Open Data Maturity in Europe 2016

Insights into the European state of play

EUROPEAN DATA PORTAL

European Data Portal is developed by the European Commission with the support of a consortium led by Capgemini Consulting, including INTRASOFT International, Fraunhofer Fokus, con.terra, Sogeti, the Open Data Institute, Time.Lex and the University of Southampton.

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Abstract

This report is the second in a series of annual studies and explores the level of Open Data Maturity in the EU28 and Norway, Switzerland and Liechtenstein – referred to as EU28+. The measurement is built on two key indicators Open Data Readiness and Portal Maturity, thereby covering the level of development of national activities promoting Open Data as well as the level of development of national portals.

In 2016, with a 28.6% increase compared to 2015, the EU28+ countries completed over 55% of their Open Data journey showing that, by 2016, a majority of the EU28+ countries have successfully developed a basic approach to address Open Data. The Portal Maturity level increased by 22.6 percentage points from 41.7% to 64.3% thanks to the development of more advanced features on country data portals. The overall Open Data Maturity groups countries into different clusters: Beginners, Followers, Fast Trackers and Trend Setters.

Barriers do remain to move Open Data forward. The report concludes on a series of recommendations, providing countries with guidance to further improve Open Data maturity. Countries need to raise more (political) awareness around Open Data, increase automated processes on their portals to increase usability and re-usability of data, and organise more events and trainings to support both local and national initiatives.

Résumé

Ce rapport est le second d'une série de rapports annuels et explore le niveau de maturité « Open Data » des 28 pays de l'UE ainsi que les pays de l'Association européenne de libre-échange (AELE), dénommés UE28+. Deux indicateurs clés sont utilisés. Ils couvrent à la fois la maturité des politiques nationales visant à promouvoir l'ouverture des données publiques ainsi que les fonctions disponibles sur les portails nationaux.

En 2016, l'UE28+ a réalisé plus de 55% du chemin vers l'ouverture des données, ce qui représente une croissance de 28,6% par rapport à 2015. Ceci démontre que les pays ont réussi à établir les bases nécessaires à l'ouverture des données. Le niveau de maturité des portails nationaux a progressé de 22,6 points de pourcentage, passant de 41,7% à 64,3%, grâce notamment à la mise en place de fonctionnalités plus avancées. La maturité « Open Data» des différents pays s'établit désormais sur quatre niveaux : débutant, suiveur, accélérateur et précurseur.

Un certain nombre d'obstacles demeure afin de poursuivre le chemin de l'ouverture des données. Une série de recommandations a été formulée de manière à guider les pays. Outre une stratégie soutenant l'ouverture des données, les pays ont besoin de plus de portage politique ; de communiquer davantage sur l'ouverture des données ; d'accroitre l'automatisation de certaines fonctions sur leurs portails pour en faciliter l'utilisation ; d'organiser plus d'événements et de formations en lien avec « l'Open Data » afin de soutenir les initiatives nationales et locales.

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Executive summary

Open Data contributes to the political, social and economic sustainability of a country. However, what is meant exactly by Open Data? Open Data refers to the information collected, produced or paid for by public bodies which can be freely used, modified, and shared by anyone for any purpose.[1] This definition can be narrowed down to Public Sector Information (PSI), or Open (Government) Data, that is to say data collected and published by the public sector.

This report is the second assessment in a series of annual studies and assesses the level of improvement of Open Data Maturity in the EU28 plus Norway, Switzerland and Liechtenstein – referred to as EU28+ - in comparison to 2015. The 2015 report serves as the benchmark to assess the developments achieved in the field of Open Data. The two key indicators used to measure Open Data Maturity are Open Data Readiness and Portal Maturity. These indicators cover both the level of development of national activities promoting Open Data as well as the level of development of national portal features.

The first key indicator, **Open Data Readiness**, assesses to what extent countries have an Open Data policy in place, licensing norms and the extent of national coordination regarding guidelines and setting common approaches. The transposition of the revised PSI Directive is also taken into account. Besides the presence of an Open Data policy, the use made of the Open Data available and the estimated political, social and economic impact of Open Data are assessed. The second key indicator, **Portal Maturity**, explores the usability of the portal regarding the availability of functionalities, the overall re-usability of data such as machine readability and accessibility of data sets, for example, as well as the spread of data across domains. The two key indicators as well as the sub-indicators are shown in the table below.

Open Data Maturity Assessment							
Open Data Readiness					Portal maturity		
1. Presence of Open Data Policy	2. Licensing Norms	3. Extent of coordination at national level	4. Use of Data	5. Impact of Open Data	6. Usability of the portal	7. Re-usability of data	8. Spread of data across domains

Table 1 - Open Data Maturity indicators

In 2016, on average, the 31 countries assessed in this report progressed by 28.6% from 2015 to 2016, leading to an increase of 12.6 percentage points. The EU28+ countries completed over 55% of their Open Data journey showing that, by 2016, a majority of the EU28+ countries have successfully developed basic Open Data policies. Although this can be considered an important positive development, significant discrepancies across countries still exist. Some countries are still in the process of creating a national Open Data portal, while other countries have already launched new initiatives and are redefining their multiannual strategy. At the same time, while in 2015 less than two-thirds of the EU28+ countries (59%) had integrated a dedicated Open Data policy, in 2016 this has increased to just over two-thirds, namely 68%. In terms of licensing norms, the countries are further developed with a 76% average score (4.3% increase in percentage points from 2015). Although national coordination has increased from 43.7% in 2015 to 49.6% in 2016, still more guidance could be provided to local or domain specific areas.

[1] The Open Definition, 2016

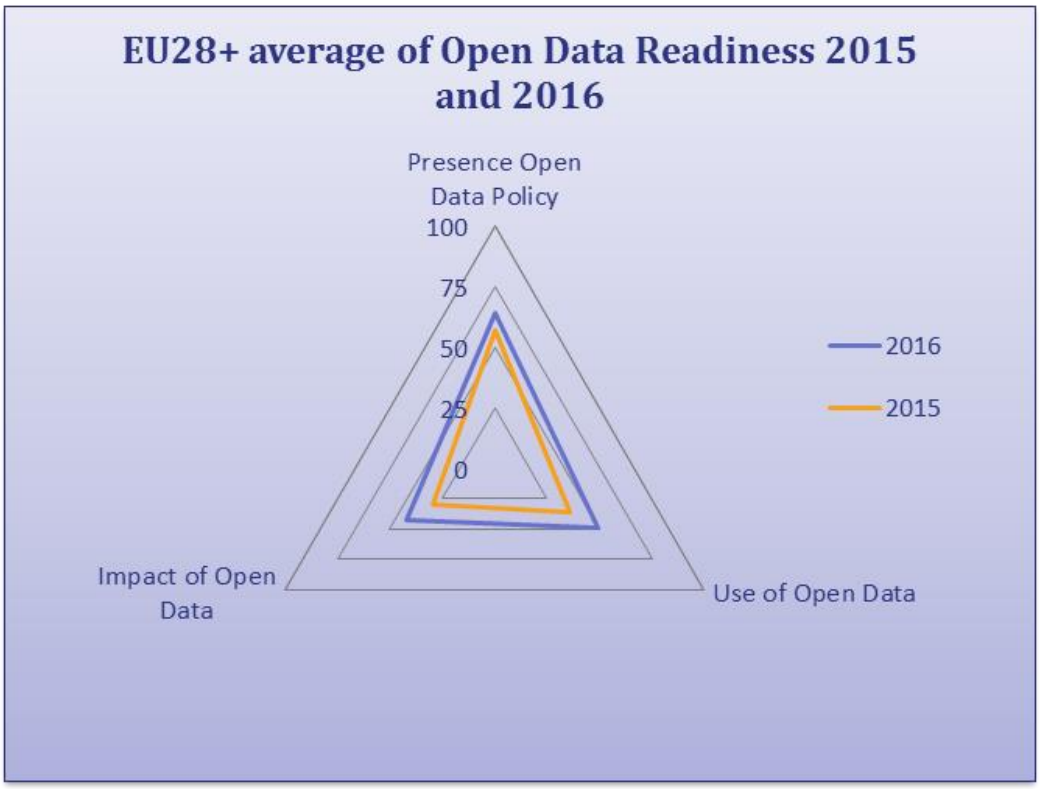


Figure 1 - EU28+ average of Open Data Readiness in 2015 and 2016

When taking a closer look at Open Data Readiness, it becomes clear that most countries show an increase in maturity regarding the presence of an Open Data policy (64.5%) which is an increase of 7.6% in percentage points in comparison to 2015. Both the Use and Impact of Open Data have also increased in comparison to 2015; however, on average the EU28+ have not yet reached the 50% threshold. The Use of Open Data increased from 36% in 2015 to 49.3% in 2016 while the Impact of Open Data increased from 29.5% in 2015 to 46.3% in 2016.

Most countries have increased their Use of Open Data as they have launched activities to promote their Open Data policies and portals and developed additional means to monitor their users. A few countries have decreased their score on Use of Open Data. This is partly due to the fact that, in 2016, the number of unique visitors was scored relative to the number of inhabitants of a given country while in 2015, points were awarded based on the absolute number of visitors. However, this adjustment in the calculation has favoured smaller countries and not proven too disadvantageous to larger countries.

In comparison to 2015, 2016 witnesses a clear increase in understanding the political, social and economic impact of Open Data; although scores differ largely between countries. However, results show that Portal Maturity is not simply linked to more countries having a portal but countries developing a more systematic impact assessment and evaluation studies of the benefits of Open Data. The Impact of Open Data increased the most on the social level, from 8.1% in 2015 to 25.8% in 2016. This can mainly be attributed to the fact that more countries were able to estimate this impact. The launch of further activities to monitor these impacts such as hackathons with stakeholders, studies and the creation of special working groups on Open Data increases the understanding of the impact Open Data can have. Although the economic impact of Open Data increased less substantially in comparison to the social impact, from 38.4% in 2015 to 50.8% in 2016, the economic impact indicator

was the only indicator to have scored above 50%; a threshold not reached in 2015. A reason for this increase could be that more countries understand the economic benefits of Open Data, thereby paving the way for more and higher quality releases of Open Data.

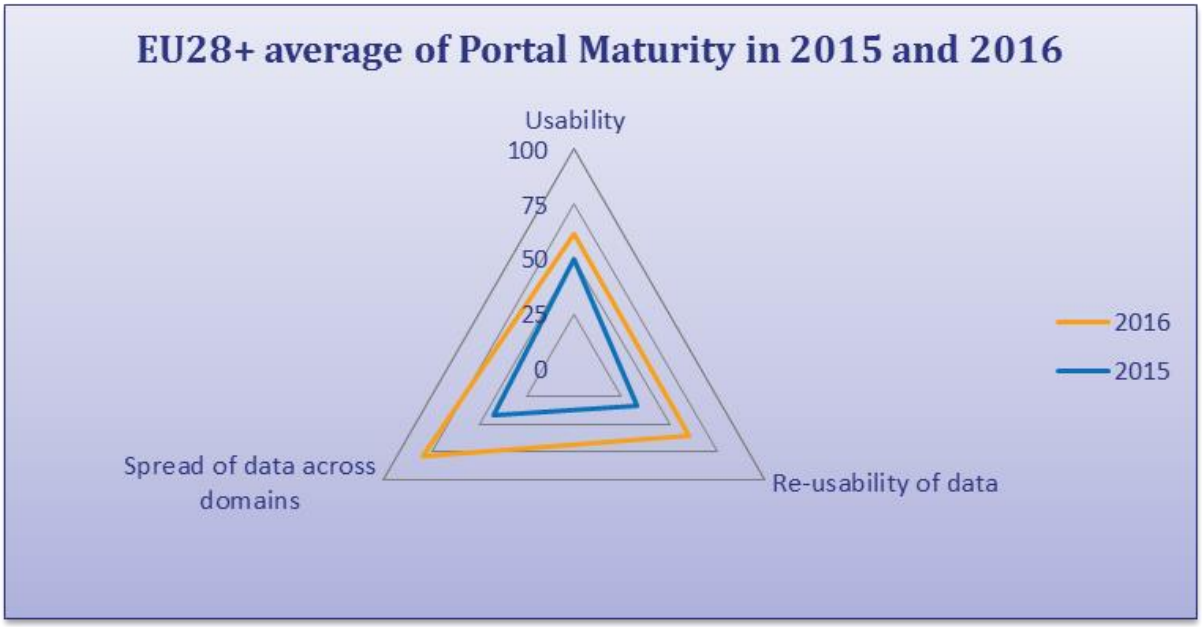


Figure 2 - EU28+ average Open Data Readiness

The maturity of Open Data portals is the second key indicator in assessing the overall level of Open Data Maturity. Portal Maturity is an important indicator when looking at the development of Open Data in a country. The Portal Maturity indicator increased by 26.2 percentage points from 41.7% to 64.3% thanks to more countries having brought more advanced features to their portal. On average, EU28+ countries have increased their development on all three sub-indicators of Portal Maturity in 2016, when compared to 2015, namely 61.3% on usability (11.0% points increase), 60.1% on re-usability (66.4% points increase) and 79.4% on spread of data across domains (37.4 % points increase).

Based on these results, to assess the overall Open Data Maturity, the EU28+ are grouped into different maturity levels: Beginners, Followers, Fast Trackers and Trend Setters.

Beginners: are in the early stages of their Open Data journey, both in terms of having an Open Data policy present as well as portal features. However, basics around availability, accessibility and portal functionalities are still limited leading to a restricted number of data sets for the public to be re-used.

Followers: have successfully developed a basic Open Data policy and have brought in more advanced features on their portal. Limitations still exist in terms of data release restricting the possibility for the public to use and re-use data sets.

Fast trackers: have significantly accelerated their Open Data journey, having either a policy or a portal that is substantially developed, however, they still face a small number of shortcomings in reaping the full benefits of either their policy or portal.

Leaders – Trend Setters*:* have implemented an advanced Open Data policy with extensive portal features and national coordination mechanisms across domains.

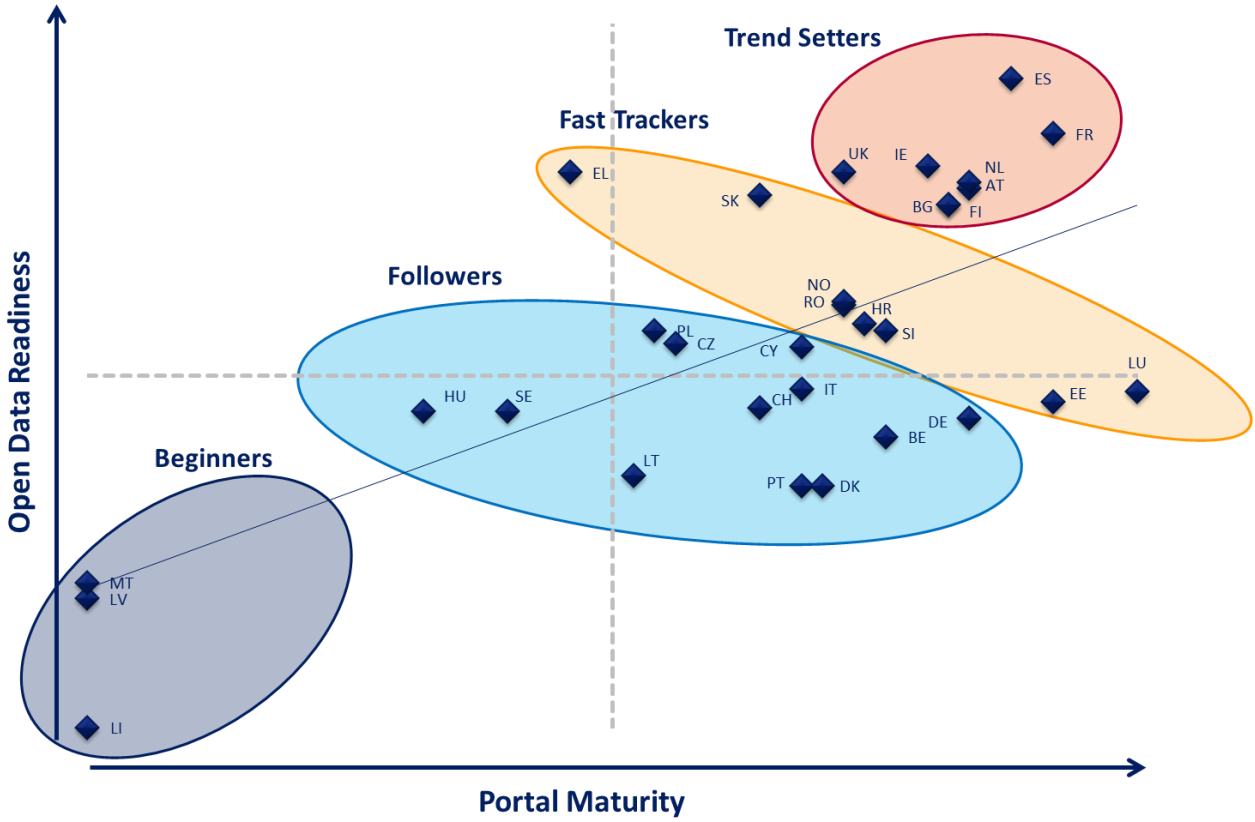


Figure 3 - EU28+ Open Data Maturity clusters

Although considerable progress is recorded across the countries, a number of barriers remain in reaching further Open Data Maturity across the EU28+. They have been categorised as political, legal, technical, financial and other. Countries developing Open Data policies need to develop adequate portals. Likewise, countries with developed portals need to pay equal attention to the development of their Open Data policies in order to offer a long-term vision for Open Data. To further assist countries in their Open Data journey, a series of recommendations is given:

1. Implement an Open Data strategy which states that all data needs an open licence; which stimulates the creation of an Open Data policy; emphasise the importance of a legal structure addressing privacy aspects and standards.
2. Improve the national portal by adding basic functionalities and enhancing the quality of the data: develop automated processes to collect data from public administrations and focus on consistent and coherent metadata quality.
3. Increase awareness around Open Data by organising more events and trainings and by diversifying the type of events; focus on raising awareness around the skills needed to work with data.
4. Launch activities to monitor the impact of Open Data. Knowing the impact of using Open Data, can also help increase the awareness, which in turn results in more Open Data, and hence more use of Open Data.

In conclusion, this landscaping report provides the findings of the second assessment in this series of annual studies. The report offers a clear overview of where the EU28+ countries stand in their Open Data developments by the end of summer 2016, as well has how they have progressed compared to 2015. A third revision is planned for 2017.

1. Introduction

Open Data contributes to the political, social and economic sustainability of a country. Yet, public administrations are often not aware of the importance and value this asset brings to their societies. Several studies conducted in recent years have underlined the importance of Open Data for economic growth. The study conducted by the European Data Portal team estimates that between 2016 and 2020, the market size of Open Data is expected to increase by 36.9% to a value of 75.7 billion EUR in 2020. Open Data has a positive economic effect on innovation and the development or enhancement of products and services. These benefits are not limited to the private sector. Public administrations themselves could save up to 1.7 billion EUR by making better use of the data it already has. [2] In order to accomplish this, data must be accessible, re-usable, and re-used. As a first step, citizens and businesses depend on the information that governments publish.

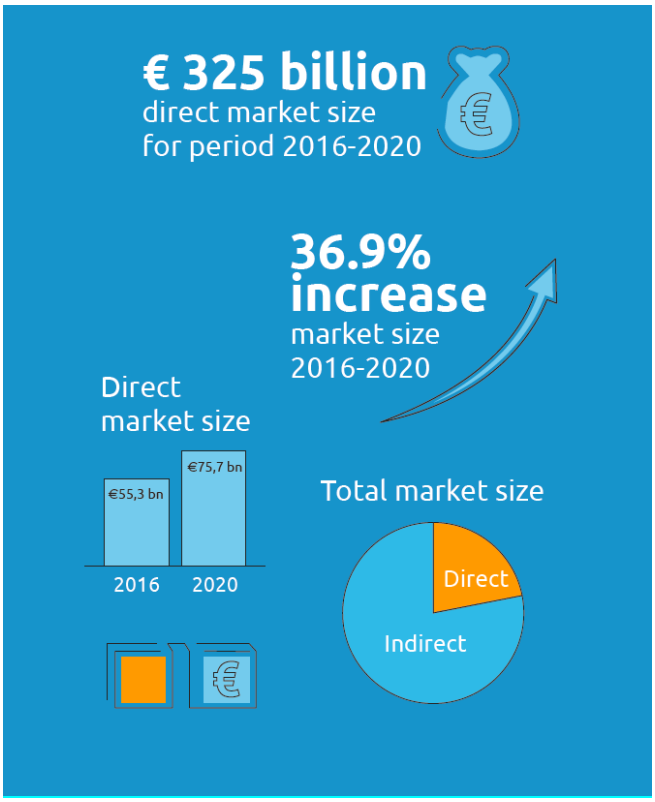


Figure 4 - Benefits of Open Data

Since 2015, the European Data Portal assesses the development of national Open Data policies and portals in Europe. This measurement focuses on the political, social and economic impact of Open Data within European countries, the development of portals and their maturity and finally the main barriers faced. The first landscaping report, published at the end of 2015, offered an overview of the maturity of Open Data for each of the EU28 countries plus Liechtenstein, Norway and Switzerland: the EU28+ countries. This report was the first assessment in a series of annual studies and serves as the knowledge base to assess the developments achieved in the field of Open Data, thereby diving deeper into national activities. This overview in turn enables understanding where to provide common support activities and where to offer further specialised training and coaching assistance.

[2] European Union, 2015. Creating Value through Open Data.

Within the context of this report, the definition of Open Data is based on the principles for Open Data described in detail in the Open Definition: Open Data refers to the information collected, produced or paid for by public bodies and can be freely used, modified, and shared by anyone for any purpose.[3] This definition can be narrowed down to Public Sector Information (PSI), or Open (Government) Data, that is to say data collected and published by the public sector.

To support the release of Public Sector Information, the EU has defined a legally binding framework. In 2003, the European Commission adopted the PSI Directive as a minimum harmonisation measure, helping to remove major barriers to the re-use of PSI by regulating the behaviour of Public Sector Bodies. The Directive provides a common legal framework for a European market for government-held data (PSI). A revision of the PSI Directive entered into force in July 2015.[4] The changes brought by the revised Directive include, inter alia, the breakaway from cost-based charging for PSI towards a marginal costs-oriented fee, the inclusion of certain cultural institutions as public sector bodies, an increased transparency regarding calculation of the fees, and support to machine-readable and open formats. Building on the revised directive, the publishing of Open Data by public administrations is expected to surge and unleash substantial economic gains.

This report provides the findings of the second assessment in this series of three annual studies. It offers a clear overview of where the EU28+ countries stand in their Open Data developments by the end of summer 2016, as well has how they have progressed compared to 2015. Chapter 2 provides an explanation of the approach used to assess Open Data activities across Europe by discussing the method used to assess Open Data Maturity as well as the details of the Open Data Maturity Scoring. Chapter 3 provides an overview of the current state of play by providing a detailed overview of the latest developments in the EU28+ countries. Chapter 4 explains which barriers remain in reaching full Open Data Maturity. The report concludes on a series of recommendations countries are invited to consider in order to reap further benefits from Open Data.

[3] The Open Definition, 2016

[4] EUR-Lex, 2013. Revision of PSI Directive

2. Approach to assessing Open Data Maturity across Europe

With the launch of the European Data Portal [5] in November 2015, Europe benefits from an infrastructure supporting the "Access to re-usable public sector information - Public Open Data".[6] This portal currently harvests all the metadata that is available on national portals across Europe and is accessible via a standard API.[7] In addition, the portal also contains a series of learning material, examples of Open Data re-use and a wide range of literature on Open Data and the implementation of the revised PSI Directive. Going beyond the Portal, European countries can receive support in the form of trainings and coaching to increase and/or improve their Open Data related activities. European countries therefore benefit from a combination of common support material and training as well as targeted support for those that are still in the early stages of the journey. Finally, since 2016, European countries can also benefit from European funding, via the CEF Public Open Data calls for generic services, to work on metadata harmonisation and enhancing the quality of the data they publish.[8]

In order to continue supporting the EU28+ countries it is important to understand where they stand on their journey to implement Open Data. This means taking a more comprehensive look into the country's setting, the data published and overall publishing practices as well as the means by which data is made available to any type of user. This activity is commonly called landscaping. It consists of drawing a picture of the latest national developments with regards to Open Data. This measurement differs from other Open Data related measurements as it combines policy, data availability as well as the level of sophistication of national data portals. The impact of Open Data is also assessed. In addition, within the European Data Portal project, better understanding the barriers faced by various countries enable further targeted support to accelerate the set-up of a Digital Single Market for data.

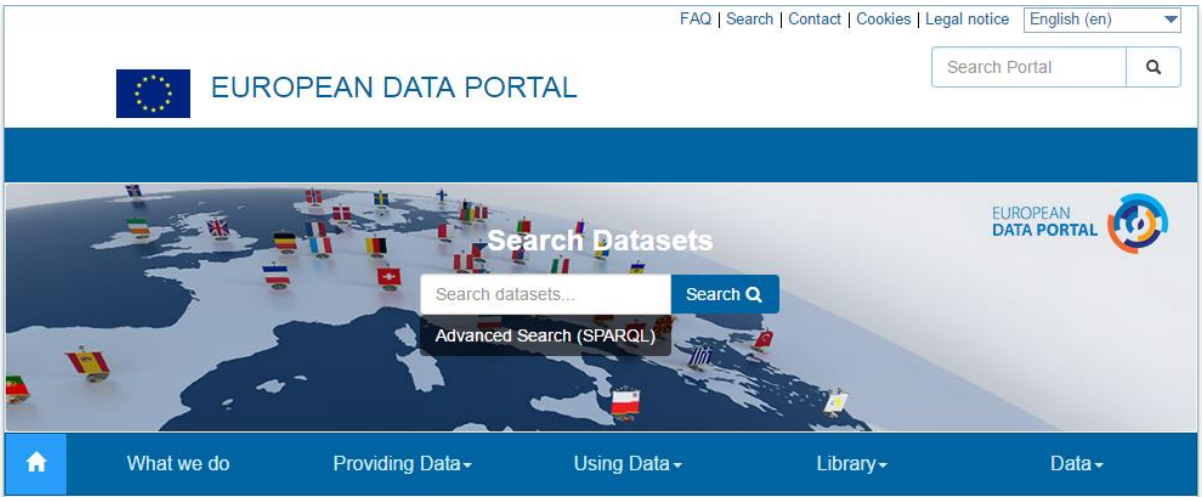


Figure 5 - Screenshot of European Data Portal website[9]

[5] European Data Portal, 2016
[6] European Commission, 2015, Digital Single Market, Connecting Europe Facility
[7] An application programming interface (API) is a set of routines, protocols, and tools for building software applications.
[8] European Commission, 2016, Connecting Europe Facilities Public Open Data call
[9] European Data Portal, 2016

2.1 Method to Assess Open Data Maturity

Establishing a landscape requires the setup of a number of indicators as well as an approach to measure these indicators. Finally, yet importantly, it requires working together with those responsible for Open Data in the countries that constitute the European landscape. The main goal of this landscaping report is to better understand the level of Open Data Maturity seen from the perspective of public sector representatives. Why such a focus? Because it is the public sector that acts as the main driver in publishing Open (Government) Data. This goal can only be achieved by working together with government representatives. All of the components assessed in this report are initiated and executed by public sector representatives. In addition, they are also responsible for taking action to improve their policies and pertaining implementation. Furthermore, by assessing all European Union countries the opportunity is created to compare the level of Open Data Maturity between those countries and to learn from best practices. Besides the 28 European Union countries, also Norway, Liechtenstein and Switzerland have been involved in this landscaping in 2016. These countries together with the 28 EU Member States are generally referred to as the EU28+.

The overall assessment of the level of Open Data Maturity for each European country is divided into two key indicators: Open Data Readiness and Portal Maturity.

The first key indicator – **Open Data Readiness** – assesses to what extent countries have an Open Data policy in place, licensing norms and the extent of national coordination regarding guidelines and setting common approaches. In addition, the transposition of the revised PSI Directive is taken into account. Besides the presence of an Open Data policy, the use made of the Open Data available and the estimated political, social and economic impact of Open Data are assessed. The combination of these three sub-indicators provides a good overview of how ready a country is in terms of its Open Data policy, thus called Open Data Readiness.

The second key indicator – **Portal Maturity** – assesses the usability of the portal regarding the availability of functionalities, the overall re-usability of data such as machine readability and accessibility of data sets, for example, as well as the spread of data across domains.

These two key indicators as well as their respective sub-indicators are shown in the three tables below.

Open Data Maturity Assessment							
Open Data Readiness					Portal maturity		
1. Presence of Open Data Policy	2. Licensing Norms	3. Extent of coordination at national level	4. Use of Data	5. Impact of Open Data	6. Usability of the portal	7. Re-usability of data	8. Spread of data across domains

Table 2 - Open Data Maturity indicators

To ensure consistency and comparability over time, the method developed in 2015 was re-used with slight enhancements in order to conduct the 2016 measurement.

To offer a more comprehensive understanding of the different indicators, leading research questions were addressed. The questions are summarised in the tables below and cover each of the sub-indicators of the Open Data Maturity Assessment Model, describing the ideal situation.

Open Data Readiness

Indicator	1. Presence of specific Open Data policy
1.1	Open Data policy and policies supporting re-use, are in place. Open Data policy is the same as the PSI policy. Open Data policy has changed since 2015. A national 5-year strategy exists.
1.2	National, but also regional/local portals are present. The data holders are able to upload the data themselves. The frequency of data collection is standardised. There is a pre-defined approach to ensure data is up-to-date. Approach on how Open Data has changed since 2015.
1.3	Priority domains for the publication of Open Data, are identified. The public administration is using data themselves for decision-making, but promoting the use by others as well by organising events. Revised PSI Directive has been transposed.

Indicator	2. Licensing norms
2.1	All data on the national portal, is available free of charge.
2.2	All data on the national portal, is open licensed.
2.3	A national data policy provides for a standard licence (or suite of licences) that public sector bodies are encouraged to avail themselves of when allowing PSI re-use.

Indicator	3. Extent of coordination at national level
3.1	National guidelines on the publication of PSI are in place.
3.2	Numerous regions and/or cities run their own Open Data initiatives, like portals or specific policies, and are integrated on the national portal.

Indicator	4. Use of the data
4.1	Overview of portal traffic statistics: • Number of unique visitors relative to the number of inhabitants; • Proportion of visitors that is foreign; • Proportion of traffic towards the portal is human; • Typical profile of visitors of the portal.
4.2	Changes in re-use since 2015. Support re-use of Open Data. Activities launched since 2015 to monitor impact of Open Data. Activities launched since 2015 to promote Open Data portal or Open Data in general?

Indicator	5. Impact
5.1 Political Impact	
5.1.1	Activities are launched since June 2015, to monitor the Impact of Open Data.
5.1.2	High impact on government efficiency and effectiveness.
5.1.3	High impact on transparency and accountability in the country.
5.2 Social impact	
5.2.1	High impact on environmental sustainability in the country.
5.2.2	High impact on increasing the inclusion of marginalised groups in policy making and accessing government services.
5.3 Economic impact	

5.3.1	Multiple macro-economic studies assessing the market value of Open Data are done as well as studies regarding better service delivery or looking at related subjects.
5.3.2	The funding model is known.

Table 3 - Open Data Readiness Detailed Indicators

Portal Maturity

Indicator	**6. Usability of the portal**
6.1	Feedback mechanisms are available on the portal to comment on data set quality and get a discussion going.
6.2	Users can access data sets, search, download and contribute themselves.
6.3	An API is available.

Indicator	**7. Re-usability of the data**
7.1	The proportion of data that is machine-readable is known.
7.2	All data is available in one – bulk – download.
7.3	File formats are searchable and it is known which file format is available the most.

Indicator	**8. Spread of data across domains**
8.1.	Data sets are numerous and up-to-date.
8.2	Multiple organisations provide a lot of data sets.
8.3	Data sets are searchable by domain with many different domains present.

Table 4 - Portal Maturity Detailed Indicators

In order to provide a detailed landscaping overview, different steps are taken:

- **Creating a list of main indicators and their sub-indicators with their respective scoring.** Important was the identification of how measuring certain indicators and listing essential sources of required information.
- **Setting up a survey to collect additional information from each European country.** A questionnaire was created based on the 2015 questionnaire. Some questions have been adjusted by for example differentiating countries by size and certain questions were added focusing on actual differences between 2015 and 2016 such as activities launched since mid-2015. The updated questionnaire was finalised together with the individual country representatives from the PSI expert group,[10] chaired by the European Commission. The countries involved in the study are the EU28 and Switzerland, Norway and Liechtenstein. A set of 72 questions was then divided into four main categories: Presence of an Open Data policy, Use of Open Data, Impact of Open Data, Portal Features. Of those 72 questions, 54 are multiple-choice or open quantifiable questions that are scored.
- **Completing existing monitoring with desk research.** Additional research has been conducted on the different national portals to validate the availability of data as well as usability of certain portals. Various monitoring activities and studies assessing the benefits of Open Data have equally been taken into consideration.
- **Drafting country factsheets and collecting input from the countries based on the results.** Based on the questionnaire and further research on the different national portals a country factsheet have been drafted for each country and was sent to the respective country representative.

[10] Public Sector Information expert group main page, 2013

- **Validating the results together with the country representatives.** The purpose of this validation is to further increase the accuracy of the research, extend the shelf value of the findings and publish all detailed results. Each country therefore had the opportunity to comment and complement both its factsheet and detailed scores. This step was introduced in the 2016 landscaping.
- **Clustering of results and drafting the report.** Based on the factsheets, a comparison was made between all participating countries. As this is the second report out of three reports, a comparison between 2015 and 2016 was included in the 2016 landscaping report.
- **Publishing the full landscaping results**. In 2016, all country scores[11] and factsheets[12] have been published on the European Data Portal.

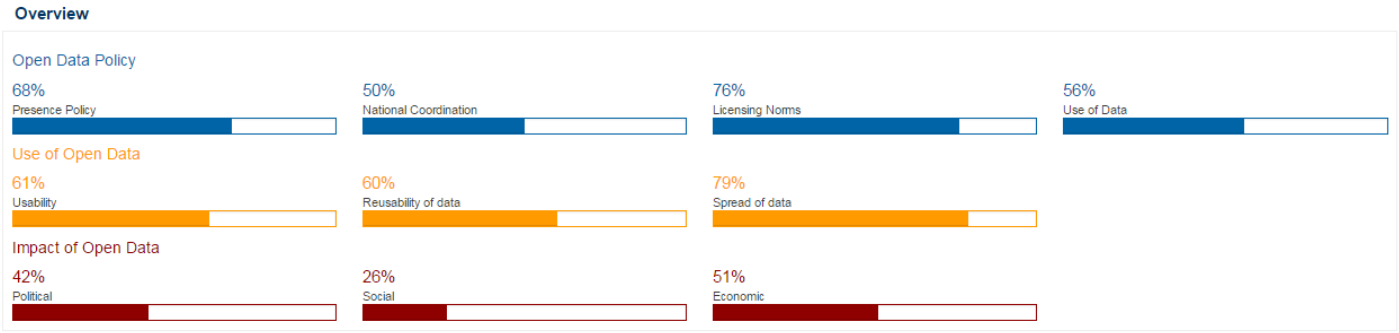


Figure 6 - Screen shot of the European Data Portal landscaping dashboard[13]

[11] European Data Portal, landscaping score, 2016
[12] European Data Portal, landscaping factsheets, 2016
[13] European Data Portal, landscaping dashboard, 2016

2.2 The details of the Open Data Maturity Scoring

The first step to assess the level of Open Data Maturity in the EU28+, is to analyse the scores obtained within the Open Data Readiness indicator. This indicator looks at the presence of an Open Data policy, the use of Open Data, and the impact of Open Data. The table below provides an overview of the Open Data Readiness indicators and the maximum scores that can be obtained per indicator. The maximum amount of points that can be obtained for each indicator depends on both the importance of the subject and the number of questions included. The entire scoring method with all 41 sub-indicators is shown in Annex I – .

#	Open Data Readiness Indicator	Number of questions	Maximum Score
1	**Presence of Open Data Policies**	**23**	**530**
1.1	(Open) Data Policy	15	330
1.2	Licensing Norms for PSI re-use	3	70
1.3	Extent of coordination at national level	5	130
2	**Use of Open Data**	**9**	**260**
3	**Impact of Open Data**	**9**	**300**
3.1	Political impact	3	120
3.2	Social impact	2	60
3.3	Economic impact	4	120
	Total	**41**	**1090**

Table 5 - Scoring of indicators Open Data Readiness

Whereas it was only possible to score 500 points on the first indicator in 2015, 30 additional points are added in 2016 in order to reflect updates to Open Data policies more precisely. Use of Open Data has also seen its maximum score increase by 60 points in order to add further granularity to the measurement.

The level of success of Open Data in a country starts with the presence of an Open Data policy. As this is the cornerstone of the **Open Data Readiness** indicator, countries can be allocated a maximum score of approximately half of the total maximum score for this indicator. Events are among the best ways to raise awareness around the existence of Open Data. Compared to 2015, three additional questions have been added that can be scored with a maximum of 30 points. These questions enable a deeper understanding of the promotion made of the re-use of Open Data. The number of events organised is assessed based on whether the countries are considered of small size (population < 9 million); average size (population between 9 and 35 million) or large size (population > 35 million).

Once the national coordination and licensing norms are in place, the second step in achieving Open Data Readiness is to measure the Use of Open Data, meaning to what extent data can easily be found at one central place and thereby efficiently re-used. Looking at portal statistics, the number of visitors gives a good indication of how successful a country is in its communication to stakeholders such as citizens and businesses. A country scores 80 points when the number of visitors on their portal per month is above 0.05% of the number of inhabitants the country has. This scoring method thus changed compared to the assessment in 2015. Such an approach mitigates any discrimination based on the size of the country. By adjusting this method all countries were given the opportunity to achieve the highest score regardless of their country size. Finally, the impact of the re-use of Open Data was measured

awarding countries a maximum score of 300 points. For many countries one of the main reasons to publish Open Data is economic gain. The more data is published, the more transparent processes become which can help identify potential bottlenecks and increase efficiency. Especially for the public sector this is a significant benefit of Open Data making the political impact of Open Data as important as the economic impact. Besides these two indicators, the social impact is also measured, however, although an increase could be observed in comparison to 2015, this indicator still appears to be more difficult to assess and therefore scored lower in comparison to the political and economic impact of Open Data.

Besides Open Data Readiness, also **Portal Maturity** is measured as part of the overall Open Data Maturity Assessment. This part comprised three additional sub-indicators with a maximum score of 250 points, as shown in the table below. For those countries that do not (yet) have a national Open Data portal, no maturity could be assessed resulting in 0 points.

#	Portal Maturity Indicator	Number of questions	Maximum Score
4	Usability of the portal	4	60
5	Re-usability of the portal	6	140
6	Spread of data across domains	3	50
	Total	13	250

Table 6 - Scoring of indicators Portal Maturity

The first sub-indicator is the usability of the portal and provides an important indication of how user-friendly a national portal is. Countries can score higher depending on how advanced the features on their respective portal are, such as the availability of a feedback mechanism on data sets and the possibility to contribute to data sets. The second sub-indicator assesses the re-usability of the portal by focusing on availability of machine-readable formats, the possibility to search on file formats and the possibility to request data sets. Where in 2015 the percentage of machine-readable formats was derived from the Open Data Monitor, in 2016 this information came directly from the countries themselves as the Open Data Monitor no longer is updated. Further information regarding metadata is directly derived from the European Data Portal. The third and last sub-indicator assesses to what extent data is spread across different data domains. A mature portal should therefore have multiple data sets spread over multiple domains coming from multiple public bodies. However, although portal maturity is important to assess, fewer points are obtained for this part of the assessment in comparison to the Open Data Readiness, as it is considered less important for the user friendliness of a portal.

In addition to the present report, country factsheets depicting the specific situation of each country are drafted. Country factsheets contain further information with regard to the impact, best practices and main barriers faced for further publication of data and its re-use. This report includes the insights regarding the maturity of Open Data, illustrated with concrete examples from the countries.

3. The current state of play

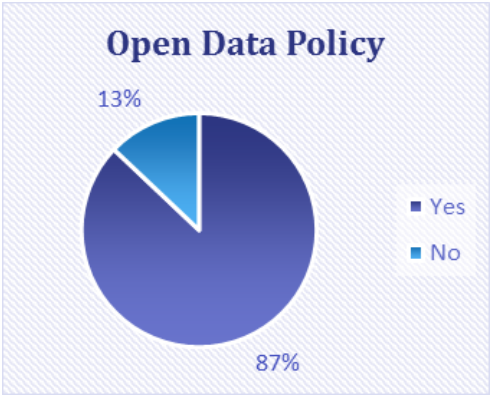
Maximizing the benefits of Open Data can be a challenge for countries, however the EU28+ countries have each found their own approach. This chapter investigates the current state of the countries with respect to Open Data Readiness and Portal Maturity. Detailed examples provide an illustration of the different approaches countries have undertaken to date.

3.1 Open Data Readiness

The first indicator that contributes to the Open Data Maturity, is Open Data Readiness. This indicator looks at basics needed to develop Open Data, for example the presence of Open Data policies. Another part of these basics are licensing norms, providing guidance in the legislation involved with Open Data. Both policies and legislation point to another indicator contributing to Open Data Readiness, namely the coordination of Open Data at national level. The current use of Open Data is also assessed. Lastly, the impact of Open Data is taken into account when looking at the Open Data Readiness. The chapter will conclude with an overview of the scores of Open Data Readiness in the EU28+ countries and a comparison between the scores of this year and last year.

3.1.1. Presence of Open Data policies

The indicator 'Presence of Open Data policies' focuses on the integration of national Open Data policies. In 2016, 81% of the investigated countries have a dedicated Open Data policy, which is a large increase compared to 69% last year. Where in 2015 nine countries did not have an Open Data policy, in 2016 this number has decreased to just five countries: Hungary, Liechtenstein, Lithuania, Malta and Portugal. The four countries that defined an Open Data policy between 2015 and 2016 are the Czech Republic, Denmark, Latvia, and Sweden. Czech Republic, Latvia and Sweden have a wider policy – typically a digital or eGovernment strategy – where Open Data is included; whereas Denmark, in addition to its existing policies, has decided to officially support the G8 Open Data Charter[14]. By having an Open Data policy more countries show their drive to move forward with Open Data, for example by providing resources for the development of Open Data. Compared to countries that include their Open Data policy into a broader digital strategy, some countries have a dedicated Open Data policy.



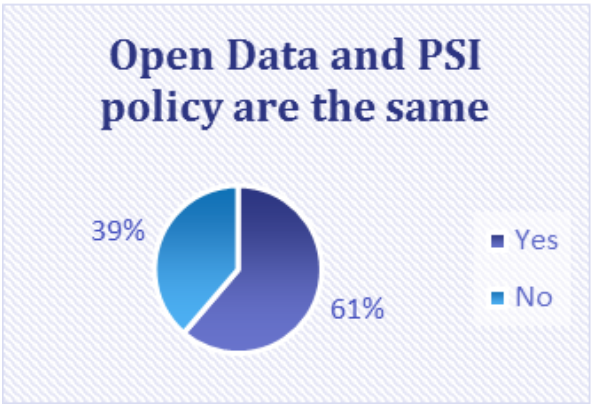
On the one hand, Austria's policy - named Framework for Open Government Data platforms - sets out a framework consisting of legal, technical and organisational requirements to be adhered to when providing public, non-personalised data. Other countries on the other hand have a dedicated chapter in a wider programme, related to digitisation or eGovernment for example. The Norwegian government published the new Digital Agenda for Norway, where data sharing is contained. The government plans to publish Government' guidelines for Open Data by the end of 2016.

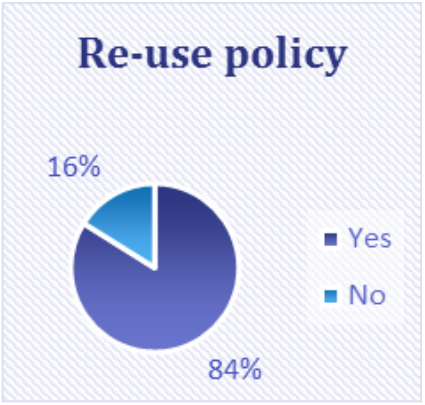
[14] A document containing five core Open Data principles, signed by the G8 leaders.

Data sharing is included in the Digital Agenda for Norway. The government plans to publish a dedicated Open Data policy by the end of 2016

Austria's Open Data policy sets out a framework consisting of legal, technical and organisational requirements when providing public, non-personalised data

For 61% or 19 out of 31 countries investigated, the Open Data policy is the same as the Public Sector Information policy. This Public Sector Information policy is mostly based on the transposition of the revised PSI Directive. This policy therefore mainly contains rules regarding availability, accessibility and transparency of Open Data. The remaining 39% of the countries have separate policies for Open Data and for Public Sector Information. These countries that have an Open Data policy that is not equal to the Public Sector Information policy define more stringent rules for Open Data, for example that the Open Data is entirely free of charge, is made available in a machine-readable format and under an open licence. Finland indicated that these three additional requirements are all listed in their Open Data policy. Their PSI policy, however, requires availability, usability, integrity and data protection for good information management practice. This clearly illustrates the difference between the two policies. A third type of policy that relates to Open Data, besides Open Data and Public Sector Information policies, is one that supports the re-use of Open Data. In 84% of the countries such policies are incorporated, which means that in many countries, national governments do not only support the publication of Open Data but also actively encourage actual re-use where the potential value of Open Data is augmented.





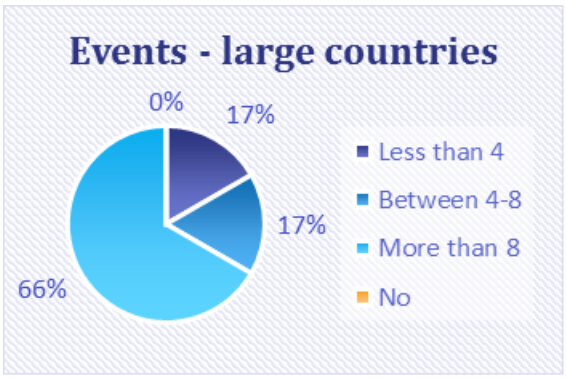
Organising events is a means for national Open Data teams to raise awareness about Open Data amongst citizens and organisations. The most popular type of event is a hackathon, where contestants are given one or multiple Open Data sets on a specific domain, or addressed a specific societal question. The aim of the event is to come up with an application based on the data, which is valuable for society e.g. improving living conditions in a given area, increasing access to education and training, etc. These events are approachable for a wide audience. The number of potential contestants differs largely, depending on the size of the country. This year the number of events is therefore assessed for large, medium and small sized countries separately. Hackathons have been organised for example in Germany through the #NRWhackathon, to develop educational applications, in Luxembourg with the "Game of Code", to develop applications in general and in Switzerland with an "Open Geneva" Hackathon, to develop applications for the health sector. Conferences are organised to increase the awareness of Open Data. Estonia for example organised a conference, Nordic Digital Day 2016, about

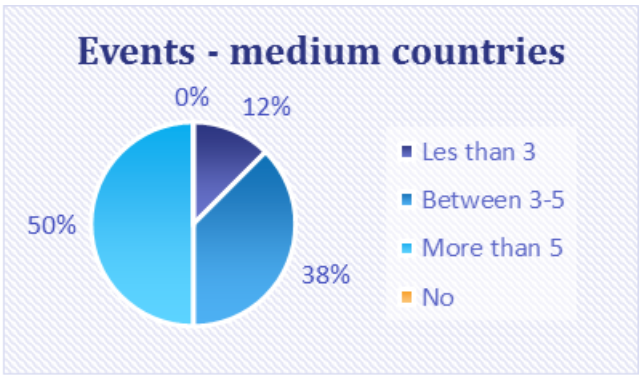
the opportunities and challenges that the emerging data society can bring. The event focused in particular on exploring how to materialise the benefits of Open Data.

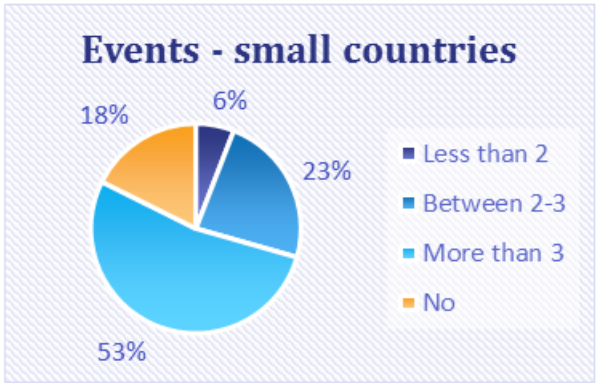
The Open Data Day, which is celebrated on the 5th of March, was the opportunity in 2016 for Romania to organise a whole week of events called the Open Government Week 2016. Several topics were debated, for example health and Open Data and the re-use of Open Data for smart cities. An overview of all events organised can be seen in the figure below.

Figure 7 - Activities during Open Government week in Romania

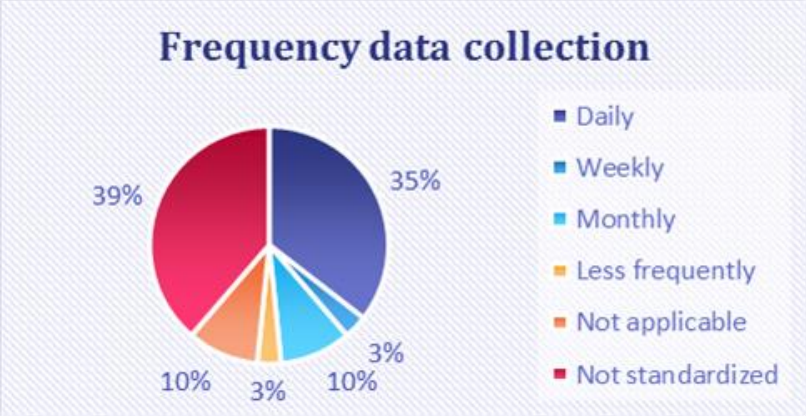
In 2015, four countries indicated they did not organise any events, whereas this year, in 2016, that number has decreased to three. Numerous events are organised throughout Europe. Larger countries organise more events, as they need to reach more people, in the absolute sense.







Having up to date data on the portal is as important as having high quality data. The frequency of data collection from relevant public sector data holders, if standardised, can be divided into four groups: daily, weekly, monthly and less frequently. 16 out of 31 countries investigated have a standardised approach to ensure data sets are up to date. 11 of these portals update the data daily, one country weekly, three countries monthly and one country less frequently than monthly.



For three countries, having a standardised approach is not applicable, as there is no Open Data portal present. The remaining twelve countries do not have a standardised approach to collect data from data holders. An example of a country with a standardised approach to ensure data sets are up to date is Greece. The law obliges data holders to update the data annually, resulting in having dedicated teams in the different public administrations that are responsible for this.

The second sub-indicator looks at the extent of coordination at the national level. Besides the national portal, the public bodies of the EU28+ countries have often created regional and/or local portals. In 71% of the countries, regional and/or local portals exist. Of course, the creation of sub-national portals can be driven by factors such as the size and the structure of the country itself. A small country may not have the need for regional or city portals to be developed for instance. Nonetheless, there are large differences between the countries whether these are integrated in the national portal or not. Again here, this can be explained by the differences in structure of the countries. Germany for example is a country with a federal political system meaning it has different regions and thus many regional portals. However, keeping track of all these initiatives is a challenge, since not all regional portals are included on the national portal. Austria has made the regions co-owner of the portal. The responsibility to have all regions included on the national portal is therefore shared. As a result, Austria has all regional portals integrated on the national portal. This example, also illustrated in the figure below, shows that it requires good coordination from the national portal to have all regional and/or local portals integrated, in turn integrating the national portal with the European Data Portal.

Some regions are too small in Ireland to have their own portal. Data produced in local authorities are available through the national portal

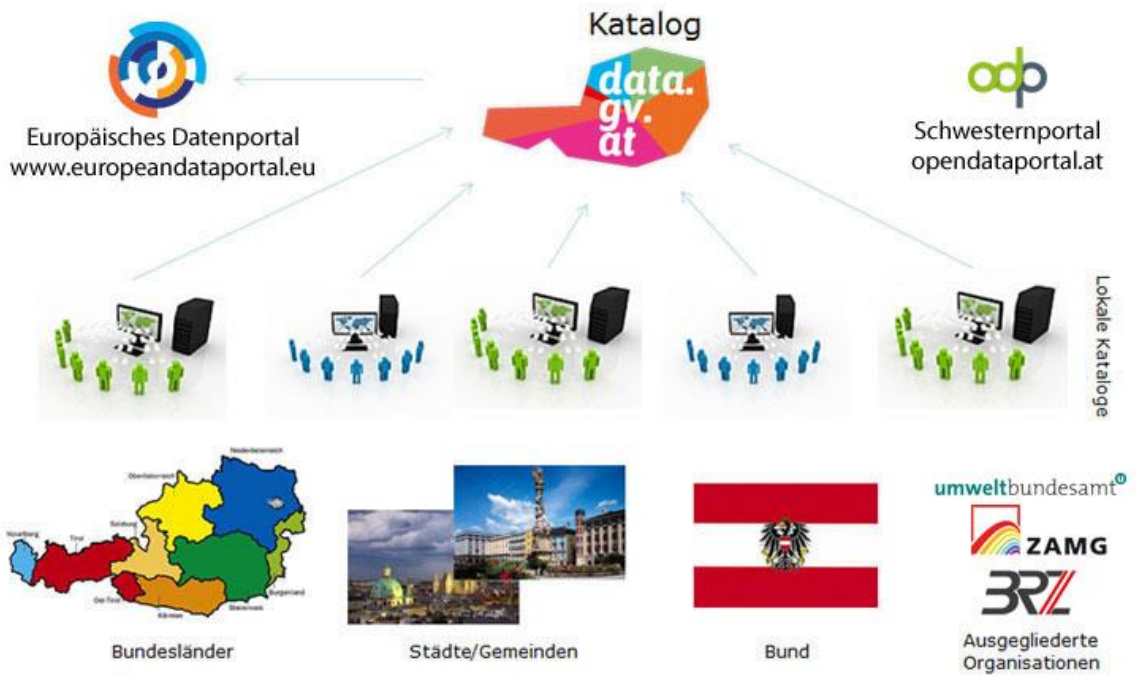
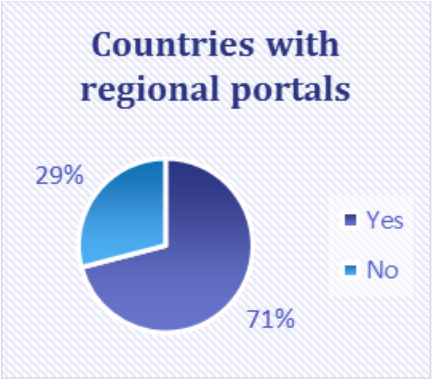
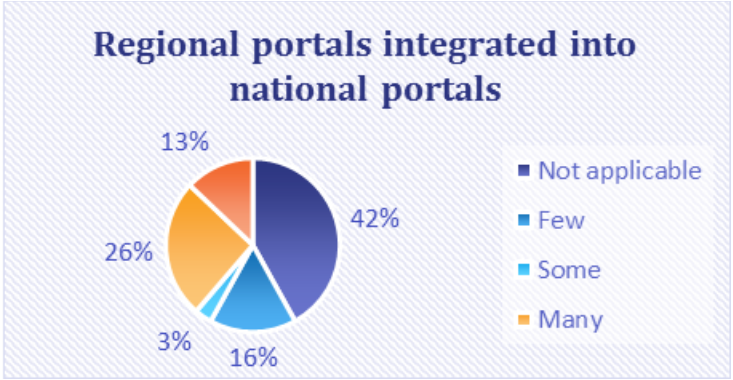


Figure 8 - Coordination Structure by www.data.gv.at[15]

The benefits of integrating regional portals into national portals are to increase the accessibility and visibility of data throughout the country. Despite these benefits, only 13% of the countries have included all their regional portals on their national portal. Ireland indicated only some of the regional portals are integrated, because the regions are too small to have their own portal. Hence, the data produced in local authorities is available through the central portal.





Besides the integration of regional portals, national guidelines can be defined to govern the publishing of Open Data. An example of national coordination is Italy where a metadata application profile has been developed based on the DCAT Application profile. The DCAT-AP_IT serves as a guideline for all public administrations across the country, regardless of the level of government to comply with when publishing Open Data. To support its implementation, the

Italian national coordination has led to a the creation of metadata profile based on the DCAT Application Profile.

[15] National portal Austria, 2016

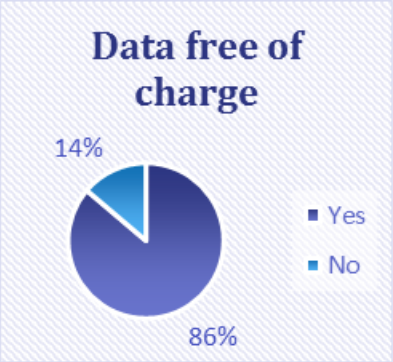
guidelines are undergoing a final public consultation during the autumn of 2016. Holding public consultations is also a means to drive ownership by giving different stakeholders an opportunity to share their expectations and influence the process at hand. A cost effective and efficient way to engage stakeholders is via webinars. The picture below illustrates the webinar the Italian portal team is hosting to present the guidelines mentioned above.

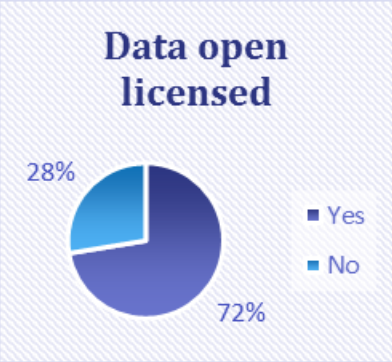
Figure 9 - dati.gov.it organises a Webinar

The third sub-indicator contributing to the Presence of Open Data policies is the use of licensing norms to enable the re-use of Open Data. Having a licence is essential for Open Data, as it contains the terms of use of the data. The government can determine the licence used when they provide national guidelines on the use of open licences. In 86% of the countries with an Open Data portal, policy encourages to use specific licences, whereas last year, in 2015, this proportion was 73%. This increase was expected due to the fact that more countries have an Open Data policy, indicating as well that the awareness of Open Data at the political level has increased. The Creative Common (CC) licence, for example CC0, CC 3.0, CC 4.0, CC-BY, CC-BY 4.0, has been mentioned most often as the standard licence. Although 78% of the countries have a standard licence, only 72% of the countries with a portal have all data on their portal openly licensed. Compared to last year this percentage has decreased, as in 2015 81% of the countries had all data open licensed. An explanation for this could be that countries focus more on quantity rather than quality of Open Data. In addition, some countries have a policy framework that does not necessarily require them to add a specific licence per data set. This is notably the case for Croatia, Hungary, Poland and Portugal. Moreover, of all countries with an Open Data portal, 86% indicated that all data on the national portal is free of charge. Slightly less data portals provide their data free of charge, as in 2015 the proportion was 89%. Three countries indicated their Open Data is not free of charge. Two of those countries, Denmark and Sweden, indicated that last year the data was free of charge whereas this year it is not the case anymore. Denmark explained they are not aware of data sets that are not free of charge, but cannot confirm all data sets are. Sweden gave a similar reason. This is mainly due to the fact that there is no automated process to keep track of the

amount of data sets that are free of charge. With the growth in data sets last year on their national portal, it would take too much time to manually check whether a fee is charged.

Based on the licences harvested by the European Data Portal, we noticed that the most popular licences out of 49 licences are OGL (Open Government Licence) 2.0, CC-BY, DL-DE-BY (Data Licence Germany) 2.0, FR-LO (French Licence Ouverte). Figures range from over 30,000 OGL 2.0 licences to just over 12 CC-BY-SA-20 licences. When looking at the most frequently used licences recorded on the European Data Portal, each country has its own national licence, which in the case of for example Germany is based on the CC-BY licence. This means that although there are global licences, countries feel the need to have their own specific licence. A particular example of this is Switzerland. The country does not have licences but works with terms of use. On the European Data Portal this specific type of licensing is not recognised and the Swiss data sets are shown on the European Data Portal as not licensed. Another issue with licensing is that the metadata does not always contain the right information about the licences. The pie charts below summarise the percentage of countries that have national guidelines, data free of charge and data open licensed.





In 2013, the PSI Directive, establishing a common legal framework for a European market for government-held data (in place since 2003), was revised. The revised Directive placed attention on the introduction of a marginal cost-oriented fee, increased transparency regarding calculation of fees, and reinforced support to the establishment of Open Data portals. Whereas the transposition deadline was July 2015, in September of 2015, only thirteen Member States had transposed – entirely or for the most part – the revised PSI Directive. This year this number has increased significantly to 25 countries; only Lithuania has yet to complete the transposition, but expects to finish it by the end of 2016. Belgium and Finland have only partly transposed the revised PSI Directive. Although it is not mandatory for the EFTA countries to complete the transposition, Liechtenstein and Norway are planning to finalise the transposition by spring 2017 and the end of 2016 respectively. Again, here we notice that from a legal perspective, PSI and thereby Open Data is being recognised more and more, thereby paving the way for further publishing of data.

96% of the EU Member States have transposed, partly or completely, the revised PSI Directive

Overview of Open Data policies

When analysing the aggregate scores for the three sub-indicators of the Presence of Open Data policies, in the EU28+, the presence of Open Data policies witnesses an overall level of 64%. The countries investigated score on average 342 out of 530 possible points. Compared to 2015, the score has increased by 7.6 percentage points, from 56.9% to 64.5%. Most of the countries have increased, although ten countries decreased.

The first sub-indicator on the integration of Open Data policies has increased from 59.2% in 2015 to 68.0% in 2016. Czech Republic increased the most, from 33.3% in 2015 to 87.9% in 2016 because various policies have been put in place to support Open Data. Portugal is one of the few countries that has decreased. This can be explained by the fact that Portugal is currently reviewing its current Open Data strategy. Portugal therefore temporarily has no long-term strategy in place while new priority domains are being identified.

The second sub-indicator measuring licensing norms has increased from 71.7% in 2015 to 76.0% in 2016. Luxembourg has increased the most of all countries on this sub-indicator. Their national portal has been launched this year (April 2016), where all data presented is free of charge and open licensed. Denmark, however, has decreased the score on this sub-indicator. As explained earlier, it is difficult to guarantee that all data on the Danish Open Data portal is open licensed and free of charge.

The third sub-indicator measuring national coordination has increased from 43.7% in 2015 to 49.6% in 2016. Greece has increased its score substantially, coming from one fourth of the points last year to almost the full score this year. In 2016, many Greek regions have their own regional portal, of which the majority is integrated in the national portal. At the local level in Italy, less Open Data initiatives are organised resulting in a slight decrease in their score on this sub-indicator.

As more and more countries define their Open Data policy – or in some cases such as Portugal are in the process of revising their policies – regions and cities are increasingly publishing data. This can be done directly via the national portal or via ad hoc regional or city portals. The challenge for the countries is to keep track of these initiatives, provide guidance where feasible and where necessary and progressively harvest their data on national portals. This leads to another challenge, namely to make sure that with an increase in the amount of data sets on the national portal, all data remains open licensed and free of charge.

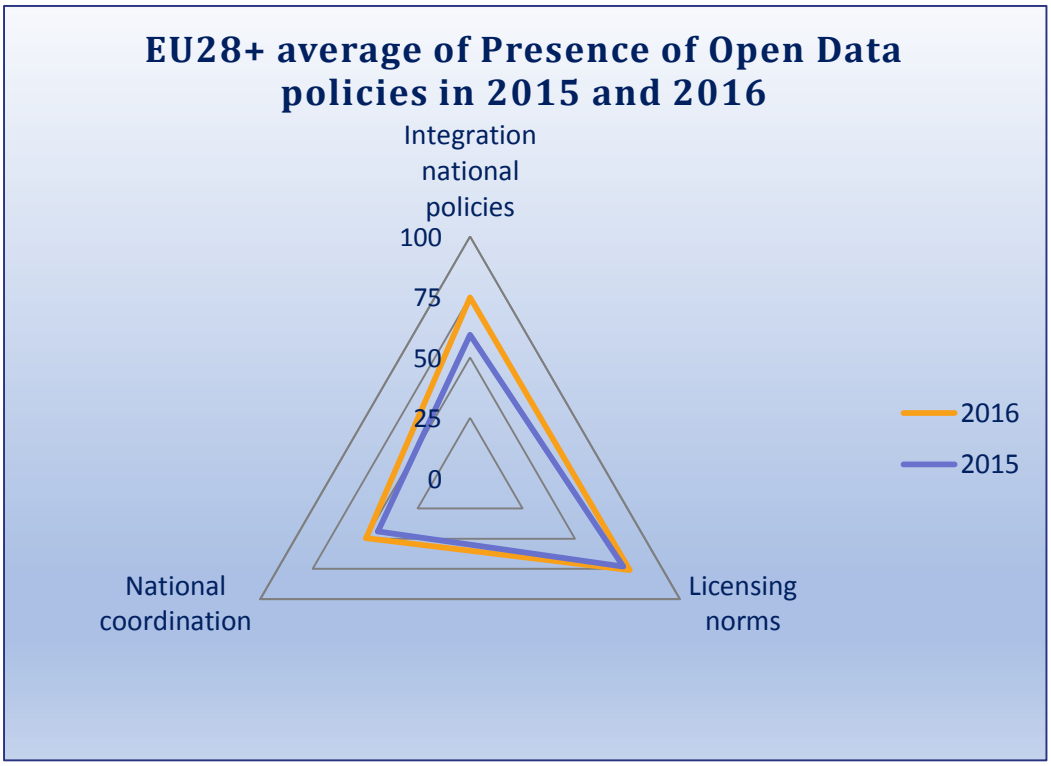
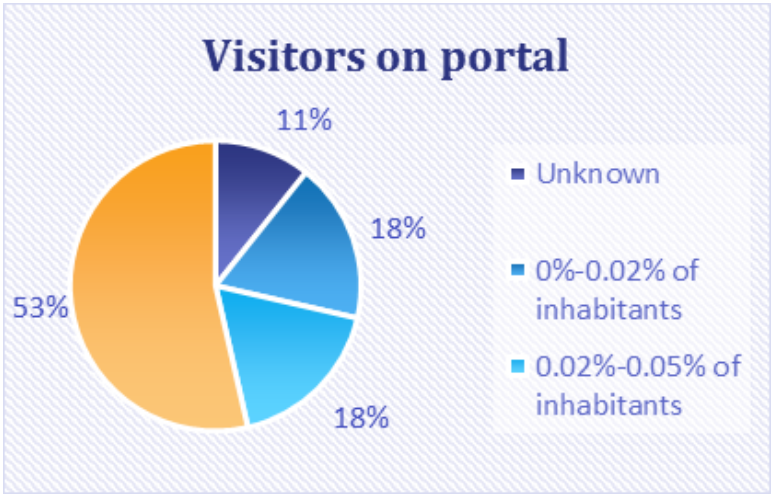


Figure 10 - EU 28+ average of Presence of Open Data policies in 2015 and 2016

Having one central place where all Open Data available in a country can be found stimulates the use of Open Data. Compared to last year, Luxembourg is the only country to have launched its national portal in 2016, leaving only Latvia, Liechtenstein and Malta to follow in developing their own data portals. However, these countries do have other websites where Open Data can be found. Latvia plans to launch its national portal mid-2017, while the city of Riga already has its own portal.[16] In Liechtenstein, the national administration publishes data on different portals. Malta has an INSPIRE data portal[17] already, providing geospatial data, and plans to launch an Open Data portal in the last quarter of 2016.



[16] National portal Latvia, 2016

[17] National portal Malta, 2016

Having a national portal is a first step in making sure that Open Data can be found. However, this does not necessarily mean that the data is easy to find or easy to download. It is therefore important to have a deeper understanding of who accesses the data portal and what they are doing on the portal. Before looking at the number of visitors, it is important to state what is exactly meant by a visitor. A visitor is someone that visits a website for the first time or if the visitor visits the page more than 30 minutes after his/her last page view.

This year the number of visitors is scored relative to the population size of each country. In 2015, 34% of the portals did not measure traffic on their websites. In 2016, only 11% of the portals do not measure the user statistics. 53% of the countries score the maximum points for having more than 0.05% of the inhabitants visiting their national portal on average per month. This illustrates growing awareness around Open Data. The countries with the largest percentage of visitors relative to their population size, can be seen in the figure below.

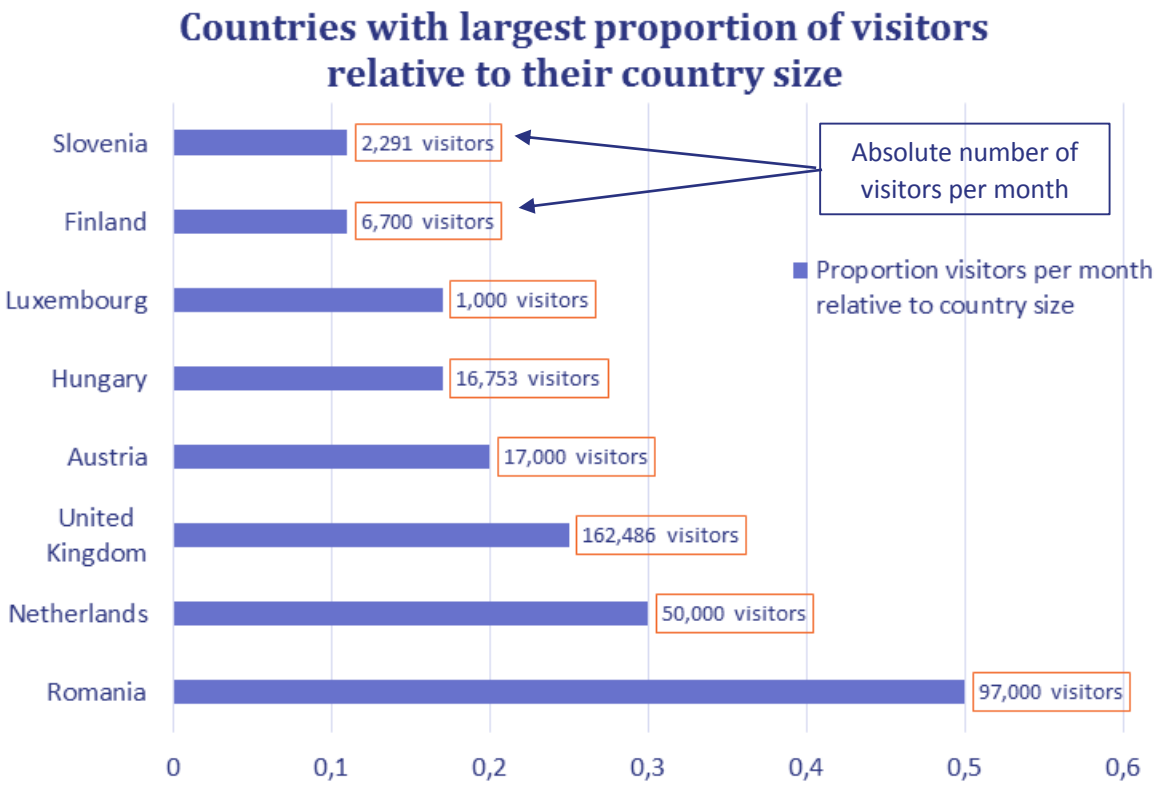
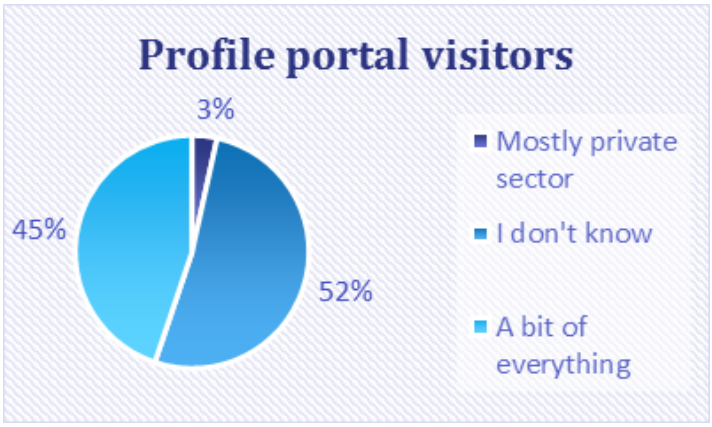


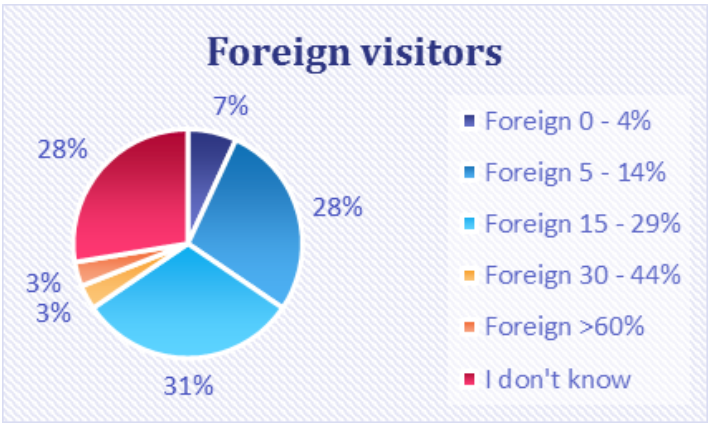
Figure 11 - EU28+ countries with largest proportion of visitors per month on portal relative to country size. Absolute numbers of visitors per month is also given

Despite growing visitor trends, countries do not collect much detailed information about their profile. Only 48% of the countries with a national Open Data portal have a basic overview of the typical profile of their visitors. This has increased a little compared to 44% of the portals in 2015.



This increase can be explained by the fact that more countries have an Open Data portal in 2016. The typical profile of the visitors of the portals is for all except Cyprus "A bit of everything". The typical profile of the visitors of the Cypriot national portal is "Mostly private sector". Portals that collect information about their visitors can adjust the content of their portal better to their audience.

Another interesting featured is the proportion of foreign visitors visiting a given country's portal.. National Open Data can also be interesting for other, most likely neighbouring, countries. 72% of the countries have information on the geographic origin of their visitors. 60% of the visitors of the Swiss portal are foreign. For all other countries that know their proportion of foreign visitors, the proportions vary from 1.5% to 30% with an the average of 16%. Having on average one sixth of the total number being foreign underlines the borderless nature of data. It equally underlines the fact that data publishers cannot presume who will be interested the most in their data



Lastly, it is interesting for countries to know how much traffic is generated via their portal API. Most of the countries do not distinguish between by machine-to-machine traffic and human visitors. For most of these countries, the percentage of machine-generated traffic is low, only 28% do know. However, there is one country, Austria, where the fraction is between 71% and 85%. As both uploading and downloading data by administrations is done through an API, this large proportion of machine-generated traffic could be a result of the structure of the Austrian portal; regional portals upload their data on the national portal.

On average, the countries score 128 out of 260 points on the use of Open Data. The scores range from zero to 230 points. Zero points are attributed to the countries that do not have an Open Data Portal.

Nonetheless, there are large discrepancies across the countries that do have a portal. The results per country can be seen in the figure below.

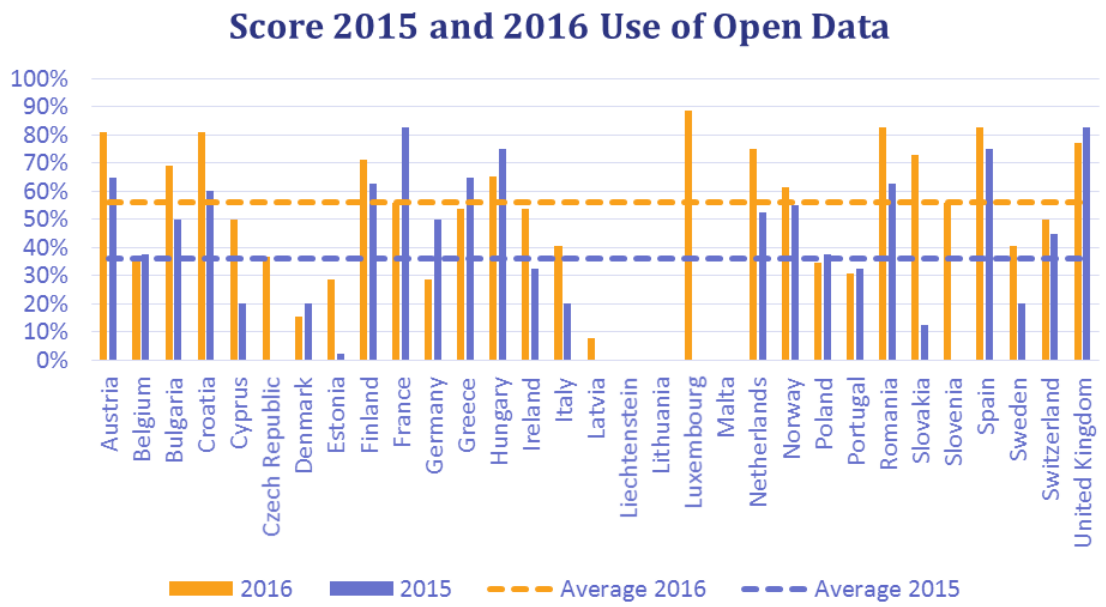


Figure 12 - Score Use of Open Data per country in 2015 and 2016, with averages 2015 and 2016

The figure above depicts the overall scores per country and equally provides the EU average scores for 2015 and 2016. Overall, the average score amongst the EU28+ countries has increased from 72 points in 2015 to 128 points in 2016. Most countries have increased as they have launched activities to promote their Open Data policies and portals, as well as developed additional means to monitor their users. Among the countries that have progressed the most, Luxembourg made the most progress on this indicator. This increase can be explained by the launch of their national Open Data portal in the spring of 2016. A few countries have decreased the score on Use of Open Data. This is partly due to the fact that, in 2016, the number of unique visitors was scored relative to the number of inhabitants of a given country. However, this adjustment in the calculation has favoured smaller countries and not proven too disadvantageous for larger countries.

Now that the framework conditions for success have been set into place, what is done with the data? What impact is Open Data expected to generate?

3.1.2. Impact of Open Data

Measuring the impact of Open Data is important because it provides a clear overview of where countries have planned to reap – or are reaping – the benefits of their Open Data policy. By measuring this impact on a yearly basis, it is possible to find out which countries are deepening their understanding of the impact of Open Data.

Some effects of the release of Open Data are visible, but an estimation of the impact created by the release of data remains a challenge to identify precisely. The main impacts recorded have been grouped into three categories: political, social and economic. The scores of 2015 were used as a baseline and updated based on the data collected in 2016. This approach was chosen because the impact is not necessarily measured by default on an annual basis. For example, several countries had

conducted studies in 2015 to measure the impact of Open Data on their respective societies, which has a continued effect and should therefore also be taken into consideration in the years to come.

To further enhance the measurement, an additional question was added in 2016 to investigate whether new activities were launched since June 2015. Ten out of 28[18] countries (36%) indicated such activities have indeed been launched since mid-2015. For example, in Slovakia, a monitoring report of the action plan of the Open Government Partnership Initiative[19] has been performed and approved providing results of management of Open Data in monitored areas. The picture below presents an overview of the average scores obtained at European level with regards to political, social and economic impacts of Open Data.

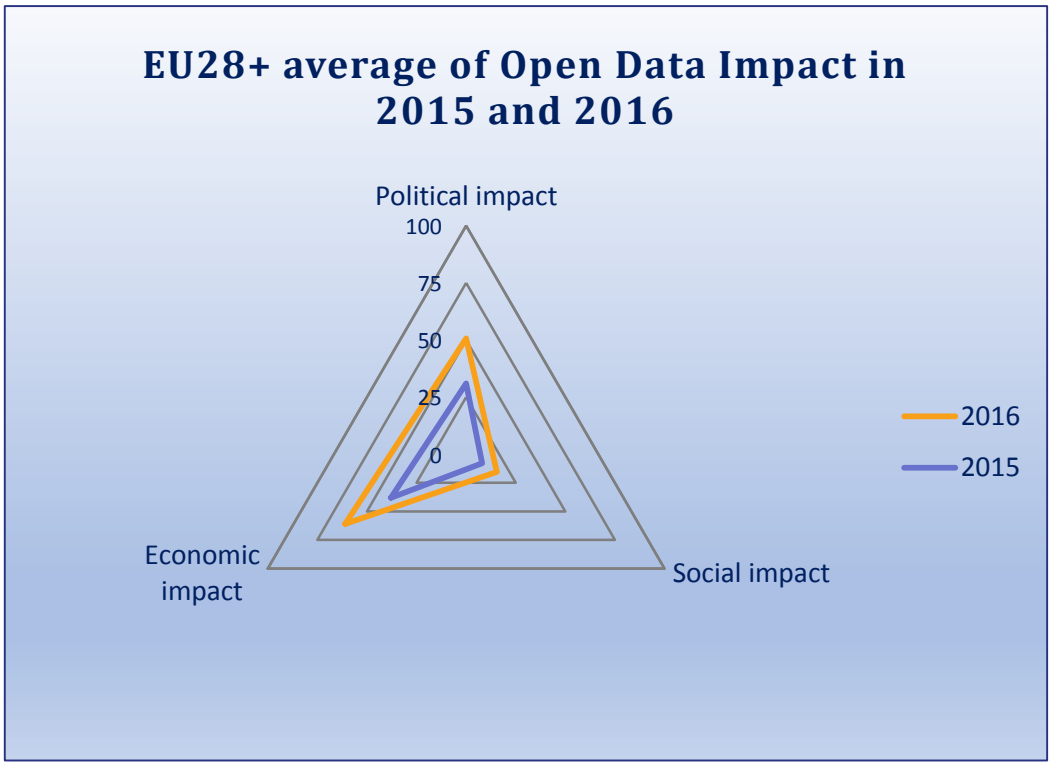


Figure 13 - EU28+ average of Impact of Open Data policies in 2015 and 2016

All three indicators witness a positive increase. In 2016, more countries were able to estimate the political, social and economic impact of Open Data on their societies with the social impact having increased the most in comparison to 2015. However, in absolute terms most countries see most benefits in the economic impact of Open Data that is demonstrated below.

Political (and efficiency) impact

Since June 2015, a total of ten EU countries (Austria, Bulgaria, Finland, France, Greece, Ireland, Italy, Slovakia, Spain and Sweden) have launched activities to monitor the political impact of Open Data. In Sweden, a Council was set up for Digitization of Sweden and serves as a forum for coordination between authorities at both national and local level[20]. Furthermore, the Swedish Cadastral and Map

[18] The scores assessing the impact of Open Data are based on 28 countries, excluding Latvia, Liechtenstein and Malta as they do not have a national Open Data portal.

[19] Open Government Partnership Initiative Slovakia, 2015

[20] Council for Digitization of Sweden, 2016

Agency (Lantmäteriet) has a mission to map the benefits and costs that occur in society due to their past and future investments in Open Data while the Swedish National Archives has to report measures taken in connection with their regulatory legal role regarding the PSI-lists.

In Austria, the business University of Vienna created a 'portalwatch' website[21] monitoring over 260 portals worldwide and the Open Data Institute Node Vienna has conducted a survey[22] to make Open Government Data: Use Cases and Stories visible in the German speaking DACHLI region[23]. While in France, the government asked "Open Data France" to publish a report on Open Data impact, expected to be published in the coming months. Furthermore, before the Digital Republic was examined in the French Parliament, an impact study had been conducted by the government to assess specific effects of the Open Data framework changes pushed by the law.

Figure 14 - Council for Digitization of Sweden - screenshot of website

Figure 15 - Screenshot of Austrian survey

In both 2015 and 2016, countries provided a broad variety of estimates concerning the impact of Open Data on increasing government efficiency and effectiveness. Where in 2015 four countries indicated this impact to be high (France, Greece, Lithuania and Slovakia), in 2016 this number has increased to seven (now also including Bulgaria, Ireland and the United Kingdom). In Bulgaria, government departments no longer require requesting data from other departments because a lot of data is now being published on the Open Data Portal thereby allowing public officials to use Open Data policy development, analysis and evaluation.

Development of Open Data in Bulgaria leads to increased administrative responsibility and accountability

Furthermore, the development of Open Data in Bulgaria leads to increased administrative responsibility and accountability, improved mechanisms for public information for reuse in an open format and therefore facilitates the use of public data by citizens and businesses. In Ireland, an increase in government efficiency could be measured thanks to myplan.ie, which has helped local authorities to coordinate the publication of planning information in a standardised and open fashion, increasing the efficiency

[21] Austrian Open Data Portal Watch, 2016
[22] Open Data Institute Node Vienna, 2016
[23] Germany, Austria, Switzerland and Liechtenstein

of planning data aggregation and management. For instance, in Ireland, the use of Open Data has helped foster collaborations, e.g. Flood risk management at the Office of Public Works (OPW)[24]. In addition, Ireland indicated that also a number of Ordnance Survey Ireland maps are now available for free and as Open Data. This will have a huge impact on potential use of national maps that currently had to be bought, both within and without the government.

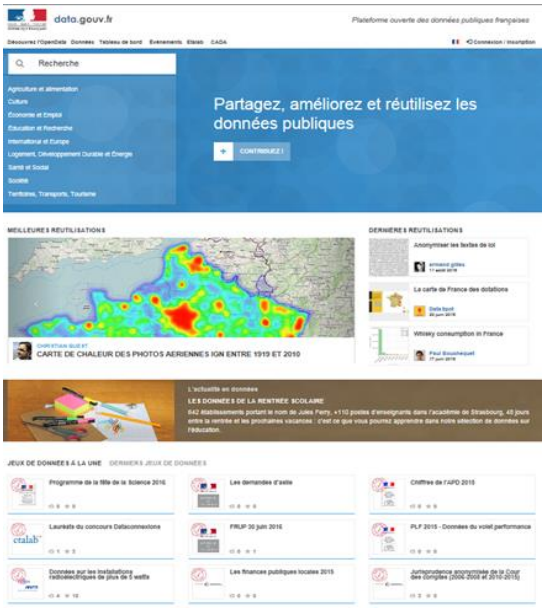


Figure 16 - Screenshot of Open Data France

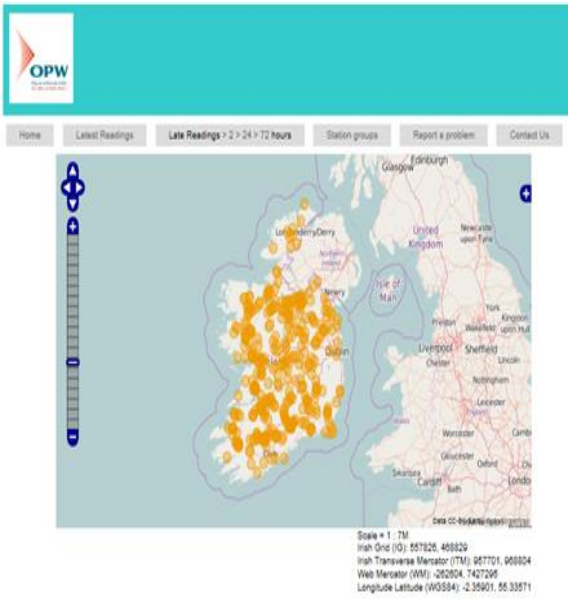


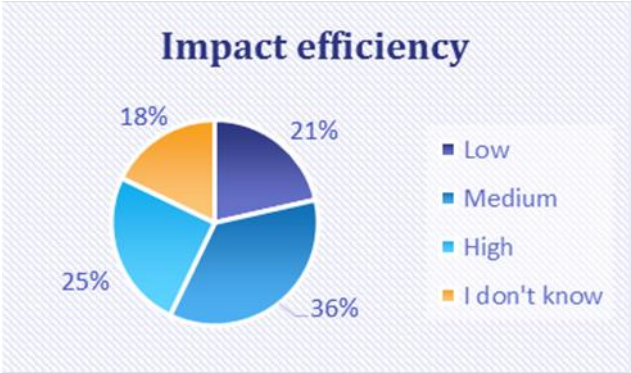
Figure 17 - Screenshot of Irish Realtime waterlevel website

In the United Kingdom, Open Data is driving efficiency and effectiveness across a wide range of government policy and service delivery. By improving its infrastructure and the quality of the data they hold and produce, they are able to offer better, more reliable Open Data both to users beyond government and for consumption within government. The United Kingdom is building open registers such as the country register[25], the first canonical source of core reference data that is reliable enough to build services on; and through Open Data has enhanced collaboration between central government departments to tackle crosscutting issues. For example, new data on destinations of young people in post-16 education has helped the departments for business and education to develop combined analysis to inform policy on improving young people's life chances.

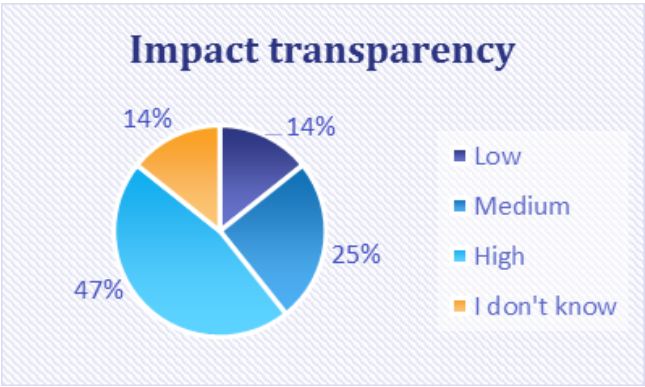
A further ten countries estimate this impact to be medium in 2016, in comparison to six countries in 2015. In Cyprus the opportunity to share data sets across departments via the Open Data Portal – thereby eliminating the need to communicate and formally ask for data sets – is estimated to have a medium impact on increasing government efficiency and effectiveness. The Netherlands mentioned that while in some areas such as traffic/public transport the impact is high, in other areas such as finance the impact is still medium, but growing. For example, Open Data on financing development aid spending makes it easier to access, use and understand effectiveness and efficiency by the Ministry of Foreign Affairs. Where in 2015, 21 countries estimated this impact to be low or not measurable, in

[24] OPW, 2016
[25] UK country register, 2016

2016 this had positively decreased to only 14 countries, showing countries are progressively understanding the benefits of Open Data and taking advantage of them.



In 2016, the impact on increasing transparency and accountability is estimated to be high by 13 countries[26] of the EU28+; an increase of five countries compared to 2015. The Slovenian Supervizor[27] application, for example is an online application that provides information to users on business transactions of public sector bodies. From 2003 to 2014, the application has grown to witness over 50 million transactions from both government and local agencies with government contractors. For example, the application maps transactions to company records from the Business Register including director lists and corporate leadership. The application is run by the Commission for the Prevention of Corruption. It won the UN Public Service Award in 2013, an important recognition of excellence in public service. The data on transactions has been provided by the Public Payments Authority and is also published at the Slovenian National Open Data portal. Open Data equally has a high impact on transparency and accountability in Finland. Finland is among the leading countries in opening up government data[28] and by its Open Government Partnership[29], which was created to fight corruption and ensure that citizens and civic organisations have the opportunity to participate in a developing society. With seven countries estimating the impact to be medium, only 11 countries estimated the impact to be low or are not able to measure it. In comparison to 2015 when 17 countries estimated the impact to be low or could not measure it, this can be considered a clear improvement in assessing the impact of Open Data on increasing transparency and accountability in a country. However, it has to be noted that in some countries such as in Denmark transparency and accountability is already considered as high without Open Data and therefore the impact is considered low even though the impact could be considered high in absolute terms.



[26] Bulgaria, Cyprus, Finland, France, Greece, Hungary, Ireland, Lithuania, Poland, Slovakia, Slovenia, Spain and the United Kingdom

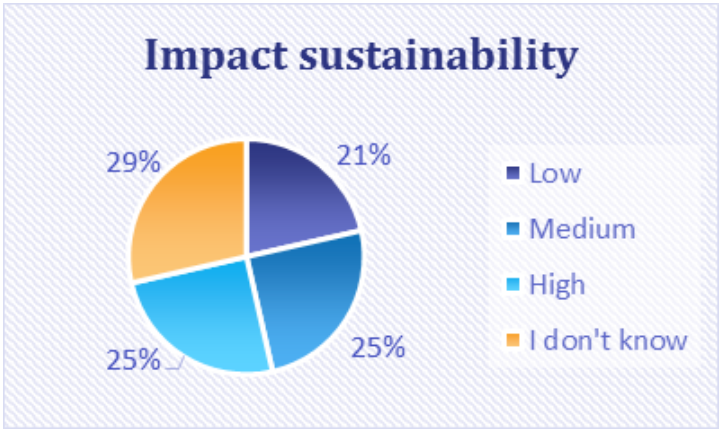
[27] Slovenian Supervizor, 2016

[28] Global Open Data Index, 2016

[29] Open Government Partnership Finland, 2016

Social impact

The social impact is measured by looking at aspects such as environmental sustainability and inclusion of marginalised groups in policymaking and accessing governmental services. Inclusion of marginalised groups describes the process by which individuals or entire communities of people that were excluded from politics, social services or various rights, opportunities and resources previously, are now able to participate in society. The social impact of Open Data has considerably increased in 2016, compared to 2015. In 2015, only Slovakia indicated having enough evidence on the usefulness of Open Data influencing environmental sustainability for instance, by having 233 environmental data sets and third parties integrating the available Ozone data in seven different applications. In 2015, only five countries indicated that Open Data had a medium impact on this indicator with the rest of the countries indicating that the impact was low or that this information was not yet available. In 2016, however, seven countries indicate that Open Data has a high impact on this indicator, namely Bulgaria, France, Greece, Ireland, Slovakia, Spain and the United Kingdom.



In Ireland, for example, the impact of Open Data on environmental sustainability is estimated to be high thanks to Geospatial and environmental public bodies being very active in publishing data in Ireland, including the Ordinance Survey Ireland, the Marine Institute, the Environmental Protection Agency, and Geological Survey Ireland. Specific examples are given on publishing mapping, water quality, air quality and waste information. Based on this Open Data are applications such as the EPA's bathing water quality website[30] and the Marine Institute's Marine Atlas[31].

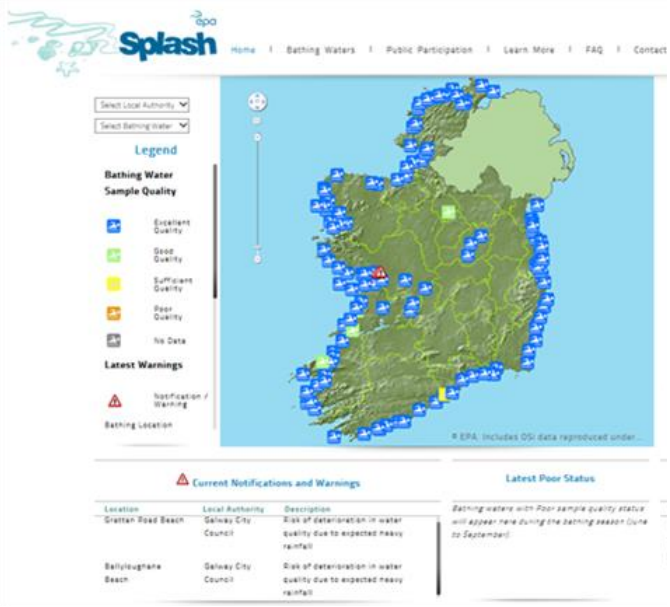
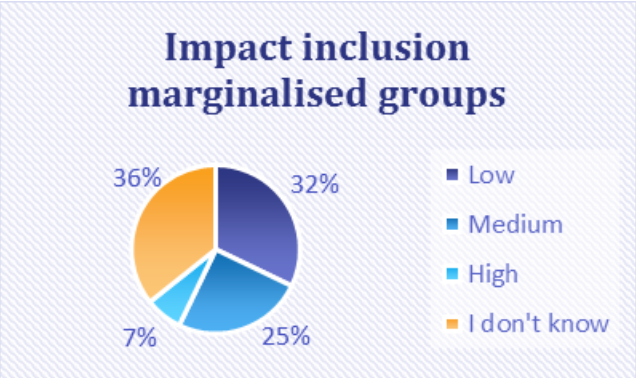


Figure 18 - Screenshot of Splash – Ireland's national bathing water quality website

[30] Splash, 2016
[31] Ireland's Marine Atlas, 2016

In 2016, Austria, Cyprus, Lithuania, Norway, Poland, Romania and Slovenia indicate that Open Data has a medium impact on environmental sustainability. Still, more than half of the countries indicate that the impact is low or that this information is not yet available. Reasons for not being able to measure this impact are mainly related to countries not having specific policies in place to measure this impact or because it is simply too early to launch an evaluation.



The impact of Open Data on the inclusion of marginalised groups has increased in comparison to last year. Where in 2015 no countries indicated the impact to be high and only Bulgaria, Finland and France indicated Open Data had a medium impact on this indicator, the rest of the countries either did not know or estimated this impact to be low. In 2016, however, two countries have indicated that Open Data has a high impact on increasing the inclusion of marginalised groups, namely Spain and the United Kingdom. In Spain, a search engine was developed, called Sin Barrera[32] that provides data on accessible spaces that indicate the accessibility level of parking spaces and architectural barriers such as trees having raised the cobblestones in a street making it difficult for a wheelchair or disabled person to navigate. In the United Kingdom, in February 2016 the government committed to publishing pay ratios in the Civil Service[33] for the first time. This was preceded by an announcement by David Cameron on 31 January 2016 that English universities will be instructed to disclose the proportion of ethnic minority applicants obtaining places as part of a drive against discrimination.

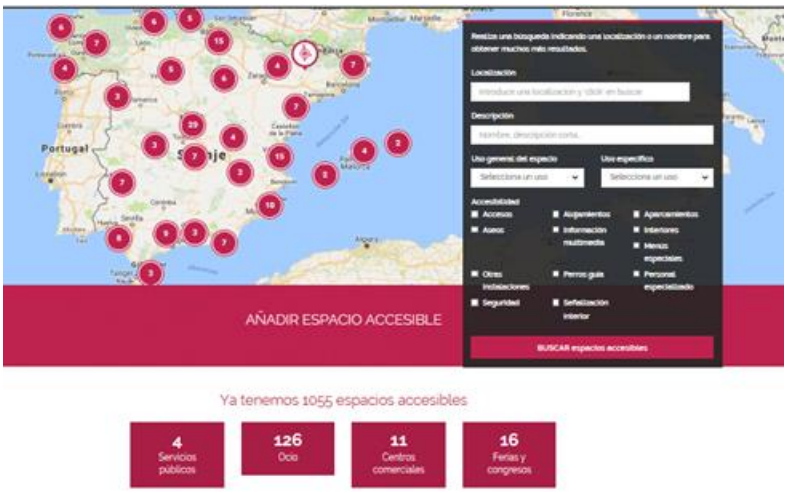


Figure 19 - Screenshot of Sin Barrera

In 2016, in addition to Bulgaria, Finland and France, also Cyprus, Greece, Poland and Romania estimate the impact of Open Data on the inclusion of marginalised groups to be medium. Since 2014, Greek law states that the implementation of Open Data policies has to contribute to the inclusion of marginalised

[32] Sin Barrera, 2016

[33] Addressing inequality in the public sector and beyond: Matt Hancock speech, 2016

groups. Furthermore, the transparency portal of the Greek Ministry of Interior and Administrative Reconstruction[34] has been re-designed to facilitate access of disabled citizens. The impact in Poland on this issue is estimated to be medium thanks to the publishing of relevant data on job opportunities, health services and social assistance. The impact in Romania is medium due to the recent launch of the anti-poverty package by the Romanian government [35], which is based on data that is largely available as Open Data. France gave as example the release of data by the Red Cross on data.gouv.fr, which makes it easier for app-builders to integrate that information when designing applicationsfor people in need. The remaining countries estimate this impact either to be low or not possible to measure at this stage.

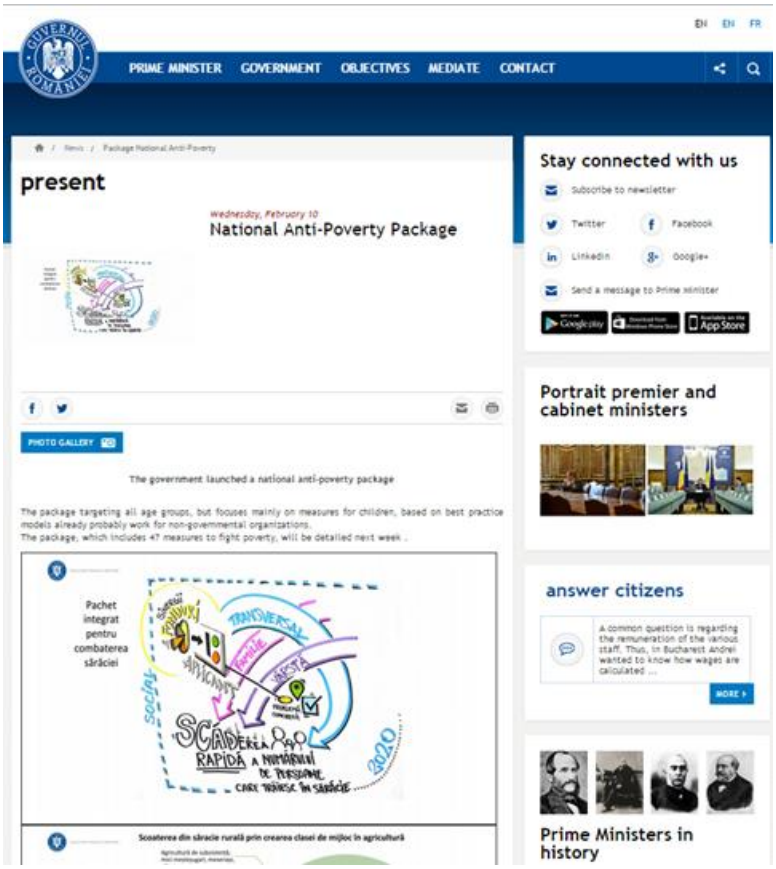


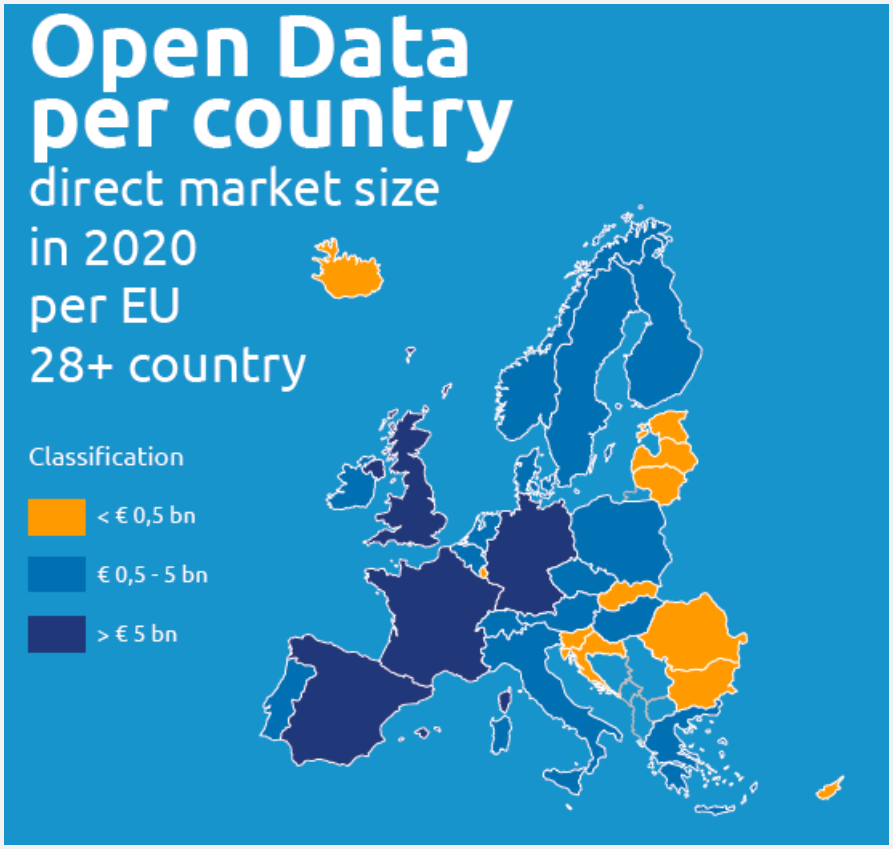
Figure 20 - Website of Romania anti-poverty package

Economic impact

One of the key policy drivers for many governments has been to use Open Data to fuel economic growth and to drive business innovation. Also the World Bank concluded in its 2014 report called Open Data for Economic Growth[36] that the economic potential of Open Data is in fact very large. The economic impact of Open Data can be measured by an increased market size, job creation, cost saving and efficiency gains. The study 'Creating value through Open Data: Study on the impact of Re-use of Public Data Resources'[37] details the expected economic gains of Open Data as well as a series of recommendations to help governments keep track of the direct and indirect benefits of their policies.

[34] Greek Ministry of Interior and Administrative Reconstruction, 2016
[35] Romanian Government, Anti-poverty package, 2016
[36] World Bank, 2014, Open Data for Economic Growth
[37] European Union, 2015, Creating Value through Open Data

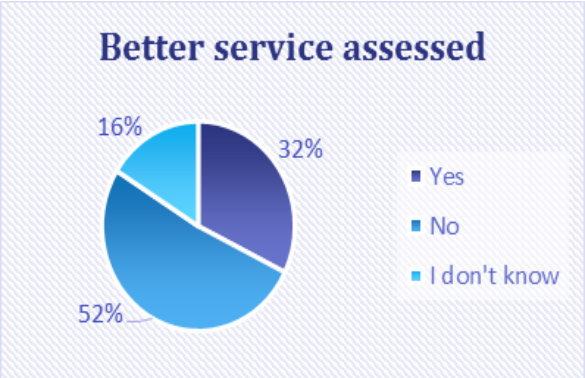
A distinction can be made between the direct market size and the indirect market size. Together they form the total market size for Open Data. For 2016, the direct market size of Open Data is expected to be 55.3 bn EUR for the EU 28+. Between 2016 and 2020, the market size is expected to increase by 36.9%, to a value of 75.7 bn EUR in 2020. The total market value of Open Data is estimated between 193 bn EUR and 209 bn EUR for 2016 with an estimated projection of 265- 286 bn EUR for 2020, including inflation corrections. For the period 2016-2020, the cumulative direct market size is estimated at 325 bn EUR. The cumulative total market size for Open Data is forecasted to be between 1,138 and 1,229 bn EUR.

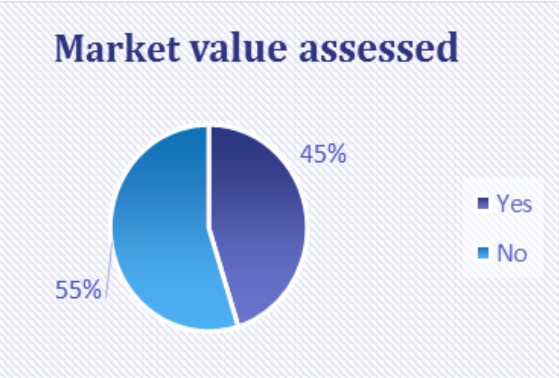


Direct market size of Open Data per country[38]

In 2015, twelve countries mentioned that macro-economic studies had been published in their country assessing the market value of Open Data. These countries were Austria, Denmark, Finland, Germany, Greece, Hungary, Netherlands, Norway, Poland, Spain, Switzerland and the United Kingdom. For most of these countries, these studies were conducted to assess the potential benefit before initiating an Open Data programme.

[38] Ibid





The studies resulted in a series of qualitative assessments of the benefits of Open Data, underlining high-level economic benefits. Some countries such as Norway, mentioned the assessment of service delivery of the government, in the 'Value of free map and property data'[39] or studies on the general impact of Open Data, such as in Finland[40]. Other economic studies such as the one conducted by the UK[41] conducted in 2015 showed that Open Data creates 0.5% more GDP compared to paid data. Switzerland conducted a study in 2015 assessing the economic impact of Open Government Data (OGD) in Switzerland and investigating the impact of OGD on the Swiss federal budget.

Open Government Data in Germany generates an economic value added of 43.1 billion EUR per year and creates 20,000 jobs

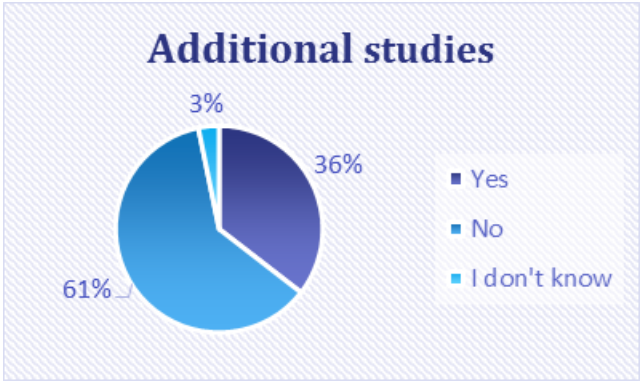
In 2016, Slovakia published two new studies and Germany published one new study. In January 2016, the Slovakian Office of the Government published a "Strategy of accessibility and use of Open Data of public administration[42]" (currently pending approval by the government), which describes in detail the strategy of Open Data management (creation, publication, access, use, licensing, evaluation of quality, prioritisation, and so on). Part of this strategy assesses the economic impact of Open Data. The other study that has been published is the Monitoring Report to the Action Plan of the Open Government Partnership Initiative[43]. In Germany, the Konrad Adenauer Stiftung published a study on Open Data: The Benefits in April 2016[44], showing that Open Government Data in Germany generates an economic value added of 43.1 billion EUR per year and creates 20,000 jobs.

In addition to studies conducted directly by the public administration, a number of publications have also been published by think tanks or civil society. Furthermore, 11 countries indicated that additional studies have been conducted to assess the impact of Open Data in their country such as the Bulgarian Institute of Public Administration that investigated research initiatives related to Open Data[45].

[39] Value of free map and property data Norway, 2016
[40] Ministry of Finance Finland, 2015, From opening up government data to its impact assessment
[41] The Open Data Institute, 2016, Research: The economic value of open versus paid data
[42] Slovakian Office of the Government, 2016, Strategy of accessibility and use of Open Data of public administration
[43] Slovakian Office of the Government, 2016, Monitoring Report to the Action Plan of Open Government Partnership Initiative
[44] Konrad Adenauer Stiftung, 2016, Open Data: The Benefits
[45] Study published by Bulgarian Institute of Public Administration on Open Data, 2015

Some countries have indicated they are aware of studies being conducted to assess better service delivery for users of public services. Although only Bulgaria, Finland, France, Lithuania, Poland and Spain indicated this was the case in 2015, in 2016 also Estonia, Ireland and Norway are aware of these studies. In Ireland, a Public Service Reform Plan[46] and associate progress reports & ICT Strategy[47] has been published in order to deliver better outcomes and efficiency through innovation and excellence in IT. In Norway, however, as part of the Digital Agenda, the Government plans to establish a common framework for Information Management and a data catalogue to access the data. In a study published in 2015[48] undertaken by Det Norske Veritas, Open Data is expected to lead to savings of 30 billion NOK over a 15-year period. This is not just data that can be openly shared but also data that can be shared within the public sector but not externally to all. In Lithuania a study on Open data[49] had been conducted in 2015 and in Spain a study had been conducted focusing on a cost benefit analysis of reuse of meteorological information in the electricity industry[50].

Figure 21 - Norwegian study by Det Norske Veritas



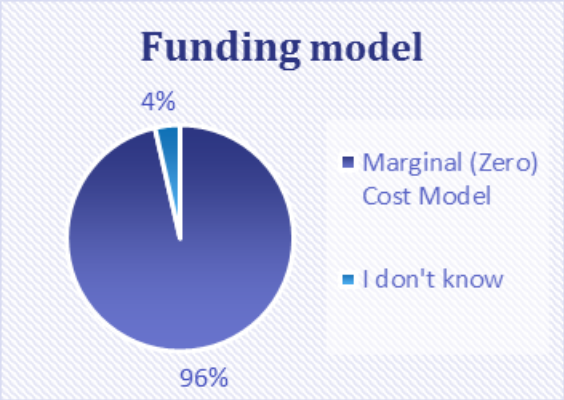
Furthermore, several studies are currently being conducted and or finalised. In Italy, a joint project between the Govlab[51] and the international research institute Fondazione Bruno Kessler[52] – Open Data 200 Italy[53] - designed and implemented to "conduct the first comprehensive, internationally comparable study of Italian companies that are using Open Data to generate business, develop products and services, and create social value". In Spain, the "Study of the Infomediary Sector: edition 2016" will soon be published. In Sweden a study of the re-use of Open Data and requirements from re-users is ongoing which will be published by Vinnova in September 2016.

Generally, one can conclude that EU countries are making important efforts to conduct and analyse the economic impact of Open Data on their respective societies. Studies are being conducted throughout Europe, although the smaller countries seem to lag behind in documenting the economic benefits of Open Data.

[46] Irish Annual Progress Report on the Public Service Reform Plan 2014-2016, 2016
[47] Irish Department of Public Expenditure and Reform, 2015, Public Service and ICT Strategy
[48] Det Norske Veritas, 2015. Gevinstpotensialet i et felles konsept for informasjonsforvaltning i offentlig sektor
[49] Lithuania, 2015, Study on Open Data
[50] Spain, 2015, cost benefit analysis of reuse of meteorological information in the electricity industry
[51] The Govlab, 2016
[52] Fondazione Bruno Kessler, 2016
[53] Open Data 200 Italy, 2016

When asked which funding model countries were using, a vast majority answered this question unanimously stating they are all using the marginal (zero) cost model. For Latvia and Liechtenstein this question is generally not applicable, since they do not have a national Open Data Portal. This is a significant increase in comparison to last year when 18 countries stated they are using this funding model; the other 13 countries either did not know which model they were using, did not answer the question or the question was not applicable to their country yet. This question is important in measuring the economic impact of Open Data, because the costs associated with opening up PSI are often cause for discussion, as many data sets that could be open and made freely accessible are currently charged for.

96% of the EU Member States have implemented the marginal (zero) cost funding model



Overview of impact indicators

Although also this year, it appeared to be difficult for some countries to assess the estimated impact of Open Data in their country, a clear increase of the political, social and economic impact of Open Data is witnessed. For some countries the impact cannot be measured as their respective Open Data portal had only recently been launched making it impossible to estimate the impact Open Data has in their country - as is the case in Luxembourg – or because no tools are available to measure this impact. When comparing the maximum points with points scored by the country, the impact of Open Data has not yet reached its full potential. However, compared to last year, the impact has increased significantly. On average, when looking at all 31 countries, 127 out of 300 points are scored in 2016 compared to 88 out of 300 in 2015. The scores differ largely between countries; scores range from zero to 280 points; from Latvia, Liechtenstein and Malta receiving 0 points since they do not have a national Open Data portal to Spain receiving 280 points. However, when looking only at the countries that have a national Open Data portal, the increase is more evident to picture. In 2015, on average countries scored a total of 98 out of 300 points compared to 141 out of 300 points in 2016. In this comparison, scores range from 30 to 280 points; from Croatia and Luxembourg receiving 30 points to Spain receiving 280 points. This shows that Portal Maturity is not just linked to more countries having a portal but countries developing more systematic impact assessments and evaluation studies of the benefits of Open Data.

The impact of Open Data increased the most on the social level, with an average increase of 17.7 percentage points from 8.1% in 2015 to 25.8% in 2016 (based on 31 countries). This can mainly be attributed to the fact that more countries are able to estimate the impact. The launch of more activities to monitor these impacts such as hackathons with stakeholders, studies and the creation of special

working groups on Open Data increases the understanding of impact Open Data can have. The increase in the impact of Open Data on environmental sustainability and inclusion of marginalised groups in policymaking and accessing government services underlines how Open Data can equally lead to unquantifiable benefits.

The second biggest increase in the impact of Open Data appears at the economic level. It has increased from 38.4% in 2015 to 50.8% in 2016. This means that although the economic impact has increased less substantially than the social impact, the economic impact indicator is the only indicator to have reached above 50%; a threshold not reached in 2015. A reason for this increase could be that more countries understand the economic benefits of Open Data, thereby paving the way for more and higher quality releases of Open Data. This is illustrated by the fact that the two countries that were able to score the maximum of 120 points this year are Slovakia and Spain. While Spain increased from 90 points in 2015 to 120 points in 2016, Slovakia increased from 50 points in 2015 to 120 points in 2016. Finland, Norway and Poland scored 100 points each but only Norway showed an increase in performance in comparison to last year; going from 40 to 100 points. Finland and Poland remained the same as last year.

Finally, the political and efficiency impact of Open Data has increased from 31.2% in 2015 to 42.2% in 2016. This underlines the overall trend witnessed across all countries that the impact of Open Data is becoming more tangible. New in 2016, the efficiency gains and ease of access of data are now clearly underlined, going beyond transparency and accountability discussions seen in the early stages of Open Data. Finally, countries that are members of the Open Government Partnership (OGP) have been asked to detail their achievements and further explore the impacts of Open Data. Thus, OGP has acted as a catalyser in driving further understanding, at country level, of the impact of Open Data. The differences between this year's results and last year's results are provided in the figure below.

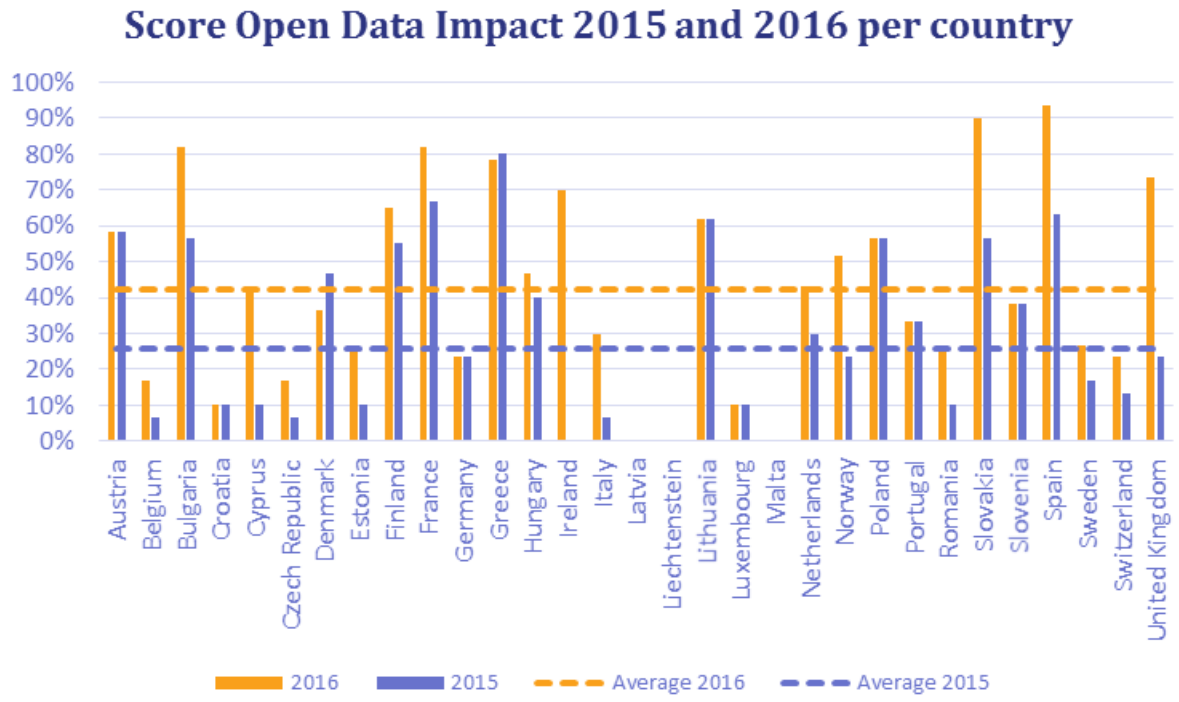


Figure 21 - Score Open Data Impact per country in 2015 and 2016, with averages 2015 and 2016

3.1.3. Overview of Open Data Readiness

After thorough examination of all indicators contributing to Open Data readiness, a general overview of the readiness of the EU28+ can be outlined. Compared to 2015, it has become clear that on average, EU28+ countries have increased their performance in all three categories, namely the Presence of Open Data policy, the Use of Open Data and the Impact of Open Data. On average, the EU28+ countries scored 597 points out of a maximum of 1090; an increase of 10.3 percentage points compared to last year, 44.5% in 2015 compared to 54.8% in 2016. The scores range from 0 (Liechtenstein) to 1005 (Spain), followed by 920 (France) and 870 (Ireland). The figure below provides a general overview of Open Data Readiness between the 28+ countries between 2016 and 2015.

Given the significant difference in allocated points, again in 2016, the EU28+ countries are not evenly ready for Open Data. However, with more countries having developed an Open Data policy, the framework conditions for the success of Open Data are spreading throughout Europe. While still a few countries do not yet have an Open Data portal, others are already more advanced and publish more and more data in open formats and free of charge. Considerable progress is recorded, namely from countries that are at the beginning of their Open Data journey or consolidating their first achievements.

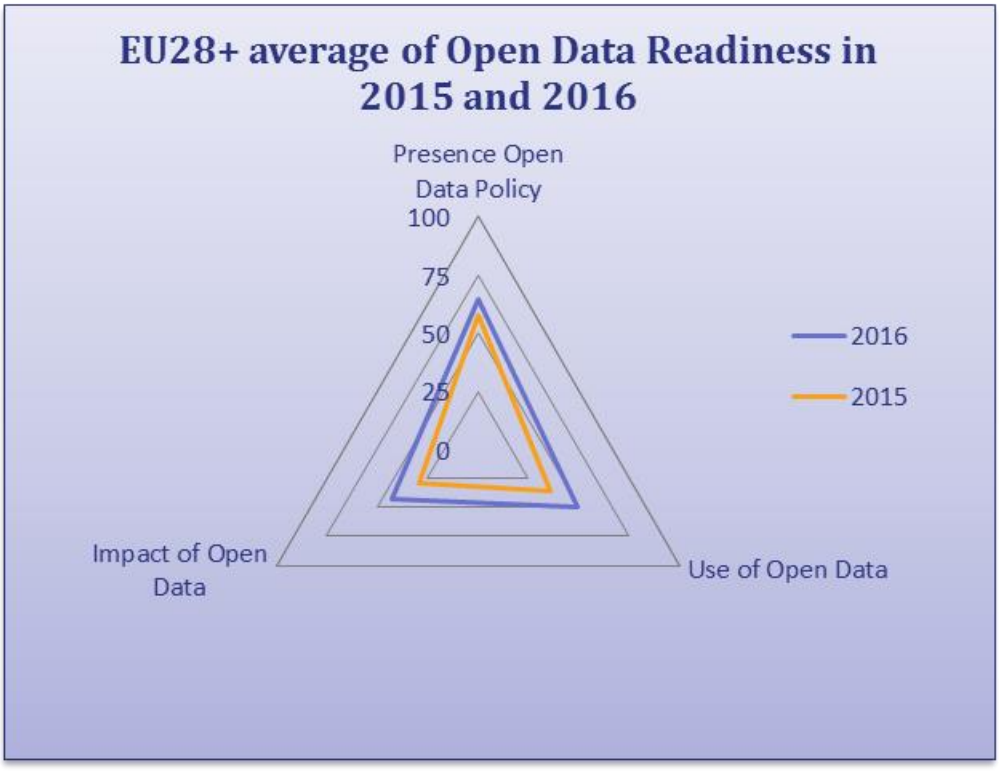


Figure 22 - EU28+ average of Open Data Readiness in 2015 and 2016

The figure below shows the comparison between 2015 and 2016 scores per country regarding the Open Data Readiness indicator. The vast majority of countries increased their Open Data Readiness, with most significant increases measured in comparison to 2015 in Ireland (37.3 percentage points increase) followed by the Czech Republic (31.1 percentage points increase), Luxembourg (29.2 percentage points increase), Slovakia (28.7 percentage points increase) and Slovenia (23.3 percentage points increase). A decrease in Open Data Readiness in comparison to 2015 is measured in only five countries, namely Portugal (11.6 percentage points decrease), Denmark (10.6 percentage points

decrease), Hungary (9 percentage points decrease), Poland (3.6 percentage points decrease) and Germany (3.5 percentage points decrease). A detailed explanation is given below.

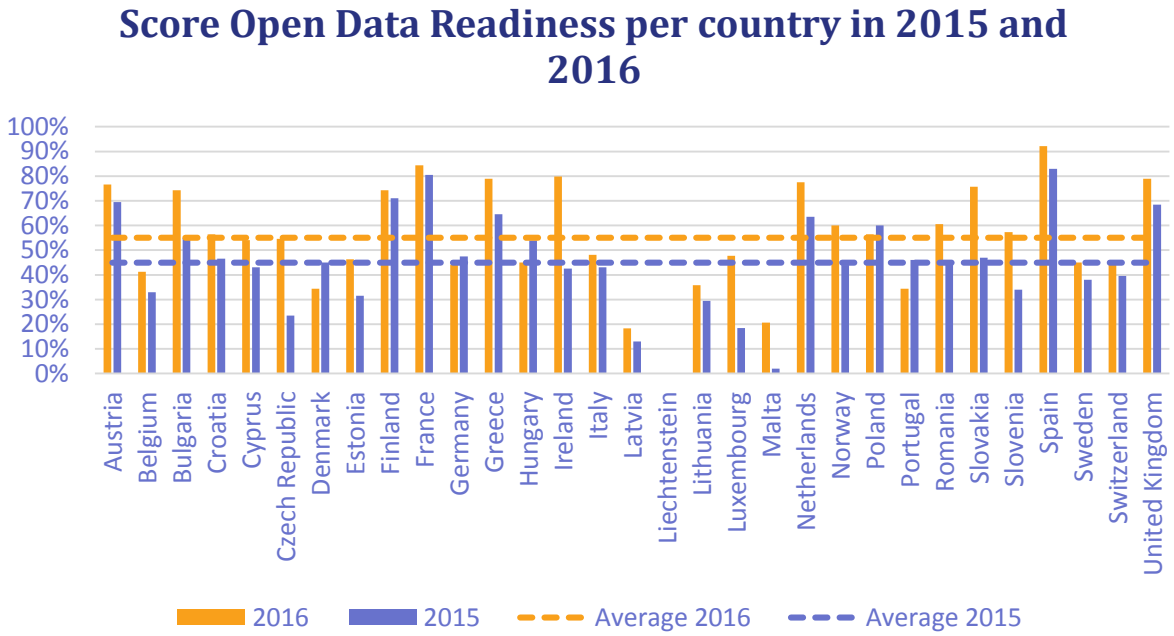


Figure 23 - Score Open Data Readiness 2015 and 2016 per country, with averages 2015 and 2016

The table below shows a distribution of countries per percentage of points collected. This enables identifying their specific level of readiness. The number of countries moving up clearly shows a progress in overall Open Data readiness.

Category	Open Data Readiness score	Number of countries 2015	Number of countries 2016
Not ready	0-20%	4	2
Partly ready	21-40%	7	4
Almost ready	41-60%	13	13
Ready	61-80%	5	10
Very ready	81-100%	2	2

Table 7 - Open Data Readiness categories

Countries that are not ready for Open Data score less than 20% out of the maximum score. The main reason for Liechtenstein (0%) and Latvia (18.3%) to score low in comparison to other countries, is because they do not have an Open Data portal in place yet, and therefore do not score points on Use of Open Data. In addition, their Open Data policy is still in progress, as is the case of Latvia. Although Malta (20.6%) also does not have an Open Data portal in place yet, it scores slightly higher than Latvia because of the Presence of an Open Data policy, therefore falling in the second category – countries that are partly ready. Portugal (34.4%) and Denmark (34.4%) fall in this category as both countries are currently in a transition phase in the wake of launching their respective country's new digital strategy that will include a chapter on Open Data. For Portugal this explains why in comparison to 2015 it no longer has priority domains identified nor has a 5-year strategy; this new strategy will be launched in due course. For Denmark this explains why the current portal carries less data as it is in a transition phase waiting for a new portal to be launched in the context of the aforementioned upcoming strategy.

Lithuania (35.8%) is the last country to fall in this category because it only just recently identified its policy domains.

A total of thirteen countries are almost ready for Open Data. This group scores on average 41.3% (Belgium) to 57.3% (Slovenia). Some countries, such as Belgium, have launched new portals and are still setting up measures to raise awareness around these new platforms. In the meantime, traffic-monitoring tools have not been put in place, limiting the understanding of user behaviours and access to data. Although Germany (44%) scores nearly the same as last year, most of these countries are showing improvements in comparison to 2015, ranging from monitoring the number of unique visitors on the national portal in Sweden to improving its impact transparency in Hungary (both 45%). Switzerland (45.4%) and Luxembourg (47.7%) have launched new national portals and Estonia (46.3%) has made more features available on its portal. Italy has improved its Open Data Readiness due to the launch of regional portals (48.2%) and in Cyprus (54.1%) more information about the users of the portal is known. In the Czech Republic (54.6%) all three sub-indicators have improved in comparison to last year while Poland (56.4%) scores nearly the same as in 2015. Croatia (56.4%) has improved its Open Data Readiness due to an increase in the spread of data made available across domains and an improvement in the re-usability of the data and finally, Slovenia shows an increase mainly due to the transposition of the PSI Directive.

Where in 2015 only five countries (Finland, Austria, United Kingdom, Greece and The Netherlands) scored enough points to be ready for Open Data, in 2016 this group has increased to ten countries, adding Ireland, Slovakia, Bulgaria, Romania and Norway. Although the former five countries remain in the same category, all five countries have shown significant improvements in all three indicators and have increased from 3.3 percentage points (Finland from 71% to 74.3%) to 14 percentage points (The Netherlands from 63.5% to 77.5%). The Netherlands now scores maximum points on the Presence of an Open Data policy thanks to the increase in number of regional portals integrated in the national portal, collection of more information on portal traffic statistics and an increase in the expected impact of Open Data on the political level. Austria increased from 69.5% to 76.6%, thanks to the implementation of a 5-year strategy. The United Kingdom increased from 68.5% to 78.9% due to having worked on their infrastructure and having further improved the quality of the data they hold. This has resulted in offering better, more reliable Open Data both to users beyond government and for consumption within government. Greece increased from 64.5% to 78.9% because its policy now encourages the use of a standard licence. In addition, the number of local and regional initiatives has increased, of which many have been integrated in the national portal. Finally, the Impact of Open Data increased in Finland thanks to a number of new activities undertaken since 2015.

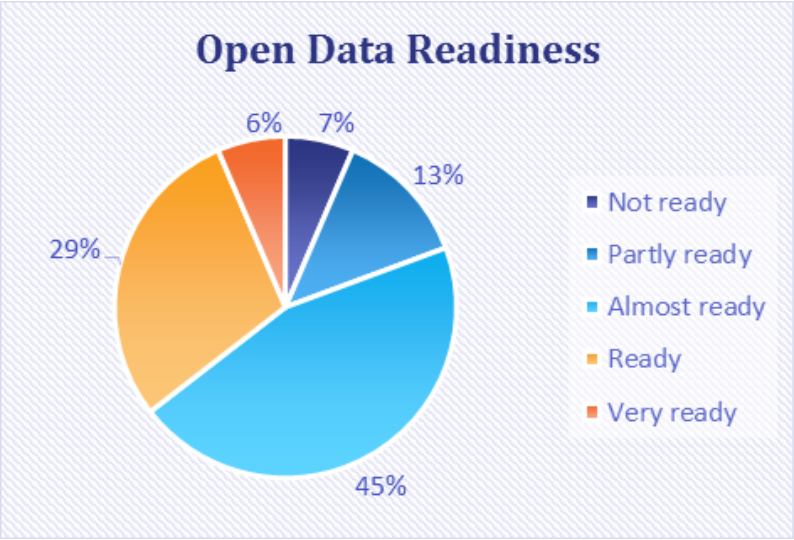
The latter group, consisting of Ireland, Slovakia, Bulgaria, Romania and Norway, increased its Open Data Readiness on all three indicators, of which Ireland has the most significant increase going from 42.5% to 79.8%, the highest generally in this group. This is due to the publication of two studies on better service delivery and because of the high political impact of Open Data on government efficiency and effectiveness and the high social impact on increasing transparency and accountability. Romania went up from 45.5% to 60.6% thanks to the high number of unique visitors of the national portal and due to an increase of the social and political impact of Open Data from low to medium. Slovakia increased by 28.7% from 47% to 75.7%, thanks to the introduction of a predefined approach to ensure all data sets are up-to-date, the identification of priority domains and the inclusion of regional portals

in the national portal. Bulgaria increased by 19.3 percentage points from 55% to 74.3% since environmental sustainability has increased from a medium to a high impact. Furthermore, the transposition of the PSI Directive is completed and the number of visitors on the portal can now be monitored. Lastly, Norway increased by 16.1 percentage points from 44% to 60.1%, benefitting from a predefined approach that has been introduced to ensure data sets are up-to-date, regional portals have been launched and finally the political, social and economic impact of Open Data has increased.

Both in 2015 and in 2016 only two countries have been identified as very ready, these are Spain (92.2%) and France (84.4%). Spain scores the highest out of all and has been able to further increase its readiness by continuously working on estimating the social impact of Open Data – now considered high – whilst this was unknown in 2015. France scores slightly higher than in 2015 on both the Presence of an Open Data policy and the Impact of Open Data.

Spain and France remain the only two countries identified as very ready for Open Data

The pie chart below presents the overall distribution of countries per level of Open Data Readiness.

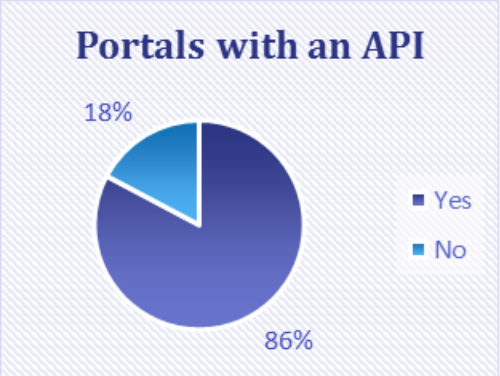


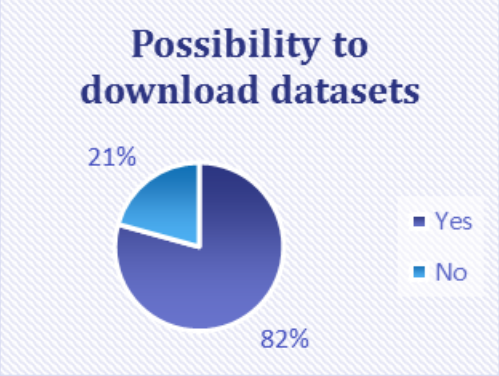
3.2 Portal Maturity

The second key indicator of the present landscaping is Portal Maturity. As almost all of the countries have an Open Data portal, it is also important to look at the features and usage of the portals. To ensure data is easy to find, access and download, data portals require a number of features to be set up. First, this section will explore the usability of the different national portals, then the re-usability of data, followed by an assessment of the spread of data before concluding with an assessment of this aggregate indicator.

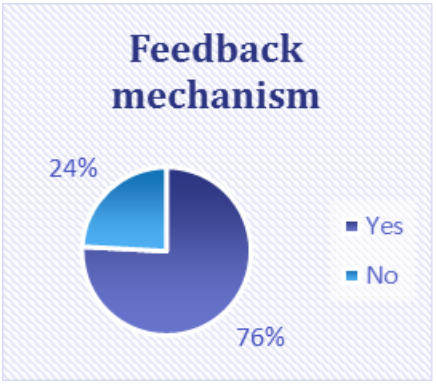
3.2.1. Usability of the portal

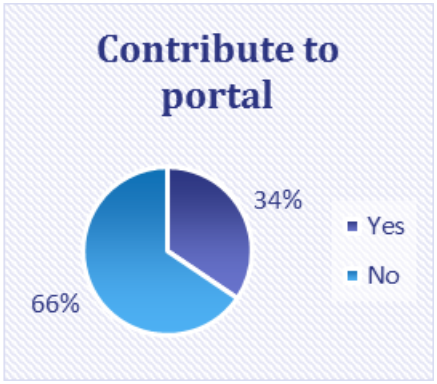
The first sub-indicator of Portal Maturity is the usability of the portal. This consists in investigating which features an Open Data portal has. A typical feature assessed is the API. An API, Application Programming Interface, allows other tools –such as machines – access to data on the portal. For example, an API allows the European Data Portal to harvest the data sets automatically from a given portal and offers links back to the data sets on the national portal. Currently 24 of the 29 countries investigated with a portal, have an API. An API allows machine-to-machine communication; however, Open Data can also be accessed by other users such as citizens and organisations. This group does not necessarily need an API, but simply needs to be able to access and then download the data sets. When re-users of Open Data do not know how to use an API to access the data, it can be useful to have an option to download the data. 79% of the countries with a portal have a feature that allows visitors to download data.





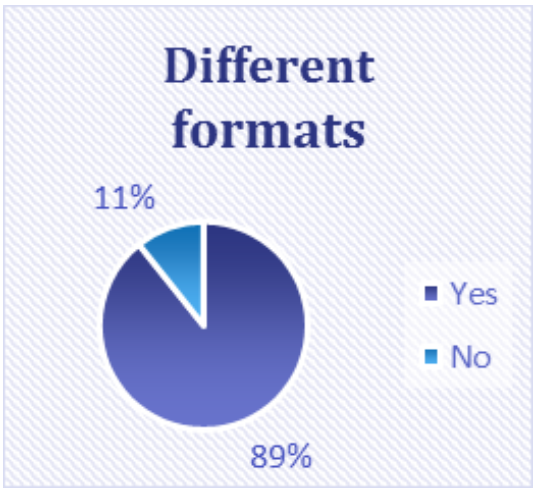
Other features that contribute to the usability of the portal are the availability of feedback mechanisms and the option to contribute (to) data sets. A feedback mechanism allows visitors to provide information about the data such as for instance indicate the quality of the data, report broken links or ask for further information about the data. Three fourths of the countries indicate that a feedback mechanism is in place on their Open Data portal. Compared to 2015, this means more than twice the amount of portals now have this feature included on their portal. Only one-third of the countries have an option on the portal to contribute directly to data sets. Although still not many portals offer the opportunity to contribute to their portal, the proportion of portals with this feature has tripled from 11% to 34%. This shows that countries not only focus on publishing an increasing number of data sets and raising awareness around Open Data but also focus on expanding the features of their national portal.

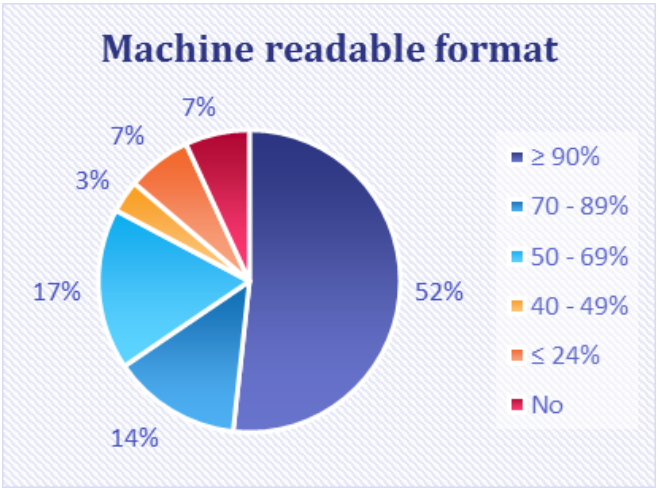




3.2.2. Re-usability of data

Re-usability focuses on the way Open Data is published. Two key features that play an important role are the machine-readability of the data and the different formats used to present the content of the data. The latter is also called a distribution. Examples of formats that are machine-readable, are csv or xlsx. PDF files, however, are not machine-readable. In 2015, only 21 countries were able to provide a percentage of how many data sets were machine-readable. This year the number of countries has increased to 27, which means that all countries with a portal are able track machine-readability except Hungary. Where in 2015, only Bulgaria, Greece and Slovakia provided more than 90% machine-readable datasets, in 2016 Austria, Croatia, Czech Republic, Estonia, France, Germany, Ireland, Luxembourg, The Netherlands, Norway, Portugal, Romania, Slovakia and Switzerland also meet these standards. Interestingly, in Greece a decrease was reported from 91% down to 55% machine-readable formats. This can be explained by the fact that there has been a substantial increase in the number of data sets published on the Greek portal, from 70 in 2015 to 2,166 in 2016. The focus has therefore been on increasing the availability of data whereby both citizens and business agreed that instead of not providing non machine-readable data at all, having access to data in any pre-existing format or language was already beneficial.





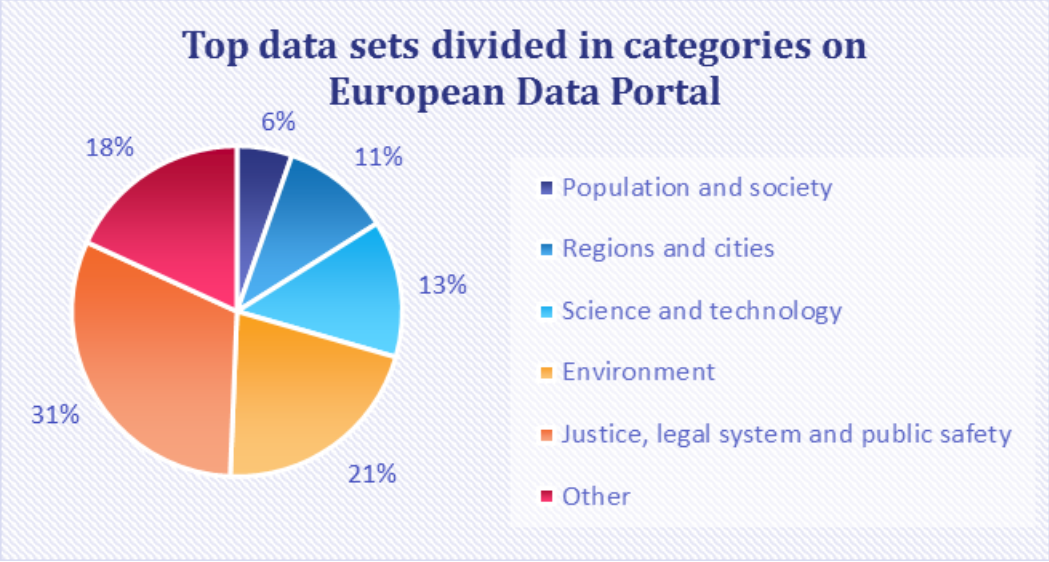
Where in 2015, 20 out of 27 countries (74%) reported the possibility to download data sets in different file formats, in 2016 25 out of 28 countries (89%) answered positively. These figures clearly indicate that European countries, at large, have invested time and effort in providing data in machine-readable formats and have been monitoring their publication of data more rigorously.

When looking at the data on the European Data Portal, over 49 different file formats are used. The most used data formats are CSV, HTML and WMS. The fourth most used data format is PDF. PDF is one of the few data formats that is not machine-readable. The following most frequent distributions are ZIP, JSON, XLS and XLSX, followed by WFS and XML. Numbers range from nearly 49,000 CSV formats to just over 23,000 JSON formats to the least used 263 shape formats. Most data formats are or are related to a spreadsheet, which enables to analyse the data more swiftly.

3.2.3. Spread of data

The last indicator that is investigated when looking at Portal Maturity is the spread of data. A comprehensive portal includes numerous data sets covering multiple domains from various governmental institutions. When looking at the spread of data, one can look at the data sets individually. However, by looking at domains, more insights can be derived and comparisons between countries can be made. A data domain is a categorisation of data sets linked to a common theme. An example of a data set is the electricity usage at governmental buildings. This data set is part of the energy and environment domain. Additional domains are company information, crime and justice, earth observation, education, finance, geospatial, global development, government accountability and democracy, health, science and research, statistics, social mobility and welfare, transport and infrastructure. For a broader description of these domains, taken from the G8 Open Data Charter,[54] Annex III – Domains listed in the G8 Open Data Charter presents a description.

To further this illustration, the European Data Portal, for instance, divided the data sets into 13 different data categories. The top five data domains that contain most data sets are justice, legal system and public safety, environment and science and technology. Even if the data domains on the European Data Portal are not exactly the same as the domains in the G8 Open Data Charter, there are a number of similarities between the domains identified by both. For example, the domain justice, legal system and public safety on the European Data Portal is comparable to the domain government accountability and democracy in the G8 Open Data Charter. The top five domains containing the most datasets are presented in the picture below, the other eight categories are grouped as "*Other*".



[54] Open Data Charter, 2013

The EU28+ countries were asked to indicate which of the fourteen data domains are in their top five most often consulted domains on their portal. However, only 57% of the countries have insights in how often the specific domains are consulted. The figure below captures how often each data domain is mentioned in the top 5. High priority domains, as identified by the European Commission in the Guidelines to the Revised PSI Directive[55], appear in orange.

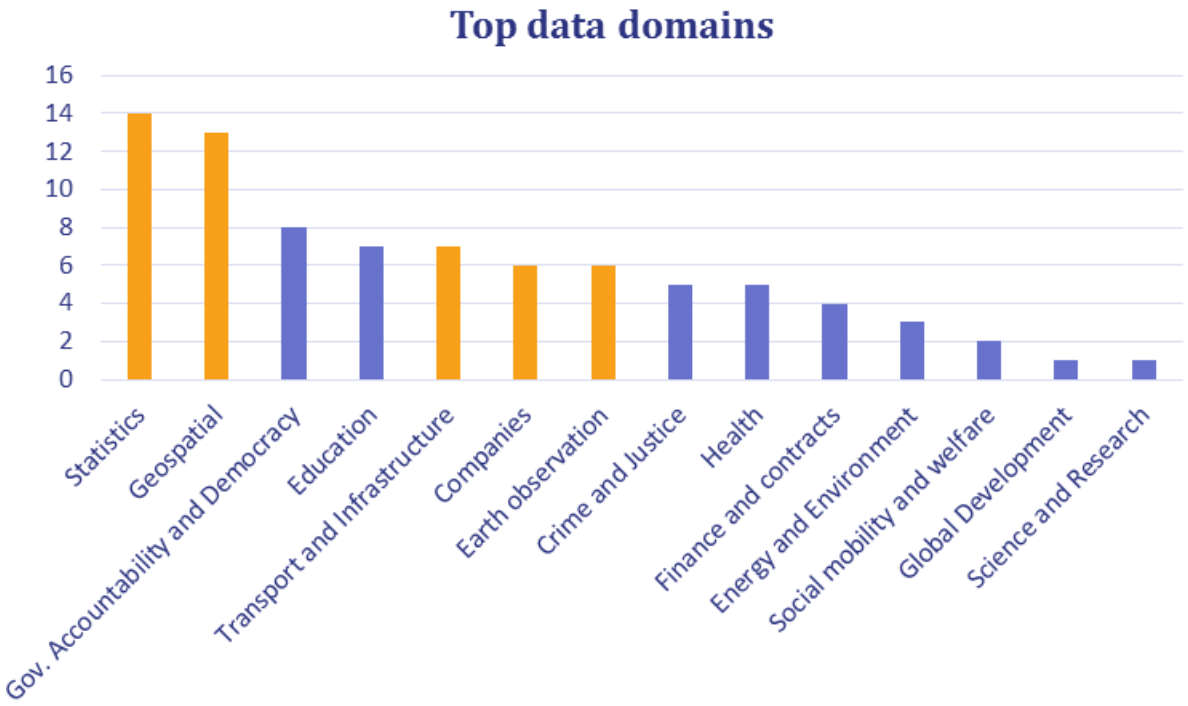


Figure 24 - Top data domains consulted by the EU28+ countries. High priority data domains appear in orange

The most consulted domains as indicated by the EU28+ countries overlap with the five data domains appointed by the European Commission. Whereas in 2015 the overlap was less evident, in 2016, these priority domains are more explicitly present in the figure above. This means that interest of users of Open Data tend to converge over time with the most valuable data sets according to the European Commission. The table below shows that the health and finance and contracts domains can no longer be found in the top 5, which could be because they are not amongst the 5 priority domains appointed by the European Commission. The geospatial domain, amongst the priority domains of the European Commission, is gaining in popularity and now second of the top 5 most consulted domains.

Place	Top 5 data domains 2015	Top 5 data domains 2016
1	Statistics	Statistics
2	Finance and contracts	Geospatial
3	Geospatial	Gov. accountability and democracy
4	Health	Education
5	Transport and infrastructure	Transport and Infrastructure

Table 8 - Top 5 most consulted domains 2015 and 2016

[55] European Commission, 2014, Guidelines on recommended standard licences, datasets and charging for the re-use of documents

Only five countries collect information about the least consulted domains. Global development is the domain that is mentioned most often amongst the less popular domains. This does not necessarily imply that this domain is less popular. An explanation might be that there are simply not many data sets in this field. On the European Data Portal, for example, the International Issues domain, overlapping with the global development domain in the G8 Open Data Charter, contains the least data sets.

Fifteen of the EU28+ countries provided details regarding the top five most downloaded data sets as well. The number one downloaded data sets differs significantly between the countries. Most importantly, there is a differences in the kind of data that is released per country. Therefore, popular data sets in some countries may not be published at all in other countries. In addition, the data sets are not always comparable. For example, the most downloaded data set in Spain is 'Registry of mayors' which is somehow comparable to the 'General information on Public Bodies', the most downloaded data set in Hungary. Furthermore, interest per countries seems to differ highly. The citizens in Finland, on the one hand, are most interested in the 'Registry of Finnish names', whereas in France the 'Nutritional content of food products' is most popular.

The top 5 of most downloaded data sets of five different countries spread all over Europe, namely Belgium, Bulgaria, Finland, Spain and United Kingdom, are visualised in the figure below. This illustrates the variety of data sets amongst the most popular ones in these countries. Most consulted data sets revolve around postal codes, registry of names, statistics about deaths in a specific city and data about election.

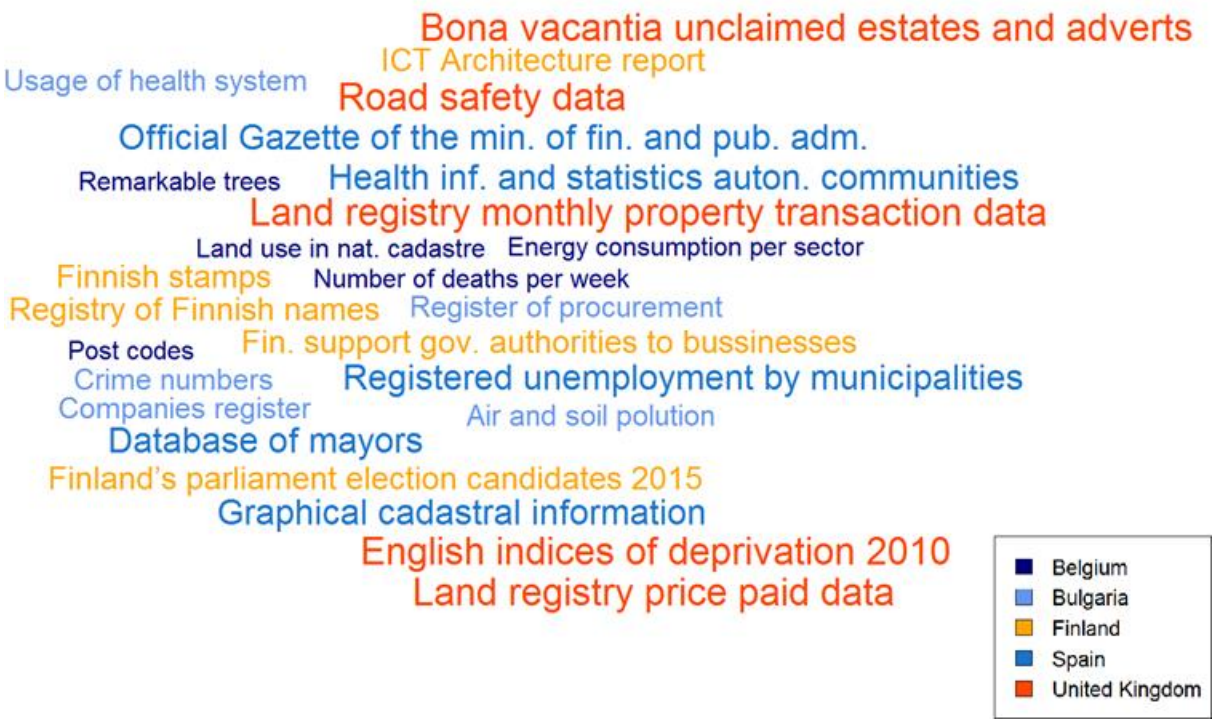


Figure 25 - Word cloud based on top 5 most consulted data sets from five different countries

3.2.4. Overview of Portal Maturity

Portal Maturity is an important indicator when looking at the development of Open Data in a country. The indicator consists of three sub-indicators, namely usability of the portal, re-usability of data and the spread of data across domains. An overview of the scores per sub-indicator is available below.

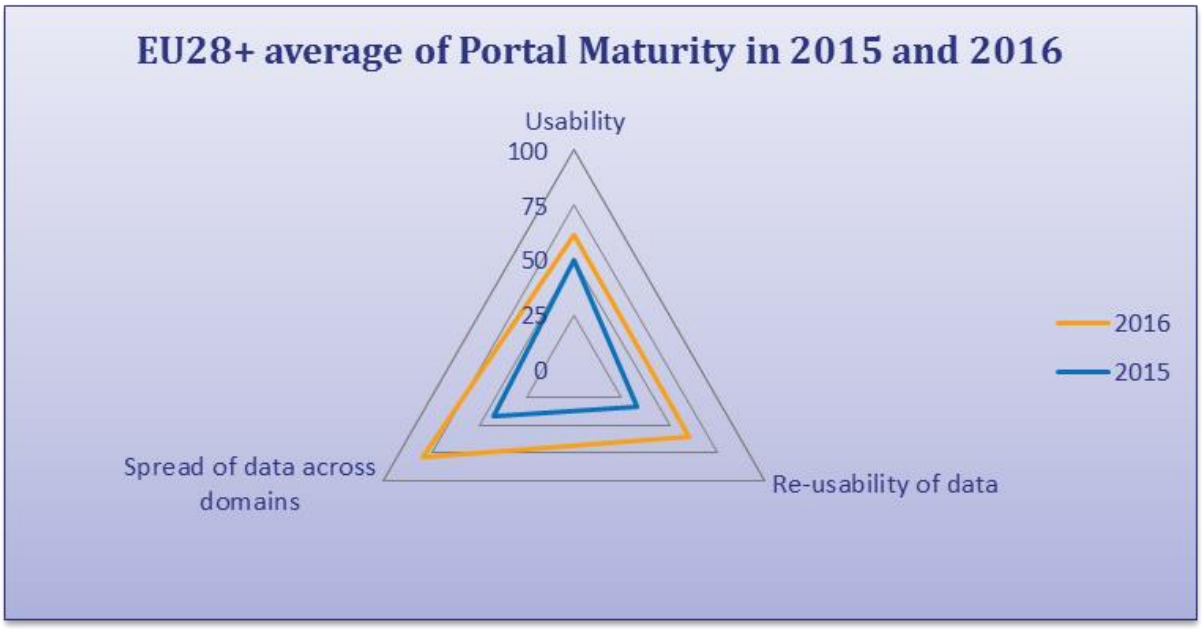


Figure 26 - EU28+ average of Portal Maturity in 2015 and 2016

Points to be scored in this category can range from 0 to 250. Only one country scored the maximum of 250 points, namely Luxembourg.

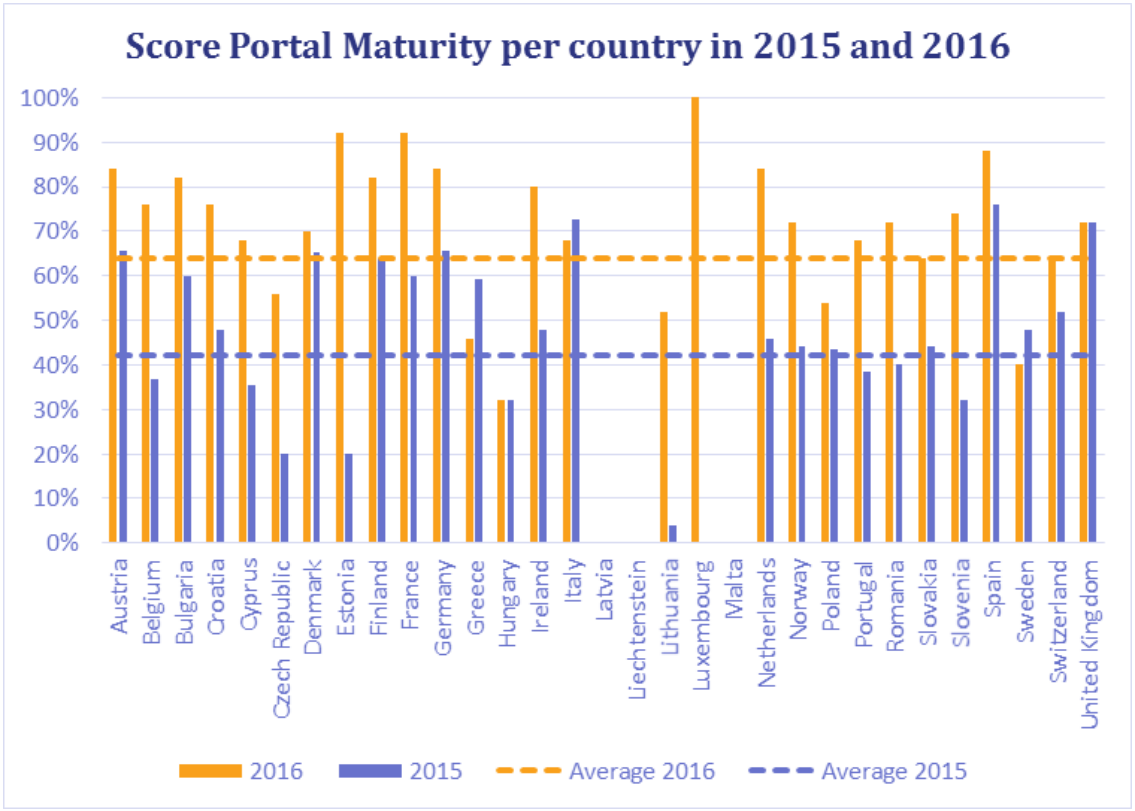


Figure 27 - Score Portal Maturity per country in 2015 and 2016, with averages 2015 and 2016

Countries that have increased the most are Estonia, Lithuania and Luxembourg. Estonia has increased on all three sub-indicators with the largest increase on the re-usability of Open Data. This results from the fact that the proportion of foreign visitors is known as well as an increase in the percentage of machine-readable data sets, which is more than 90%. The amount of features on the Estonian portal has increased, resulting in an increase in the sub-indicator usability of the portal. Lithuania has increased due to similar reasons as Estonia: more information about the visitors of the national portal is collected and the percentage of machine-readable data sets is known. Luxembourg has increased thanks to the launch of their national portal. Luxembourg has fast-forwarded from zero points last year to the highest possible score of 250 points this year, making this the fastest growth on the Portal Maturity indicator. Their national portal includes extended features. This results in high traffic numbers and a good overview of these visitors. The challenge for Luxembourg will be to continue on this track as more data is expected to be published. Belgium, Croatia and Slovenia have also considerably progressed, especially with regards to the re-usability of their data.

All countries, except Greece, Sweden and Italy have either increased or scored similarly to 2015. As explained earlier, Greece has decreased because they focus now on opening up more data rather than publishing only data that is machine-readable. Likewise for Italy and Sweden, the proportion of machine readable formats has reduced slightly. In the case of Italy, the release of the Italian DCAT-AP_IT profile will substantially increase both the number and quality of the data sets published in the short term.

4. Barriers remain in reaching full Open Data maturity

The previous chapter detailing the current state of play of the 28+ countries shows that clear progress can be measured compared to 2015. It has also become clear that the vast majority of the countries is still struggling to reach full maturity. To find out what is preventing these countries from maturing, several barriers have been identified offering further insight into the difficulties countries are facing when dealing with Open Data. These barriers have a negative impact on the further publication of data by the respective governments as well as the stimulation of the re-use of Open Data. Therefore, this chapter dives deeper into the country specific issues by addressing political, legal, technical, and financial barriers. Finally, other barriers have also be identified, such as little awareness and low availability of data released by some countries. In general, countries have indicated to experience a mixture of the different barriers.

4.1 Political barriers

Approximately one third of the countries are facing political barriers. Despite the fact that most countries have a full-fledged Open Data policy in place, the barrier that most countries have to face is the engagement of policy-makers in Open Data. Politicians are not well aware of the benefits of Open Data resulting in the fact that they do not identify Open Data as a priority, but solely see it as a 'nice to have' feature. This sponsorship of Open Data at the highest level could lead to an increase in publishing data at all levels of government, thereby creating peer-pressure among administrations. Another political challenge can be found in countries where Open Data laws are taken to the next level. Such an ambitious legislation or policy agenda is laudable but may take more time to adopt and implement; meeting more resistance than a series of smaller actions. The acceptance of a new law about transparency by default is for instance a challenge Austria has to address for instance. Not all countries face this challenge, as it is mainly an additional law on top of the revised PSI Directive, making the publication of Open Data in general, an obligation. However, this law takes it one step further by making publishing of public sector information mandatory.

Most often mentioned political barrier is a lack of engagement of policy-makers in Open Data

Coordination and cooperation between national and regional public sector bodies, is another challenge countries face when opening up Open Data. This is strongly dependent on the structure of the country. Norway indicated that their regions are highly independent and are therefore not included in the national programme regarding Open Data. A similar situation occurs in Germany.

4.2 Legal barriers

Countries are experiencing three main legal barriers, when working with Open Data. Firstly, a legal framework to publish Open Data is missing: data publishers expect or need one to start publishing data. This goes beyond transposing the revised PSI directive and calls for a broader framework, including definitions, roles and responsibilities, as well as accountability for publishing data. Malta for instance, is a country that has been focusing on providing this legal framework and considers it a key success factor for sustainable Open Data publication. Switzerland plays in tune and indicates that data publishers need a legal framework to start publishing the most wanted data. Other countries do have

a legal framework, but their government structure results in various frameworks causing inconsistency or lack of clarity.

A second legal barrier countries encounter concerns licences, which play an important role in Open Data. Without an open licence, data cannot be used freely. In some countries, licences are not regulated nationally. In Germany, although there are national licences, those licences are not always used. Several countries also believe that by publishing the data and making it openly accessible solves the question of the licence, as the data is now free to access. However, this is not sufficient.

German government regulates open licences nationally, however they are not always used

Privacy is an important legal barrier. Multiple countries, Belgium, The Netherlands and Spain, indicated that privacy laws prevent opening up data.

The third challenge countries are facing are privacy constraints that prevent data publication. Multiple countries such as Belgium, the Netherlands and Spain, explained that a privacy framework prevents the publication of Open Data, which is deemed privacy sensitive. Privacy is becoming an increasingly hot topic as politicians and citizens fail to understand Open Data on the one hand and the absence of an actionable legal framework as described above on the other hand.

4.3 Technical barriers

Various technical challenges are present when working with Open Data. One barrier indicated most often by countries, is the low quality of the data, for example when Open Data is published in an unstructured or in a non-machine readable format. When the quality of the data is poor, it can prevent citizens or organisations from re-using the data. The quality of the data can be improved by setting up standards for the collection and publication of Open Data. However, countries also indicate that this is one of the technical challenges present. Indeed, countries try to both increase the amount of data being published and are equally concerned by the quality of the data itself. In Belgium, each administration has its own tool to publish Open Data and in Norway, standardisation of API's is missing. An explanation for the lack of standardisation could be that countries want to make the publication of Open Data as easy as possible for data publishers, while setting up standards requires them to do more than the minimum to open up the data. This equally applies to data formats, whereby publishers are expected to make their data available in formats that are more standard.

Data publishers should be aware of technical standards, when they exist. Bulgaria indicated that automatically uploading and updating data by administrations that maintain and collect the data, is a barrier. However, these public bodies should then have the required technical knowledge to implement such features, which is not always the case. A best practice countries could learn from is Italy where strong national guidelines are in the process of being set up to ensure high levels of metadata quality whilst respecting the autonomy of the different regions. Another approach is the one undertaken by Greece, where the Ministry responsible for the Open Data policy has trained public administrations to publish their data and upload it to the national portal. Despite the fact that this remains a manual exercise, it is a substantial first step in helping administrations publish their data.

4.4 Financial

Many countries indicate that public authorities are used to selling their data. When legislation is forcing them to open up data free of charge, they have to face a loss of revenue. It is therefore necessary to reorganise the funding model of certain public bodies. Benefits of publishing Open Data for free are not clearly documented, making it difficult for administrations to justify the loss of revenue, or more broadly, understand the benefit of publishing data in the first place. The loss of income by making data available free of charge, strengthens the general view that most public bodies have to prioritise their tasks and revenue sources. This links to the political barriers mentioned in the beginning of this chapter, whereby policy makers need to further sponsor Open Data. For example, Latvia explained that a political decision is needed to grant government funding. The annual budget of Open Data teams also needs to be allocated for one-time expenses, for example the renewal of old technical system and their interfaces as was indicated by Finland.

In many countries public authorities are facing a lack of income now that legislation forces to open data up free of charge, whereas before they would sell the data

4.5 Other barriers

In addition to the four typical barriers mentioned above, research points to the fact that there are still few awareness raising activities around the availability of Open Data. Even if this report underlines a growing trend with this respect, most citizens and businesses are not aware of existing publicly available data sets. Besides the data itself, citizens are not aware of the benefits of Open Data either. Entrepreneurs or other re-users of Open Data on the other hand, are not aware of the data that data holders actually have. Therefore is it important to ensure a continuous dialogue between data users and data holders, to stimulate the re-use of data. Amongst data publishers, the awareness of Open Data is limited as well. This varies per country whether this holds for national or local governments.
Secondly, when assessing the availability of Open Data, the conclusions show that there is not much Open Data available yet and availability can vary considerably from one data domain to another. Explanations for the low availability of data are that public bodies have a limited focus on publishing Open Data, and public administrations are not willing to open their data. Estonia indicated that there are no clear benefits for data owners to publish Open Data, making it challenging to open the important data sets. To stimulate the re-use, administrations should open data that is most valuable for re-use. This requires further insight into what users are looking for.

4.6 Progress on barriers

Generally, when comparing the results from 2015 to 2016, a conclusion can be drawn that many countries are actively trying to tackle the different barriers they are faced with in their home countries. One of the main positive changes has been the transposition of the revised PSI Directive. Where in 2015 one of the financial barriers was switching from a cost-based pricing to a Marginal (Zero) Cost Model, in 2016 the vast majority of the countries indicated the latter is their funding model, showing strong growth in the demand for Open Data. The transposition of the Directive has equally provided a legal framework for publishing data, even if incomplete, it is a stepping stone to begin defining more in-depth policies, as explored in chapter 3.

On the political level, barriers related to regions establishing a passive approach by Open Data holders, such as in Slovakia, are overcome by the adoption of the “National Concept of Information Society

(2016)"[56]. The "Programme Resolution of the Slovak Government 2016" and "Strategy of accessibility and use of Open Data of public administration" expresses a strong ambition to release Open Data to the public. Furthermore, in Croatia one of the main political barriers is to ensure good coordination between numerous public sector bodies. Therefore, plans have been made to ensure greater coordination through the OGP Council Initiative. Other political barriers relate to a lack of awareness by politicians. Since Open Data is driven by public body representatives, it is essential to make them more aware of the benefits Open Data brings to society, as is done in Malta where data advocacy has been one of the main actions to address this problem.

To address both the political and technical barriers related to having different (autonomous) Italian regions, Italy set up strong national guidelines to ensure high levels of metadata quality. Another technical barrier relates more to the lack of technical employees dedicated to the task of publishing data. In Spain, in order to overcome the barrier of the lack of technical knowledge among civil servants, a personalised and direct Help Desk for the PSI re-use managers was set up for national, regional and local administrations. In addition, new functionalities were included on the Spanish Open Data portal. In Portugal, work on general maintenance and improvement of the National Open Data portal was carried out. Furthermore, in 2015, many countries were often facing the challenge of not having data available in open format. Other challenges lie in the fact that for instance, Lithuania does not have a national Open Data portal that includes easy to use functionalities. This technical problem is being addressed by applying for EU funding in order to implement a project proposal to make their national Open Data portal more user-friendly.

In the Netherlands, one of the main legal barriers is related to privacy issues. In order to move away from this barrier, data sets are supplied to the Statistics Netherlands[57], which only publishes statistical information without identifiable or traceable personal data. One of the legal barriers existing in Ireland is related to ensuring that the appropriate licence is applied. In order to overcome this challenge, Ireland has organised a public consultation on the appropriate licence for the Open Data Initiative and subsequent selection of CC-BY. For Belgium, a major legal barrier is the fact that Belgium, due to its federal system, has four governments that each have an Open Data policy and regulation. Even though they are similar, it still makes it difficult to re-use certain important data sets across the whole country. This barrier is being addressed by making data sets from both the federal and the regional governments available on one single website: data.gov.be; making it easier to find and compare similar datasets from the regions. However, this also poses the challenge of data interoperability, which is a broader challenge for all countries.

Although a lack of funding is still seen as one of the major barriers, in 2016, several countries indicated this barrier was being addressed by organising more meetings and negotiations with the government and public administrations to raise more awareness around the importance of Open Data, such as the International Open Data Conference[58] taking place this year in Spain. In Estonia, organising events and raising awareness around both benefits and challenges has already led to the allocation of more resources for opening up data and pursuing communication efforts. In October 2016, a hackathon will be organised intending to create certain applications based on Open Data.

[56] Slovakia, National Concept of Information Society, 2016

[57] The Centraal Bureau voor de Statistiek publishes reliable and coherent statistical information which corresponds to the needs of Dutch society.

[58] IODC 2016, Spain

5. Insights and recommendations

5.1 Open Data Maturity

The Open Data Maturity Assessment measures the level of maturity of a country by looking at both Open Data Readiness and Portal Maturity. Within this assessment, countries were able to obtain a maximum score of 1340 points. Awarding full points to a country would mean that it has reached full Open Data Maturity. Although countries are improving their respective maturity level in general, none of the EU28+ countries have achieved full maturity in 2016. The table below presents the countries identified as Beginners, Followers, Fast Trackers and Trendsetters.

Open Data Maturity category	Number of countries 2015	Number of countries 2016
Beginner	7	3
Follower	14	12
Fast tracker	N/A	8
Trendsetter	10	8

Table 9 - Number of beginners, followers and trendsetters in 2015 and 2016

The scores for the EU28+ for Open Data Maturity range from 0 to 1225 points with an average of 758 points. On Open Data Readiness, the average score in 2016 is 597 points. On Portal Maturity, the average score is 161 points. When considering only the 28 EU Member States, average scores range from 200 to 1225 points with an average of 786 points with regards to Open Data Maturity. On Portal Maturity, the average score is 166 points. As was mentioned in the method chapter, if a question remains unanswered, even when asked for further feedback, the country receives 0 points for that particular question. If a certain question is not applicable to a certain country, this country is left out of the final comparison and therefore has no impact on the average score for that question and or indicator.

To be able to cluster countries together into four different groups, the same principle from 2015 is applied within the 2016 analysis. In addition, in 2016, a fourth level of maturity is added called 'Fast Trackers' to highlight those countries that have significantly accelerated their Open Data Readiness compared to the EU28+ average. Based on the assessment, European countries are clustered into four different levels of Open Data Maturity:

Beginners: are in the early stages of their Open Data journey, both in terms of having an Open Data policy present as well as portal features. However, basics around availability, accessibility and portal functionalities are still limited leading to a restricted number of data sets for the public to be re-used.

Followers: have successfully developed a basic Open Data policy and have brought in more advanced features on their portal. Limitations still exist in terms of data release restricting the possibility for the public to use and re-use data sets.

Fast Trackers: have significantly accelerated their Open Data journey, having either a policy or a portal that is substantially developed, however they still face a small number of shortcomings in reaping the full benefits of either their policy or portal.

Leaders – Trend Setters: have implemented an advanced Open Data policy with extensive portal features and national coordination mechanisms across domains.

The figure below shows the results from the Open Data Maturity Assessment for the EU28+ countries for 2016. When comparing the results of this year with 2015, several conclusions can be drawn. In 2015, seven countries are considered as Beginners, a group of 14 countries was considered as Follower and ten countries had reached the level of Trend Setter. In 2016, however, only three countries are still in the Beginner stage, while 12 countries being in the Follower stage and eight countries having developed to the new level called 'Fast Trackers'. By adding a fourth level to assess Open Data Maturity within the EU28+ countries, in 2016 the number of countries being considered Trend Setters has slightly decreased to eight countries.

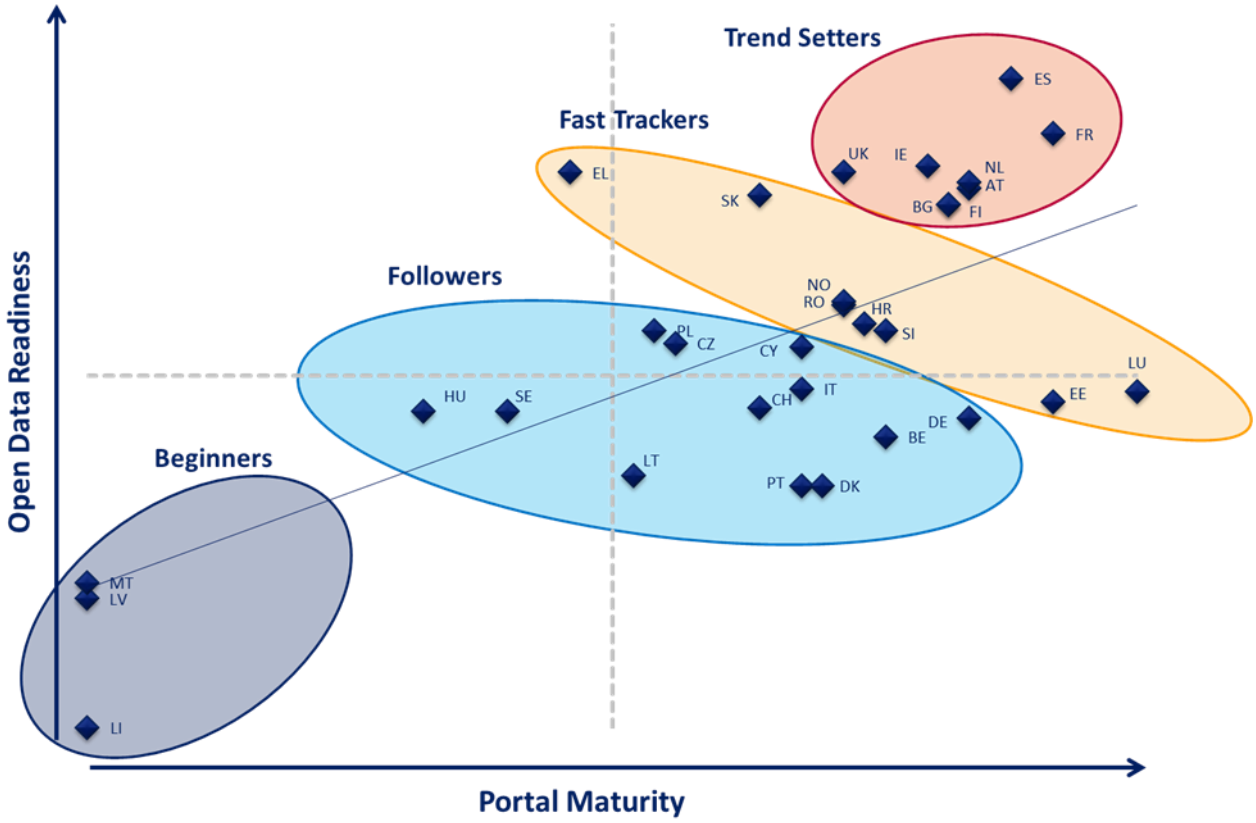


Figure 28 - EU28+ Open Data Maturity clusters

When looking at the detailed progress per country, it is apparent that more countries have shifted through the different stages. Spain (91.4% total) remains the most important Trend Setter in terms of Open Data Maturity, followed by France (85.8% total), Ireland (79.9% total), the Netherlands (78.7% total) and Austria (78.0% total). These countries benefit from both strong policies and have continued developing their portals during the course of 2016. Malta and Latvia have slightly improved their Open Data Readiness with Malta going up from 0 points to 225 points. Further progress in their portal maturity, however, could be a next step. However, both Malta and Latvia are preparing a number of actions along these lines, as can be shown in the country factsheets available on the European Data Portal.

Luxembourg serves as the best example of maximum acceleration in Portal Maturity and in Open Data Maturity overall. Where in 2015, Luxembourg was considered a Beginner, in 2016, Luxembourg has reached full Portal Maturity, making Luxembourg the only country in 2016 to have reached that stage. Luxembourg is therefore one of the two countries – together with Estonia – to have accelerated their

course and moved into the Fast Trackers category. Since Luxembourg also increased its Open Data Readiness by over 29.2 percentage points to a total of nearly 47.7%, Luxembourg scored the most significant overall development in Open Data Maturity of 42.7 percentage points in comparison to 2015. Estonia accelerated in its Portal Maturity and has, by 2016, reached 92 percentage points, making it second together with France, having increased its Open Data Maturity by 25.7 percentage points from 29.2% to 54.9%. Both the Czech Republic and Lithuania have also made significant improvements in both their Open Data Readiness as well as their Portal Maturity with the Czech Republic having increased its Open Data Maturity by 32.1 percentage points from 22.8% to 54.9%. Both countries are now considered Followers in the 2016 measurement.

The Netherlands (18.7 percentage point increase) and Ireland (36.3 percentage point increase) have improved both their Open Data Readiness and their Portal Maturity to such an extent, that in 2016 they are considered Trend Setters. An important reason for this positive development lies in a better appreciation of the estimated impact of Open Data on the one hand, and by having integrated more regional portals into the national portal on the other hand. This year, the Netherlands was able to reach full maturity on the presence of an Open Data policy, the most prominent sub-indicator in assessing the level of Open Data Readiness.

A total of five countries have accelerated their activities as well and joined the Fast Tracker category. Most notably Slovakia since it has accelerated most in terms of both its Open Data Readiness and its Portal Maturity (27.1 percentage point increase). Other countries now considered Fast Trackers are Norway, Romania, Switzerland and Slovenia. Important reasons for this positive development are linked to having a predefined approach in place to ensure all data sets are up-to-date, the identification of priority domains, the possibility to measure the number of unique portal visitors and growing activities measuring the estimated impact of Open Data on society.

At the same time, this means that four countries have moved back from the Trend Setter level into either the Fast Tracker or the Follower level. Greece is now considered a Fast Tracker because although it scores high in terms of Open Data Readiness – in 2016, Greece scores 78.9% for this key indicator, making it 4th on this ranking together with the United Kingdom – it is still in the process of further developing its Portal Maturity. The three countries that are now considered Followers are Denmark, Germany and Italy. For Denmark the main reason for this shift is the fact that Denmark is currently in a transition phase waiting for a new portal to be launched resulting in a 10.6 percentage point decrease in Open Data Readiness and an overall Open Data Maturity decrease of 8 percentage points. On the one hand, Germany increased its Portal Maturity by 18.4 percentage points in comparison to 2015, but its Open Data Readiness decreased by 3.5 percentage points, resulting in an overall score of 51.5% that is equal to the EU28+ average. On the other hand, Italy increased its Open Data Readiness by 5.2 percentage points but decreased its Portal Maturity by 4.8 percentage points resulting in an overall increase of 2.9%, which is below the acceleration level of the EU28+ countries in general, making Italy a Follower. Italy, for example, is consolidating a number of substantial activities in validating national guidelines for publishing Open Data and thereby creating the necessary framework conditions to increase the quality of the data available on their portal in the near future.

The map below offers an illustration of the countries that are Beginners (amber), Followers (light blue), Fast Trackers (red), Trend Setters (dark blue). The Open Data in Europe Dashboard on the European Data Portal website offers insight into both EU28+ aggregate and country specific scores. Specific country factsheets are equally available online[59].

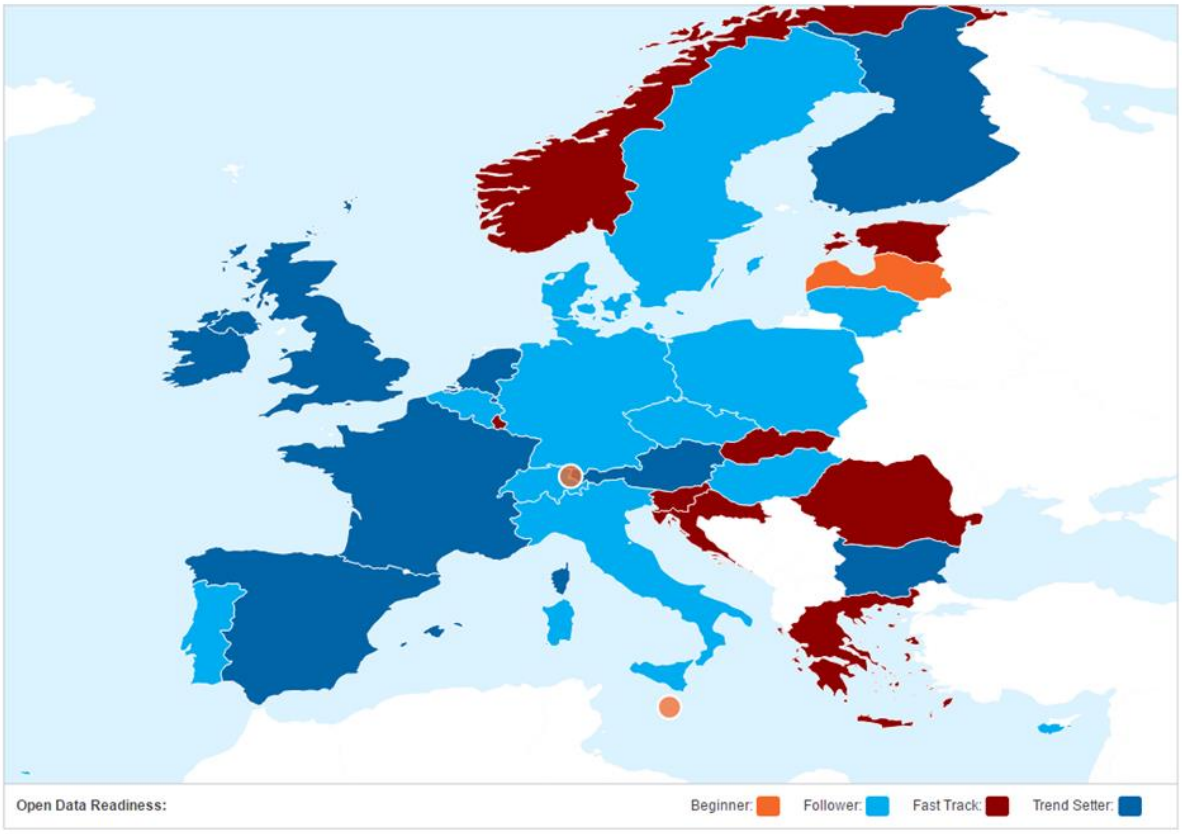


Figure 29 - Open Data maturity map

The 2016 European Open Data landscaping shows a positive development concerning both the EU28+ countries as well as the EU28 Member States. Many countries have made significant improvements in their level of Open Data Maturity, which put them on track to reap the benefits of Open Data in the short and long term. However, a gap remains between the ambition and guidelines set forward. Countries developing Open Data policies need to develop adequate portals. Likewise, countries with developed portals need to pay equal attention to the development of their Open Data policies in order to provide a long-term vision for Open Data. Having said this, at the time of conducting this survey, several countries were in a transition phase; either waiting for a new portal to be launched or were in the process of establishing a new 5-year strategy. Therefore, we expect results from next year's survey to again show a clear improvement in completing the Open Data journey of the EU28+. The figure below presents the overall scores for Open Data Maturity, comparing 2015 to 2016.

[59] European Data Portal dashboard, 2016

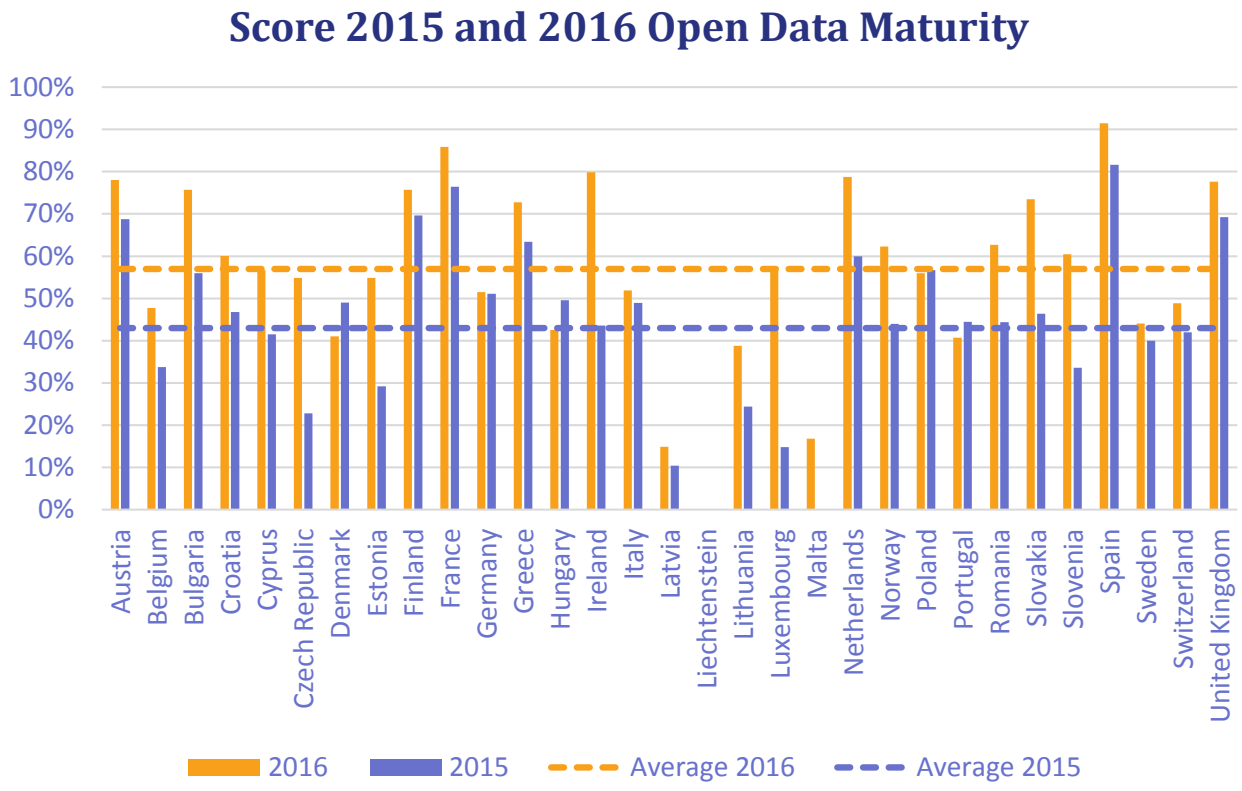


Figure 30 - Score Open Data Maturity per country in 2015 and 2016

5.2 Recommendations

As described in the previous section and illustrated throughout the report, substantial progress has been made by many countries in moving forward on their Open Data journey. However, in a variety of areas countries can improve further and need to continue addressing barriers that remain. To do so, a series of recommendations highlight where improvements can be achieved. The recommendations from last year's report have been re-assessed, to reflect on what has already been done and what can still be achieved by countries to improve their overall Open Data maturity.

Implement a Data Strategy. This recommendation was made in 2015 and clear progress has been made along these lines, however, a number of countries still lack a holistic approach in addressing all aspects required within an Open Data strategy. The strategy should state that all data needs an open licence and stimulate the creation of an Open Data policy. The strategy should emphasise the importance of a legal structure and define standards for the publication of Open Data. Some outdated strategies should be revised to going beyond harvesting low hanging fruit and address administratives that are still holding their data captive. Countries can equally improve by providing a further detailed legal structure and standards. Telling data holders which standards to use can contribute to the interoperability of data. For example, by providing data holders with a standard licence, data providers can include this licence in their metadata so that it is recognised by both data providers and data users. Addressing the diversity of licences, or providing a licence assistant tool mapping equivalences in licences can support the re-use of Open Data. The legal structure can help countries address privacy concerns when opening up data.

In June 2016, the European Data Portal published a report on Open Data and privacy[60] where guidelines are provided to promote the utility of data while ensuring data controllers' obligation to respect the right of data subjects to personal data protection, this report has developed a series of 8 recommendations, as follows:

1. Understand the data. Consider potential use cases, the value of the data and potential risks.
2. Consult. Engage stakeholders about the publication programme, be mindful of additional risks that are identified.
3. Remember the three pillars of privacy, data protection and public confidence.
4. Be very sure of the grounds for publishing personal data.
5. Anonymise well and thoroughly. Follow guidelines for anonymising personal data.
6. Remember utility. There is no point publishing data which has been denuded of serious content.
7. Don't release and forget. Anonymisation and Open Data are not cheap options.
8. Have a plan in place in the event of a problem. Be not only transparent, but also transparent about your transparency

Adding basic portal functionalities and enhance data quality. A significant increase has been noted in assessing the sophistication of portal features compared to the functionalities to interact with users of Open Data. On the more technical side, some improvements are still necessary. To further develop automated processes each national portal should have an API in combination with a complete metadata profile. This allows a portal to share the data with data users more easily. This can for instance enable harvesting data directly from public administrations in an automated fashion, saving efforts in manual uploading of data and limiting errors when editing data and metadata manually. The example of Estonia's policy entitled API first, underlines how important machine-to-machine communication is for efficient interactions and overall service delivery.

Other portal features can drive traffic to the portal and help raise awareness around the data made available. For instance having a section providing latest news on Open Data related activities within the country can drive traffic to the site as in terms of unique and returning visitors. Finally, focus on data quality. Now that the basics are in place, with regards to both data policies and data portals, it is key to focus on increasing data quality. A few trivial first steps consist of checking the metadata for typos. Misspelling of licences for instance can cause confusion for users. Different spellings of a given locality can also cause searches to be inconsistent. Typos or different spellings can limit the discovery of data. Here activities conducted at EU level on controlled vocabularies can be of interest to learn from in order to increase semantic interoperability.

Many resources are available on metadata profiles and controlled vocabularies are made available by the European Commission: http://data.europa.eu/

Increasing awareness around Open Data: The significant increase in the number of events has contributed in communicating about Open Data. However, further awareness raising sessions are needed. For example by making the most use of the Train-the-Trainer sessions, which are available on the European Data Portal[61]. This programme consists of 13 training sessions designed for anyone to

[60] European Data Portal, 2016, How to address privacy concerns when opening data
[61] European Data Portal, 2016, Training Companion

discover more about Open Data and run sessions about it. The sessions teach how to deliver training on the basics of Open Data. There is also material included to suit the needs of the trainer.

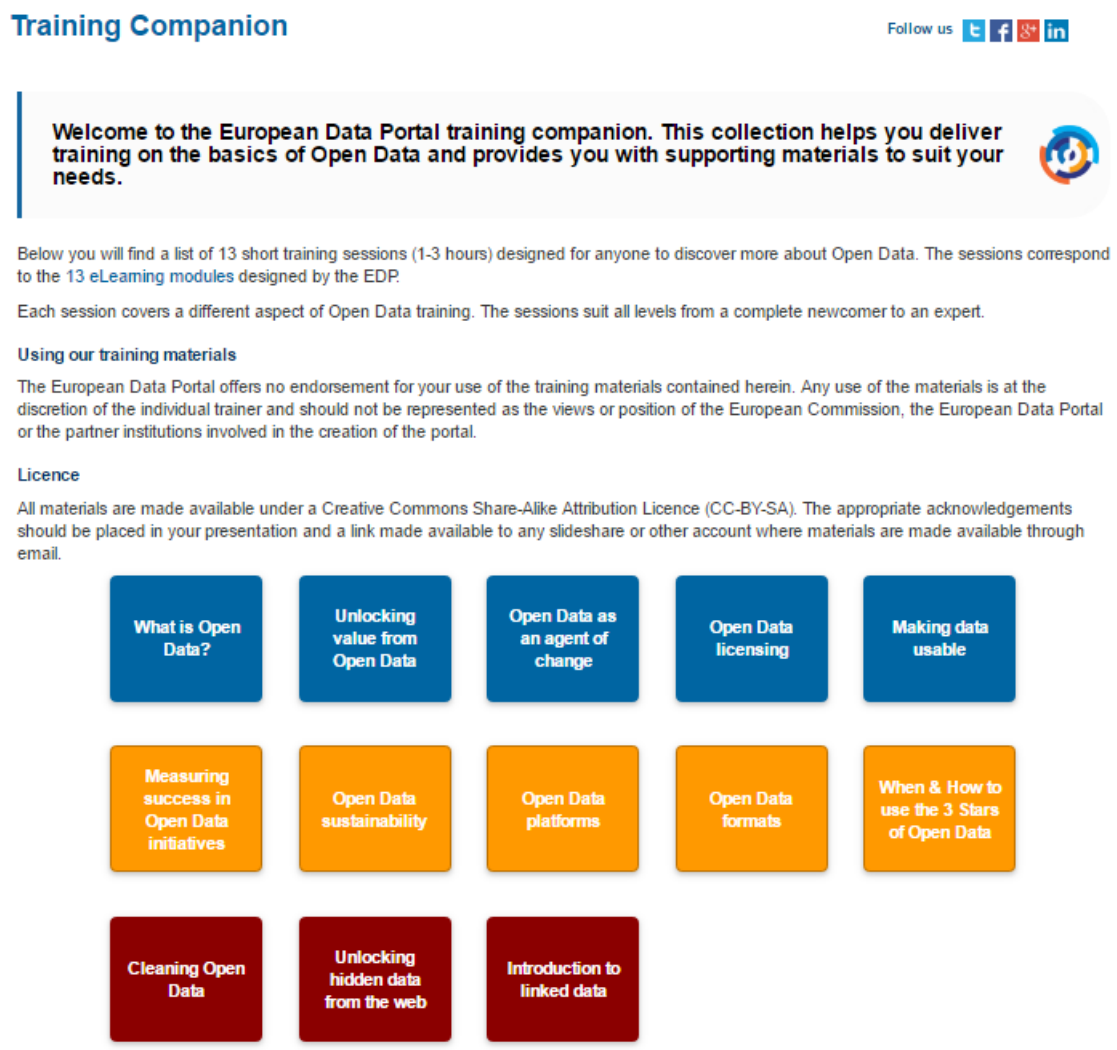


Figure 31 - Training Companion on the European Data Portal

Awareness raising also means focusing on developing the right skill set to work with Open Data. To work with (open) data, different skills are required. Better than chasing "Open Data unicorns", people with well-developed skills in different disciplines, build a team. A multidisciplinary team where skills can be complemented is key. These are the key steps to develop interesting new insights, products and services based on Open Data[62]. These skills blend hard and soft skills as illustrated in the figure below.

[62] European Data Portal, 2016, Discover what skills are required to work with Open Data

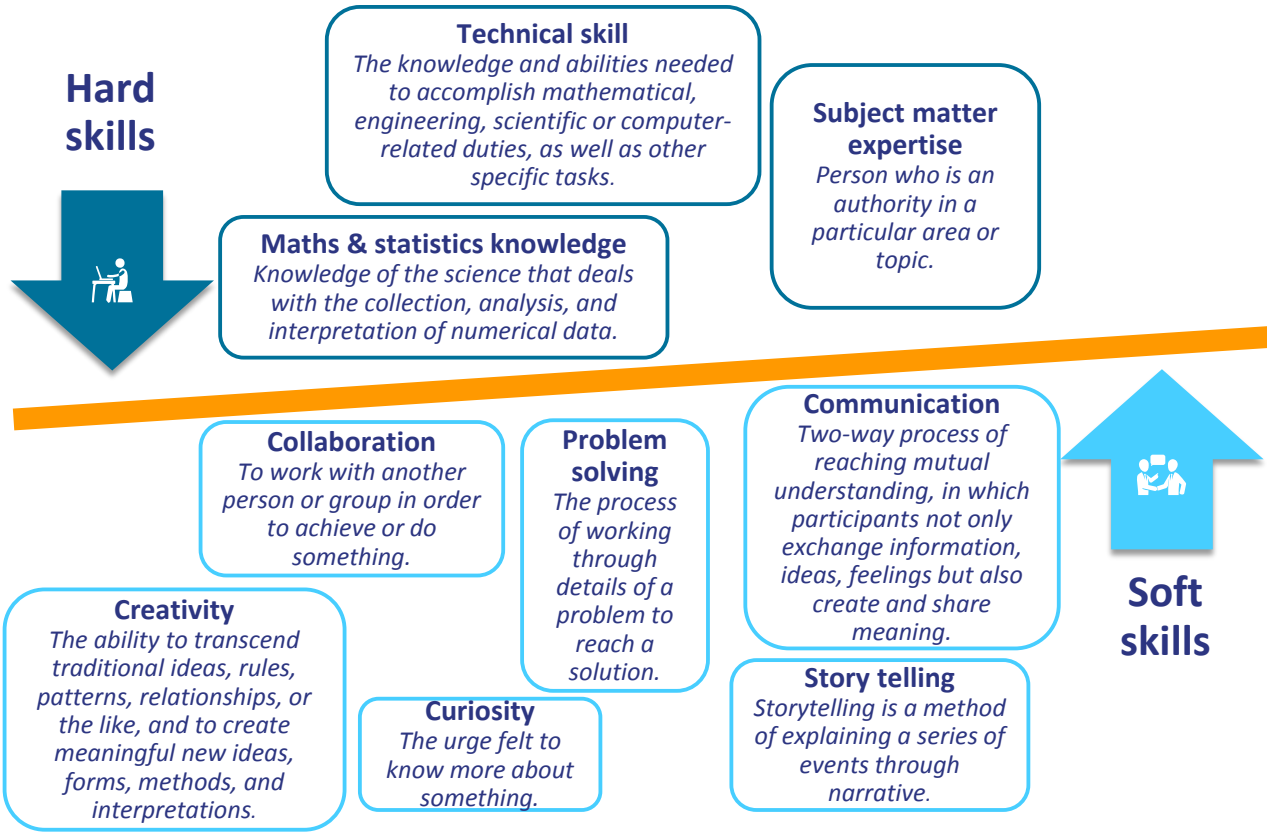


Figure 32 - Hard and Soft skills to work with data

Monitor the impact of Open Data related activities. As countries are advancing more in their Open Data journey, one expects the benefits and impact to increase as well. Countries should measure these benefits to harvest the efforts that have been made. In addition, collecting evidence of the benefits of opening up data and making it available via a portal, will provide evidence to convince more conservative public administrations to open up their data as well. Showcasing examples of applications making use of the data published can also help decision makers as well as users of the benefits of Open Data. Develop sections on your data portal where you present examples of applications, services and products built using Open Data. The European Data Portal contains a long list of examples of re-use [63]

[63] www.europeandataportal.eu/en/training-library/library/use-cases

Conclusion

This report has presented the findings of the Open Data in Europe measurement for 2016. The Open Data maturity for the EU28+ countries is built upon two indicators: Open Data Readiness and Portal Maturity. The assessment sheds light on the progress achieved by the various countries. The impact of Open Data is equally further documented at country level and countries are progressively developing their portals to include further sophisticated portal functionalities. Barriers do however remain in moving forward. These barriers are categorised as political, legal and technical barriers. Recommendations are formulated to help the countries focus on what matters the most to secure the progress they are making in developing Open Data policies and portals. The next report will be released in 2017 and will further explore the progress made by the countries in completing their Open Data journey.

For a complete overview of the results, country by country[64] as well as detailed country factsheets[65], all the data has been made available on the European Data Portal.

We would hereby wish to thank the different countries for their availability in taking part in this measurement exercise and for having validated the scoring.

[64] European Data Portal, landscaping score, 2016

[65] European Data Portal, landscaping factsheets, 2016

Annex I – Links to country factsheets

1. Austria
2. Belgium
3. Bulgaria
4. Croatia
5. Cyprus
6. Czech Republic
7. Denmark
8. Estonia
9. Finland
10. France
11. Germany
12. Greece
13. Hungary
14. Ireland
15. Italy
16. Latvia
17. Liechtenstein
18. Lithuania
19. Luxembourg
20. Malta
21. The Netherlands
22. Norway
23. Poland
24. Portugal
25. Romania
26. Slovakia
27. Slovenia
28. Spain
29. Sweden
30. Switzerland
31. United Kingdom

Annex II – Detailed scoring

Large countries
France
Germany
Italy
Poland
Spain
United Kingdom

Medium countries
Belgium
Czech Republic
Greece
Hungary
Netherlands
Portugal
Romania
Sweden

Small countries	
Austria	Latvia
Bulgaria	Liechtenstein
Croatia	Lithuania
Cyrpus	Luxembourg
Denmark	Malta
Estonia	Norway
Finland	Slovakia
Iceland	Slovenia
Ireland	Switzerland

	# indicators	Answer	Scoring	Additional scoring 2016
Overall scoring	**61**		**1250**	**90**
2.2 Presence of (Open) Data policy	**23**		**500**	**30**
2.2.1 (Open) Data Policy	**15**		**300**	**30**
Q2.1 Is there an (Open) Data policy in your country?		Yes	20	
		No	0	
Q2.2.1 Are there policies supporting the re-use of Public Sector Information (within public administration, by the private sector)?		Yes	20	
		No	0	
Q2.2.2 Is your Open Data Policy the same as your Public Sector Information Policy?		Yes	10	
		No	0	
Q2.2.3 Was the (Open) Data policy in your country updated since April 2015?		Yes		10
		No		0
Q2.3.1 Is there a national (Open) Data portal in your country?		Yes	30	
		No	0	
Q2.3.2 Are there also regional, local portals?		Yes	20	
		No	0	
Q2.4 Can all the different Public Sector Data Holders (ministries, departments, etc) upload data themselves to the portal?		Yes	20	
		No	0	
		Not applicable	0	
Q2.5 What is the frequency in collecting the data from the relevant public sector data holders?		Daily	50	
		Weekly	30	
		Monthly	15	
		Less frequently	0	
		Not standardized	0	
		Not applicable	0	
Q2.6.1 Is there a pre-defined approach to ensure the datasets are up-to-date?		Yes	20	
		No	0	
		Not applicable	0	
Q2.6.2 Has your approach on how to open data changed since mid 2015?		Yes		10
		No		0
Q2.7 Are there priority domains for the release of data?		Yes	10	
		No	0	
		Not applicable	0	
Q2.8 Is Open Data used in decision making (i.e. are public administrations making use of the data as evidence to be included in evidence based policy making)?		Yes	20	
		No	0	
Q2.9 Have there been national or regional events (e.g. hackathon, events) held annually to promote Open Data and PSI re-use (organized by whichever organization or group)?		Yes, less than 4	20	
		Yes, between 4 - 8	30	
		Yes, more than 8	50	
		No	0	
		Yes, less than 3	20	
		Yes, between 3 - 5	30	
		Yes, more than 5	50	
		No	0	
		Yes, less than 2	20	
		Yes, between 2 - 3	30	
		Yes, more than 3	50	
		No	0	
Q2.10 Is there a national strategy in terms of Open Data for the next five years?		Yes	30	
		No	0	
Q2.11. Is the revised PSI Directive transposed?		Yes		10
		No		0

2.2.2 Extent of Coordination at National Level	5		130	0
Q2.12 Do you have national guidelines on the publication of Public Sector Information?		Yes	20	
		No	0	
Q2.13 Do cities or regional governments run their own Open Data initiatives (e.g. dedicated data policies, portals, etc.)?		Yes	10	
		No	0	
Q2.14 Would you describe the number of city/regional Open Data initiatives in your country as very few / some / many initiatives?		Very few	0	
		Some	10	
		Many	40	
		Not applicable	0	
Q2.15.1 Are city/regional portals and datasets integrated into the national Open Data portal?		Yes	30	
		No	0	
		Not applicable	0	
Q2.15.2 If yes, how many portals are integrated?		Few	0	
		Some	10	
		Many	20	
		All	30	

2.2.3 Licensing Norms	3		70	0
Q2.17 Is all data available on the portal free of charge?		Yes	30	
		No	0	
		Not applicable	0	
Q2.18 Is all data available on the portal open licensed (i.e. open licence included in the metadata)?		Yes	25	
		No	0	
		Not applicable	0	
Q2.19 Is there a national data policy that provides or stimulates the use of a standard licence (or suite of licences, for example Creative Commons licences)?		Yes	15	
		No	0	
		Not applicable	0	

2.3 Use of Open Data			200	60
Q3.1 How many unique visitors go to your Portal every month?		<0.014% of inhabitants	0	
		>0.015% of inhabitants	5	
		>0.02% of inhabitants	20	
		>0.025% of inhabitants	25	
		>0.03% of inhabitants	30	
		>0.035% of inhabitants	35	
		>0.04% of inhabitants	40	
		>0.045% of inhabitants	60	
		>0.05% of inhabitants	80	
		I don't know	0	
Q3.2 Is your national Open Data portal accessible via a specific API?		Yes	40	
		No	0	
Q3.3.1 What is the typical profile of your visitors?		Mostly private sector	10	
		Mostly public sector	10	
		Mostly citizens	10	
		A bit of everything	25	
		I don't know	0	
Q3.3.2 What percentage of your visitors is foreign?		Foreign 0 - 4%	0	
		Foreign 5 - 14%	10	
		Foreign 15 - 29%	20	
		Foreign 30 - 44%	30	
		Foreign 45 - 59%	20	
		Foreign >60%	10	
		I don't know	0	
Q3.3.3 What proportion of traffic towards the portal is generated by API (i.e. Machine traffic)?		API 96 - 100%	0	
		API 86 - 95%	5	
		API 71 - 85%	10	
		API 56 - 70%	15	
		API 41 - 55%	20	
		API 26 - 40%	25	
		API 11 - 25%	20	
		API 0 - 10%	15	
		I don't know	0	
Q3.12 Did you see any changes in the re-use of data since mid 2015?		Yes		20
		No		0
Q3.13 Did you launch activities to monitor the re-use of Open Data?		Yes		20
		No		0
Q3.14 Do you support the re-use of Open Data?		Yes		10
		No		0
Q3.15 Did you launch any specific communication activities to promote your Portal or Open Data in general?		Yes		10
		No		0

2.4 Impact of Open Data		300	0
2.4.1 Political Impact		120	0
Q4.1 Since June 2015, have you launched any activities to monitor the impact of Open Data?	Yes	30	
	No	0	
Q4.2 Has Open Data had a low/medium/high impact on increasing government efficiency and effectiveness?	Low	0	
	Medium	20	
	High	40	
	I don't know	0	
Q4.3 Has Open Data had a low/medium/high impact on increasing transparency and accountability in the country?	Low	0	
	Medium	20	
	High	50	
	I don't know	0	
2.4.2 Social Impact		60	0
Q4.4 Has Open Data had a low/medium/high impact on environmental sustainability in the country?	Low	0	
	Medium	15	
	High	30	
	I don't know	0	
Q4.5 Has Open Data had an impact on increasing the inclusion of marginalized groups in policy making and accessing government services?	Low	0	
	Medium	15	
	High	30	
	I don't know	0	
2.4.3 Economic Impact		120	0
Q4.6 Have there been macro-economic studies assessing the market value of Open Data (i.e. estimating the euro value of Open Data in your country)?	Yes	40	
	No	0	
	I don't know	0	
Q4.7 Have there been studies on assessing better service delivery for users of public services?	Yes	30	
	No	0	
	I don't know	0	
Q4.8 Are there any additional studies on the impact of Open Data in your country that you would like to share with the research team?	Yes	20	
	No	0	
	I don't know	0	
Q4.9 What kind of funding model has been developed when setting up the portal?	Profit Maximizing	0	
	Average Cost / Cost Recovery	10	
	Marginal (Zero) Cost Model	30	
	I don't know	0	

2.7 Portal features		250	0
2.7.1 Usability of the portal		60	0
Q7.1 Does your national Open Data portal offer a feedback mechanism on datasets?	Yes	20	
	No	0	
Q7.2 Does your national Open Data portal offer the possibility to contribute to datasets?	Yes	20	
	No	0	
Q7.3 Does your national Open Data portal offer the possibility to download datasets?	Yes	10	
	No	0	
Q7.4 Does your national Open Data portal offer the possibility to access datasets?	Yes	10	
	No	0	
2.7.2 Re-usability of the portal		140	0
Q7.5 Does your national Open Data portal offer the possibility to download all datasets at once (in	Yes	20	
	No	0	
Q7.6 What proportion of the data is available in machine readable format? [self assessment]	≥ 90%	60	
	70 - 89%	50	
	50 - 69%	40	
	40 - 49%	30	
	25 - 39%	20	
	≤ 24%	10	
	No	0	
Q7.7 Does your national Open Data portal offer the possibility to search on file format?	Yes	20	
	No	0	
Q7.8 Does your national Open Data portal include the possibility to request datasets?	Yes	20	
	No	0	
Q7.9 Does your national Open Data portal include a news section?	Yes	10	
	No	0	
Q7.10 Does your national Open Data portal include examples of the re-use of Open Data?	Yes	10	
	No	0	
2.7.3 Spread of data across domains		50	0
Q7.11 Does your national Open Data portal offer the possibility to search on data domain?	Yes	20	
	No	0	
Q7.12 Does your national Open Data portal distinguish between more than 10 data domains?	Yes	15	
	No	0	
Q7.13 Does your national Open Data portal include datasets from more than five data publishers (departments, institutions)?	Yes	15	
	No	0	

Annex III – Domains listed in the G8 Open Data Charter

To adopt an internationally recognised approach in structuring data sets, the consortium uses the domains listed in the G8 Open Data Charter.[66]

Data Category* (alphabetical order)	Example datasets
Companies	Company/business register
Crime and Justice	Crime statistics, safety
Earth observation	Meteorological/weather, agriculture, forestry, fishing, and hunting
Education	List of schools; performance of schools, digital skills
Energy and Environment	Pollution levels, energy consumption
Finance and contracts	Transaction spend, contracts let, call for tender, future tenders, local budget, national budget (planned and spent)
Geospatial	Topography, postcodes, national maps, local maps
Global Development	Aid, food security, extractives, land
Government Accountability and Democracy	Government contact points, election results, legislation and statutes, salaries (pay scales), hospitality/gifts
Health	Prescription data, performance data
Science and Research	Genome data, research and educational activity, experiment results
Statistics	National Statistics, Census, infrastructure, wealth, skills
Social mobility and welfare	Housing, health insurance and unemployment benefits
Transport and Infrastructure	Public transport timetables, access points broadband penetration

[66] Open Data Charter, 2013