensure coordination of activities within the country and set up 'road-shows' to promote the team's scope and activities with the main public administrations. Include all levels of government in this process.
4. Organise a series of open data events at national level and focus on engaging both data publishers and re-users in your country. Prioritise the promotion of data publication best practices and re-use cases during such events.
5. Set up relevant communication channels and contact persons for data publication within public administrations (e.g. open data liaison officers). Maintain an active dialogue with the officers and enable regular exchange of knowledge amongst them, focusing on efficient online channels, in this time of pandemic (meetings, online forums etc.).
6. Identify the main data holders in the country and understand the main concerns and barriers to data publication. Take the first steps to overrun these barriers and unlock the publication of data.
7. Organise workshops and awareness-raising sessions with the main data holders. Use materials already developed in other countries and at European level for content and as source of inspiration.
8. Develop guidelines to enable publication of data, of its metadata and the take-up of suitable licensing conditions. If standard licences are not suitable, 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 develop such guidelines. Raise awareness amongst main data publishers around the importance of metadata and promote the DCAT-AP standard, specifications, and existing guidelines developed at 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 adequate to support your scope and mission. Set up dedicated news and blog sections to promote relevant developments and to showcase re-use. Ensure feedback channels are seamlessly integrated into the national portal. Be aware of users' rights and privacy as you perform web analytics, and choose your technology carefully, particularly following the invalidation of the EU-U.S. Privacy Shield.
10. Ensure that the national open data strategy guarantees scoping, management, and funding of the portal. Use action plans with actions and responsible entities or persons to ensure the strategy to be carried out. Ensure that sufficient resources are allocated to open data awareness-raising activities with both publishers and potential re-users.

³⁴⁶ For example, by following the methodology of data.europa.eu's report "Economic Impact of Open Data: Opportunities for value creation in Europe" (2020). Available at <https://data.europa.eu/sites/default/files/the-economic-impact-of-open-data.pdf>

Conclusions

This report offered an extensive view into the 2021 edition of data.europa.eu's (formerly conducted by the European Data Portal) annual open data maturity benchmarking exercise. It provides insight into the developments in the open data field in European countries, including the 27 EU Member States, participating EFTA countries Iceland, Norway, and Switzerland, participating Eastern Partnership countries Georgia and Ukraine, as well as Montenegro and the United Kingdom.

The assessment measured open data maturity against four dimensions: policy, impact, portal, and quality. Maturity was scored against these dimensions, forming an overall open data maturity score for each country. The countries were clustered into four groups, from the most mature to the least: trend-setters, fast-trackers, followers, and beginners. For each, recommendations tailored to the level of maturity and characteristics of the clusters have been provided. By doing so, the report provides policymakers and national open data teams with actionable guidance to continue their development in the field of open data, in turn, enabling the creation of meaningful and sustainable benefits for the citizens of their countries.

The Member States are in the process of transposing the Open Data Directive into their open data policies, which aims, among other things, to reap the full potential of open data re-use. The Open Data Directive requires the adoption by the European Commission, via a future implementing regulation, of a list of high-value datasets. Although the adoption is still ongoing, this landscaping exercise got a first glimpse of the approach Member States will use to implement the upcoming regulation.

The open data impact dimension experienced the largest increase compared to the other dimensions underlining the increased importance of understanding, monitoring, and measuring open data value creation and impact. This is in line with one of the objectives of the Open Data Directive to reap the full potential of open data re-use. In recent years, impact was often measured by monitoring user analytics of national open data portals or by keeping a list of use cases. This year a clear trend has shown towards conducting in-depth research, such as desk research or surveys. This will, in the long-term, result in a structured approach on measuring open data impact and more accurate estimations of the impact on the society and economy as a whole.

Finally, the COVID-19 pandemic continues to strengthen the value and high social impact of open data in 2021. Last year's assessment showed the emphasis on the importance of systematically collecting and making data available to the public as a response to the pandemic. This year, the initiatives and dashboards are in most cases complemented with recent statistics about national vaccination rates, vaccination productions capacities, protective equipment availabilities, intensive care capacities, etc., showing the continuation of the value creation.

Looking ahead, the scores of the countries are consistently high and are gradually approaching the 100%. This proves the value of a revision of the methodology which is scheduled for 2022. The new methodology will aim to stimulate the Member States to continue to improve and grow beyond the current assessment, while ensuring consistency and comparability of the results.

This report and the numerous best practices from the countries aims to inspire the national open data teams but, also, anybody fostering open data availability and re-use. Cross-border collaboration will be stimulated ever further throughout 2022, enabling the open data community to learn from each other, and to spark new initiatives. This is of pivotal importance to reach the full potential of open data in Europe.