International open data best practices
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INDEX

INTRODUCTION

The Open Data Barometer

1. PREPARATION FOR OPEN DATA

1.1. Government policies and actions
   1.1.1. Open data initiatives
   1.1.2. Open data strategies and policies
   1.1.3. Data management and publication

1.2. Business and entrepreneurs
   1.2.1. Support for innovation
   1.2.2. Availability of training resources

1.3. Civic and regulatory framework
   1.3.1. Regulatory framework
   1.3.2. Collaboration between government and civil society in the publication and use of data.

2. DATA AVAILABILITY

2.1. Aspects related to data quality
   2.1.1. Machine readable formats
   2.2.2. Gratuity and completeness
   2.2.3. Open licences and re-use
   2.2.4. Information updating and sustainability

2.2. Examples of best practices and use cases in the publication of data
   2.2.1. Maps and cartography
   2.2.2. Property registry
   2.2.3. Official statistics
   2.2.4. Budget and expenditure
   2.2.5. Business registry
2.2.6. National legislation  
2.2.7. Public transport  
2.2.8. International trade  
2.2.9. Health  
2.2.10. Education  
2.2.11. Criminality  
2.2.12. Environment  
2.2.13. Election results  
2.2.14. Public procurement

3. IMPACT OF OPEN DATA

3.1. Political impact  
   3.1.1. Government efficacy and efficiency  
   3.1.2. Transparency and accountability

3.2. Social impact  
   3.2.1. Inclusion of marginalised social groups  
   3.2.2. Environmental sustainability

3.3. Economic impact  
   3.3.1. Macroeconomic impact  
   3.3.2. Entrepreneurs and new business

4. MAIN CONCLUSIONS AT GLOBAL LEVEL

5. FIGURES AND MAPS
INTRODUCTION

Following on from the report on Trends in Open Data Initiatives published two years ago, this document reviews the best and latest practices in the implementation of open data to be found throughout the world.

To this end, this report is based on the analysis of the results and the large amount of data available in the third edition of the Open Data Barometer, placing special emphasis on existing practices in the most outstanding countries and with the best performance within each of the multiple indicators included in the study.

Developed by the World Wide Web Foundation in collaboration with the Open Data for Development network (OD4D), the Open Data Barometer (ODB) seeks to discover the true value and impact of open data initiatives around the world as regards the principles of the International Open Data Charter. The Barometer analyses global trends, and provides comparative data on countries and regions using a detailed methodology which combines data on the context and preparation of the country, technical assessments of the level of openness of available data and other secondary indicators developed by international reference bodies, including a detailed analysis on three components as detailed in the following figure:

![Figure 1. Study areas of the Open Data Barometer](image)

The following sections will review in detail the best practices for each of the main study areas of the Barometer: Preparation, Data Availability and Impact.
1. PREPARATION FOR OPEN DATA

An open data initiative needs the collaboration of each stakeholder to be effective, including government, civil society and the private sector. It must always seek an appropriate balance between a government with the capacity to create, manage and publish data and other agents that have the resources, technical know-how and the socio-political environment needed to use such data as a tool for creation and evolution.

In this chapter, a number of examples of best practices and use cases for each of the indicators covered by the Barometer are reviewed to obtain an adequate preparation to make data openness more efficient, including:

- **Open data strategies and policies** that provide a sound policy framework to achieve the long-term sustainability required.

- **Open data initiatives** that provide the necessary resources to materialize the established strategies and policies.

- **Proper data management and publication** to guarantee the necessary quality in the data that is shared.

1.1 Government policies and actions

This section will address some examples of how best-valued governments prepare to make the most of open data.

1.1.1 Open data strategies and policies

There must be a national policy or strategy that serves as a guide in the transition towards open data in the medium and long term. This policy should clearly establish the right of access and re-use of information, as well as the obligation to use open licenses.

In order to create the necessary capacity to carry out these processes, theoretical and skills training actions should also be planned for the public employees who will carry them out. In addition, regular monitoring of the progress made is also necessary.
Some reference examples at international level are shown below:

**France**

The [roadmap](#) published in 2013 serves as a reference for the strategy of public data openness and sharing in the country where the principle of free public data defined in a previous circular is reaffirmed. This roadmap also relies on the [reference documentation](#) developed with the aim of explaining the importance of open data to public employees and promoting its adoption.

In addition, the [creation of specific sectoral committees](#) has also led to the publication of new specific recommendations for the [transport](#) and [health](#) sectors, some of them already incorporated in the applicable legislation.

The evolution of the initiative can also be followed through the specific [control panel](#) included in the national catalogue. This monitoring serves to assess progress towards the target of the [40,000 datasets published](#) that has been set for the year 2017. In addition, the indicators are also used to establish the project’s budget priorities. [Etalab](#) regularly organizes training and skills development actions aimed at public employees, generally intensive and focused on a specific sector.

**United Kingdom**

Each of the government's main agencies has its own open data strategy and is responsible for coordinating its publication. For its part, the government has also developed and implemented different reference policies in this area, including:

- The [Open Data Whitepaper](#) published in 2012 as a guide to implement the national project.

- [Departmental strategies](#), published and updated independently by each agency.

- [Action Plans for Open Government](#), which contain numerous commitments on open data.

Precisely the latest action plan to date includes the explicit commitment that all government data must be "open by default." For the assessment of progress the development of a model of
maturity and self-evaluation has been commissioned. Additionally, the government has established a number of concerted training and skills development actions for public employees and a "programmers’ club" with the aim of bringing the data closer to the employees.

1.1.2. Open data initiatives

In order for an open data initiative to be solid, the necessary resources to provide support and continuity should be available, including the necessary staff and budget. There must also be an explicit commitment from the government supporting the initiative publicly and officially.

Some reference examples at international level are shown below:

France

The decree of the Prime Minister of 2011 was the official start of the open data initiative in the country, establishing the principle of free and open access for the re-use of public sector information. From there, the Etalab mission was created to support administrations in the process of opening up their data, as well as serving as an interlocutor with the other social agents. In the year 2013 Etalab published a new version of its data catalogue that became the first platform of this type open to citizen contribution.

The 2015 team had 11 people managed by the General Secretariat of Modernization and an allocated budget of one million euros. In addition, open data is one of the main objectives in the National Digital Strategy and the Action Plan for Open Government.

Republic of Korea

The Open Data Strategic Council is responsible for coordinating and evaluating all government policies and strategic plans for open data, including the data catalogue itself.

The government plans to invest approximately 10 million euros in the period 2015 to 2017 and has a team of 5 people in the Ministry of Public Administration, 40 people in the National Agency for the Information Society and 605 people in the different municipal governments.

All this is backed by a support centre dedicated exclusively to open data and a law that includes all the commitments acquired, including the planned implementation schedule.
The US has for a long time had an open data initiative with a robust action plan which has recently been strengthened with the 2014 presidential order through which open and reusable data became the new standard of the administration.

The agencies in charge of the initiative are the same ones responsible for e-administration, science and technology. Moreover, there are leaders in each of the federal agencies responsible for coordinating all actions related to open data in collaboration with a specific working group. In addition to the official data catalogue, there are other initiatives focused on more specific sectors such as health, energy or education.

The UK has been a pioneer since 2009 and has succeeded in establishing a mature and stable open data Initiative which relies on several important pillars such as the National Open Government Licence, the Open Data User Group and a whole policy base that provides support. Thanks to this, the national initiative has enjoyed a period of continuity and growth even through several different governments.

To this day, the government continues to work on ambitious new goals, such as the development of a national data infrastructure, all coordinated from the Cabinet Office.

The team that maintains the data catalogue has four people engaged exclusively in this task and an annual budget of £800,000.

1.1.3. Data management and publication

Effective management will require a complete inventory of existing data, regardless of whether it has been published or not. Added to this must be metadata and complete reference documentation explaining clearly the characteristics that define the dataset we are working with.

Finally, in order to guarantee minimum data quality, it is also necessary to carry out routine checks on several aspects such as completeness, level of detail, update frequency or maintenance over time, among other characteristics.
Some reference examples at international level are shown below:

**United Kingdom**

The national data catalogue has been in place since 2010 and contains records and metadata of the available data and that which has not been already published. Moreover, it is also complemented with several functionalities that facilitate the continuous feedback of the users, who can for example request new data or make queries. For purposes of information, estimates on future updates and the launching of new datasets are also published.

In addition, there are technical guidelines and standards for the publication of datasets, as well as principles for public data designed to guide the different government agencies. All this is reinforced by the principles of open standards for software interoperability, which also require the use of open data standards.

The catalogue also uses the "5 stars" rating system to assess the published data and the incorporation of a new system to report incidents regarding the quality of data is being evaluated. The new national data infrastructure in development plans to incorporate further documentation on file formats, standards used and any applicable level of service agreement.

**United States**

The national catalogue follows the publication guidelines established through the "Project Open Data schema", which establishes the specific metadata that should accompany the published datasets. The project also includes introductory materials and multiple additional information, as well as other practical guides. There is also the possibility of requesting new data not yet available, as well as reporting problems with existing data.

All this is complemented by a special program at the service of the general administration whose objective is to provide the necessary support to all federal agencies so they can develop their own programming interfaces and thus improve access to the data they manage.
1.2. Business and entrepreneurs

Open data are also a tool that governments can use to create new ideas, create new businesses and generate more wealth and employment in general. All these potential benefits should be encouraged by explicit support through training activities and promotion.

This section addresses some examples of how best-valued governments are prepared to promote innovation and economic development through open data.

1.2.1. Support for innovation

Governments should make substantial commitments to promote a new culture of innovation using data as raw material. This requires the organization of different activities focused on both civil society and the private sector. All relevant government agencies should be involved in the development of these initiatives, and the different existing incentives should ideally include economic incentives. In addition, the administration itself should become an active part of the process and have internal teams and processes dedicated to fostering innovation.

Some reference examples at international level are shown below:

France

The country’s administration has long supported the promotion of the innovation culture through data in its two possible aspects. Internally it is articulated through the Startup State programme, which has led to projects to simplify access to public procurement and public aid or access to fiscal data. Only in the year 2015 7 million euros were distributed over a total of 42 projects, half of them based on open data. The government also supports digital innovation through its new initiative, French Tech, in which open data is also crucial.

United Kingdom

The government has launched a whole series of initiatives for the promotion of innovation, including an incubation programme for data companies, an aid programme for data innovation and a number of innovative idea contests to tackle social and economic challenges and solve them using data.
Other specific agencies have also created their own programmes for the promotion of innovation through open data, such as the Innovation Department or the National Maps Agency.

### 1.2.2. Availability of training resources

There needs to be widespread access to quality training to cover the new needs that arise from open data, from purely technological aspects to more advanced aspects of data science, including also the essential notions of other closely related subjects such as statistics, graphic representation of information or legal aspects, among others.

Some reference examples at international level are shown below:

#### United Kingdom

There is a wide range of possibilities in the country to improve personal skills in the use and re-use of data. There is a whole catalogue of options in universities ranging from data science to related technologies, analytics or even innovation through data, as well as many other specialities. There is also the possibility of taking professional training courses through bodies that offer them regularly, such as the Open Data Institute and Open Knowledge. These courses cover a wide range of subjects with everything needed to work with open data.

#### United States

Challenge.gov provides training modules on how to take advantage of innovative models of data use to solve social problems. There are also many other organizations such as Open Knowledge, Sunlight Foundation or GovLab that offer open data training covering multiple aspects. Of course, the country's universities also have several related training programmes in their catalogues, including data science, design with data or data visualization and some even have their own data school.

#### France

There are several entities, both public and private, that give access to a whole training catalogue that includes from political and legal aspects to community management, data journalism or data science. The central government and local agencies also organize their own training events. To
all these, we must add the usual training courses in issues related to statistics, journalism, engineering or political science.

### 1.3. Regulatory and civil framework

In order for an open data initiative to flourish and bear fruit, a number of initial conditions must be met in society, including at least a **legislation that supports privacy, freedom of information and the right to access data**. Without these elements any initiative would run the risk of becoming mere appearance without real transformative effect. In addition, the rights mentioned also provide an ideal basis upon which to build a society that is more participatory and involved in government decisions.

This section addresses some examples of these legislative and collaborative aspects in the best-valued governments.

#### 1.3.1 Regulatory framework

Regulatory frameworks that guarantee access to information and the protection of personal data must exist and be sufficiently strong, reliable and with guaranteed operation. There are two **key elements** in this area:

1. To have solid and established rights of access to information regulated under their own legal framework and for these rights to be put into practice effectively. Examples of reference in this regard are countries such as **Finland, United Kingdom, New Zealand, Chile, Estonia, Iceland, Republic of Korea** or **Sweden**.

2. To have a consistent data protection framework that is broad in its scope of application and includes the right to choose and the decision-making capacity of individuals, which allows access to personal data and rectification thereof and imposes clear responsibilities in the treatment of the data. Examples of reference in this regard are mainly European countries such as **Finland, Estonia, Belgium, Sweden, Spain, Uruguay, France, Norway, Germany, Iceland** or **Ireland**.
1.3.2 Collaboration between the government and civil society in data publication and use

A society that actively and constantly engages, organizes, participates and demands more data is a key element to guarantee the success of any open data initiative. The government on its part must always listen and be open to collaboration. Communication between the two parties should be continuous and fluid.

Some reference examples at international level are shown below:

United Kingdom

The country has a competition and innovation programme through which key challenges are posed in sectors such as energy management or geographic and urban mobility, so they can be solved in the best possible way by using the new possibilities offered by open data.

France

To encourage external collaboration, Etalab holds the annual Dataconnexions competition that presents an award to the best initiative for the use of open data published by the administration. It is the fifth edition of the competition. There are also other sectoral initiatives such as the Climate Change Challenge, an event with an innovative format whose goal is the co-creation of innovative solutions to the challenges posed by climate change thanks to the awareness and dialogue enabled by the data.
2. DATA AVAILABILITY

This section presents examples of good quality practices in the publication of reference and high value datasets selected among the 1,380 sets analysed in total. All have achieved the highest scores of the study in their respective categories or have fallen just short thereof, generally due only to the lack of unique codes for the data to allow adequate identification for subsequent treatment.

In the Barometer the quality of government data available is analysed through a number of indicators inspired by the principles of open data and the open definition, indicated in the following figure.

![Figure 2. Quality indicator of Open Data Barometer](image)

### 2.1. Maps and cartography

The biggest problem with cartographic data is the lack of regular updating. Therefore, there are few examples that can be found with the highest possible score. One of them is the Ordnance Survey in the UK that offers a whole range of maps, data and additional products in open, reusable and free format available to anyone who wants to use them.

Geogratis, Geobase and the Canada Atlas are the three main products through which the Government of Canada also offers access to geospatial and topographic data, as well as other additional services for the search and discovery of related information.
2.2. Property registry

Property records are one of the most problematic datasets, since they are rarely available in open and online format, and when they are, they are generally very difficult to find and it is not uncommon that they also require payment of some kind of fee to access the information.

Once again the United Kingdom, through its property register, gives us detailed and public information on the prices paid and the details of transactions made since 1995 at monthly, annual and total level. It also complements access to raw data with a useful query tool and even an index of housing prices in the country from the available data.

2.3. Official statistics

Although official statistics are the type of data that are most easily found online in most of the countries analysed, it is still difficult to find these data under an open license that allows them to be re-used. Even so, there are some notable examples such as the open data available through the US National Statistical Agency, which covers a wide variety of topics with more than 3,800 datasets available in XLSX and CSV formats, including: business, economy, education, employment, families, health, housing, income, trade, population and public sector information.

The French INSEE also provides a wide range of statistical data in open format, valid for re-use through the national open data platform data.gouv.fr, including a population census that is updated annually and is based on surveys from the last five years.

Data.gov.ie also provides a variety of up to 112 individual datasets from the Irish Central Bureau of Statistics, which includes information on such varied topics as population, society, agriculture, fisheries, food, the environment, Economy and finance, education, crime, science, technology, transportation, housing, health, art, culture, government and public services. All these data are also available through a dedicated website and, in addition, the census data also has its own semantic data service.
2.4. Budgets and expenditure

These represent the two faces of open data since, although budgets are widely available and generally in an open form, as regards expenditures on the contrary it is also almost impossible to find data disaggregated at the level of individual transaction.

However, in Brazil, the integrated planning and budgeting system (SIOP) provides historical budget data between 2010 and 2015 for each institution and department of the different agencies in the three existing levels of government. All information can be exported in reusable formats such as CSV and XLS. Other additional features include specific reports on budgets and expenditures on specific government action plans, as well as a database of budget legislation. In addition the national open data portal also offers the same information in semantic format for the period 2000-2014.

On the other hand, the website dedicated to public spending in the United States not only allows detailed searches to be performed with a variety of criteria, but we can also select the information we want to download in different formats, all of them reusable (CSV, TSV or XML). An access interface (API) is also available which facilitates the work of programmers who want to re-use the information to offer new applications and services.

2.5. Business registry

Undoubtedly the least accessible dataset in the world. It is only possible to offer one example of good practice on this occasion, which also has certain limitations.

ABN Lookup is the public access to the Australian Business Registry (ABR) which provides complete and open information on any company that has been registered to obtain the appropriate identification number (ABN). The same information is available through the official data catalogue for download in open and reusable (CSV) format.

2.6. National legislation

This data is very rarely available in open and reusable formats, with one notable exception which provides one of the best open databases existing in all areas.
The **UK National Archive** has a comprehensive [national database on legislation](https://www.nationalarchives.gov.uk/datasets), including all historical reviews of existing laws. The website is built on a database in XML format which is also accessed through a publicly available [programming interface](https://www.nationalarchives.gov.uk/datasets) (API) that also enables access to the same data in semantic format through the content negotiation technique. All the details can be consulted through the [specific documentation for the developers](https://www.nationalarchives.gov.uk/datasets) who want to re-use the data.

### 2.7. Public transport

Despite being one of the datasets most in demand, it is still one of the most difficult to locate, especially in less developed countries. And in the rest of countries the situation is quite different, as for example:

- The [public transport database in London](https://www.tfl.gov.uk/safety-operations/database-and-routes), which also has information on [UK bus schedules, buses, trams and ferries](https://www.tfl.gov.uk/), as well as a [complete database of public transport access points](https://www.tfl.gov.uk/transport-database) (NaPTAN).

- In **France** the main rail transport networks (SNCF and RATP) provide [frequently updated open data on schedules, stations and safety information](https://www.sncf.com/).  

- [Journey.fi](https://journey.fi) is the service of the public transport agency in **Finland** that provides accurate information on trains, buses and flights. This service also includes local connection routes for 21 cities in the country.

- Added to this example, the National Transportation Directorate in **Uruguay** offers its inhabitants permanently updated information on the [schedules of the national bus service](https://www.ministeriodetransporte.gub.uy/).  

- [Strætó](https://www.straeto.is) is the service with real time information on bus schedules in **Iceland** managed by the six municipalities that make up the metropolitan area of the capital of the country. Apart from providing information through an interactive map it also allows download of all data in XML format.

- In **Chile** there is information on public transport for the main regions and cities of the country, including Santiago, Valparaiso, Concepción and Los Lagos.

- Finally, information on [stations, stops and schedules of the transport network](https://www.red.es), including trains and buses at national level, is also available in **Greece**.
2.8. International trade

In the category of international trade data it is possible to find a greater number of countries that have information available and ready to be re-used, although usually in an excessively aggregated form. This type of data is usually collected through national statistical agencies, foreign trade departments or by the customs authorities themselves, and is classified according to the different types of goods.

The best-rated examples in this category include data available in the United Kingdom, the United States, France, Canada, Denmark, the Netherlands, Sweden, Australia, Austria, Brazil and Ireland.

2.9. Health

Although the available information is usually disseminated by multiple agencies and is not easily locatable, there are several examples again that have a high score on the Barometer scale.

- The wide range of health data available through the National Health System (NHS) in the UK, including for example more specific data such as vaccination statistics.
o In the case of the **Netherlands**, it is the national statistical centre which provides varied information on health.

o In **Sweden**, the National Council not only publishes statistics on diseases, injuries and mortality, but also a complete set of national guidelines for the prevention and treatment of diverse diseases in reusable formats.

o Both the Brazilian health portal (DATASUS) and the Institute of Geographic and Statistical Information (IBGE) make available to their users a selection of health information through graphs and reusable data files.

o In turn, the open data portal in **Uruguay** provides a large amount of health data published by the Ministry of Health.

o Since 2009 every hospital in **Switzerland** has to publish certain indicators on the quality of the services offered, including the number of cases, mortality statistics, proportions and duration of the average stays.
2.10. Education

Information on performance of the educational system also offers us a wide variety of examples from countries at the top of the ranking, which publish high quality data, though it is often not in reusable format and is also published irregularly and therefore hardly comparable. This data is generally shared between the ministries responsible for education and the national statistical agencies.

- **School performance** and inspection information in several regions of the UK, as well as **absenteeism levels** in school.

- In **France** the Ministry of National Education, Higher Education and Public Research publishes **statistics on school performance** for each centre, including the results of examinations, through the national data platform.

- Both the **Ministry of Children, Education and Gender Equality** and the **National Statistics Agency** publish data on the performance of the education system in **Denmark**. The Ministry of Higher Education and Science also provides some information, but in non-reusable formats.

- The main providers of this type of information in **the Netherlands** are once again the Ministry of Education, Culture and Science - through the **national data catalogue** - and the **National Statistics Agency**.

- In **Australia** this information is available from a variety of sources, including the National Statistical Institute. However, the most complete information can be obtained from the data published by each state, such as **New South Wales** or **Victoria**.

- INEP, an agency attached to the Ministry of Education in **Brazil**, is responsible for providing **detailed statistics** for both basic and university education, including indicators on school census, level of educational development, infrastructure quality, educational options available, attendance ratios, graduation age, etc. The Department of Education and Skills of the Irish National Statistics Agency publishes **indicators** annually on students and teachers at all educational levels.
2.11. Criminality

Crime data is generally quite homogeneous in terms of structure and level of detail across the different countries. It is available in many countries, but most of it is only in the form of reports and not as reusable formats. Some exceptions are those shown in the following figure:

- **UK police** provide [information on crime](#) broken down by units and areas. Moreover, the information is also available through a programming interface (API) to facilitate its re-use.

- **Crime data** is also available in **Canada**, including the nature of the crimes and the application of civil and criminal justice. Denmark also offers [data](#) on the crimes committed, victims, prosecutions, convictions and recidivism.

- In **Germany**, crime data is collected and analysed for the total of the country by the federal police (BKA), although there is also some data available for states, districts and cities. The data is aggregated at the level of the criminal offices of each state.

- In **Spain**, the Ministry of the Interior has published [quarterly data on crime](#) since 2005, which includes the total number of crimes and the breakdown by types (homicides, murders,
violent deaths, robberies with violence or intimidation, robbery in homes, vehicle theft, drug trafficking, etc.).

- **Singapore** police share key crime statistics from their annual report. The data includes information on the entire crime life cycle, including geographic coordinates.

- **Ireland**'s central statistical office publishes crime data on a quarterly basis including the number of reported incidents classified by type of crime and region. The data comes from the PULSE system to promote police effectiveness.

### 2.12. Environment

There is a general lack of environmental information, with a large number of countries that do not publish any information at all, with the exception of:

- In the **UK**, the DEFRA agency publishes information on different air pollutants and suspended particles. It is also possible to perform custom or raw data downloads for the total data.

- The **environmental sustainability indicators** (CESI) program in **Canada** tracks data on the country's performance related to certain indicators of environmental sustainability including
information on air quality, climate change, water availability and quality, and protection of the nature.

- In **Finland** there is data from the *air quality analysis* based on the research conducted by the IMF and SYKE, as well as some *statistics on natural and environmental resources* and *forests*.

- **Germany** has a large amount of information accessible through the *National Weather Service*. More information on *air quality* and the *level of riverbeds* can also be found through other agencies.

- In **Brazil**, thanks to satellite monitoring, it is possible to obtain data on *gas emissions* and *deforestation* that are frequently used by civil organizations to open the *public debate* on the problem.

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### 2.13. Election results

Electoral data on the other hand is widely available, although not always with the level of detail that would be desirable. Some good references in this area would be those identified in this figure.
The UK electoral commission coordinates the management of all **electoral data** as an independent body reporting directly to the British Parliament.

Information on the electoral results in **France**, including presidential and parliamentary elections, is available in open format through the national catalogue.

In **Sweden** the **data available** includes details on incoming and outgoing MPs, seat allocation, vote distribution and division by regions and cities.

The Electoral Commission of **Australia** provides a **complete collection of electoral data** in raw since 2004.

All **data on municipal, parliamentary, presidential and European** elections is also available in **Finland**.

Other countries that publish statistics and electoral data following the open data guidelines and philosophy are **Brazil**, the **Czech Republic** and **Costa Rica**.
2.14. Public procurement

The main problem with public procurement data is that it is very rarely available in reusable formats, which makes its subsequent analysis very difficult. In this case some good examples to follow are those included in this chart.

- Since 2004, Canada’s new regulations require all contracts above $10,000 to be published. The listings are updated quarterly.

- Historical recruitment data for all government agencies in Australia since 1999 is available through the AusTender platform.

- In Uruguay, the Procurement and Contracting Agency of the State (ACCE) provides information on tenders and contracts through the state procurement portal.

- The different Swiss contracting authorities at federal, cantonal, local level and public companies jointly operate an information system on recruitment, tender and contract opportunities, that can also be managed directly through the site itself.
3. IMPACT OF OPEN DATA

Finally, this last section reviews some examples of good practices and use cases for each of the following impact areas covered by the Barometer.

3.1. Political impact

In this section we will see some examples of how open data can contribute to generating political impact in different ways.

3.1.1. Government efficiency and efficacy

Open data can contribute to improving government efficiency and effectiveness in multiple ways:

- Improving resource planning and management.
- Facilitating public scrutiny and cost optimization.
- Making possible the development of new external services that contribute to the efficiency of existing services.
- Improving communication and collaboration among departments.
- Elaborating new policies based on existing data.

Here are some international reference examples.

Denmark

Thanks to open data, the fire department has access to information about the storage of potentially explosive or poisonous materials, which makes their interventions safer. Another good example is the programme for publication of address databases, which in addition to improving the data quality obtained an estimated saving of more than 10 million euros per year.

France

Cases such as FinCom or DataPublica, which assess the financial situation of cities and use open information to improve local policies, show how open data is having an impact on the efficiency and effectiveness of government in the country. In this case too the publication of the national
address database has been an important milestone whose direct impact on the country's economy is estimated at around 0.5% of GDP.

**New Zealand**

In a recent survey of all government agencies, approximately two-thirds acknowledged using open data from other agencies, reducing time for data management and avoiding redundancies. The report on the state of the nation also draws upon multiple sources of open government data, such as the statistical office or the police. Another interesting example is the experiment carried out through which the economic trends in the country can be predicted thanks to the monitoring of traffic lights and traffic.

**Norway**

The Agency for Public Management and eGovernment (DIFI) believes that openness of geospatial data has resulted in a reduction in the costs of sharing such information between agencies. In addition, openness of company registers has also led to greater efficiency. Other relevant examples in the country are the use of open data to improve the management of nurseries or also improve the quality of public road network data.

### 3.1.2. Transparency and accountability

Data can contribute to improving the transparency and accountability of governments in different ways:

- Providing raw material which investigative journalists can use to monitor government activities.

- Providing applications through which citizens can give their opinion about the public services they receive.

- Making possible the monitoring of government decisions.

- Contributing to increased involvement of society in the day-to-day of politics.

Here are some international reference examples.
United Kingdom

Publication of data on multiple sectors such as crime, health, public spending or elections has had a considerable impact on the transparency of government actions, including examples such as the creation of the Peace Index, the use of visualization in Where do my taxes go to influence spending policies or the debate on participation in elections.

France

The platform OpenFisca is a complete and open simulation of the country's socio-fiscal system. Thanks to the use of the data opened up by the administration anyone can perform simulations on how tax revenues are currently used and what impact any reform in budgets would have on the funding of government programmes. Open data has also contributed to the analysis of a number of controversial cases in the administration, such as the undue allocation of funds to certain entities, perks received by doctors from pharmaceutical companies, local funding or the activity of members of parliament.

Norway

Despite having a long tradition of transparency, the emergence of open data has also given rise to new positive effects in the country, such as a significant boost to so-called data journalism or new innovative services such as Do they fulfil their promises? Additionally, since the beginning of the national open data initiative, the number of requests for access to information has been reduced by 400% thanks to the new philosophy of proactive transparency.

3.2. Social Impact

In this section we will see some examples of how open data can contribute to generating social impact in different ways.

3.2.1. Inclusion of marginalized social groups

Open data can help facilitate the inclusion of certain marginalized groups in society (by age, race, sex, class, skills, etc.) through the direct use of data by these groups to campaign for their rights and equality.
Here are some international reference examples.

**Canada**

A large number of participants in the [Open Data Experience](#) that the government convenes annually are young, a group that traditionally has not had a high degree of participation in the development of public policies. In addition, there is a considerable amount of [open data on Aboriginal communities](#) that has been used to assess the [inclusion of these groups in society](#) and [general awareness](#).

**Mexico**

In Mexico there are a number of documented cases on how open data has been used to favour certain traditionally marginalized groups, with examples such as the [reduction of maternal mortality](#), the [respect for historical rights to land ownership](#), the [fight against violence](#) or the [atlas of marginality](#).

**Austria**

In several cities new applications and services have been developed to facilitate the movement of disabled people through the re-use of public sector information, including the [location of car parks for disabled people](#) or [maps of accessible public transport stations](#).

**Sweden**

There are some examples in Sweden of how data published by the government has been used, for example, to improve inclusion and care policies for the [unemployed](#) or the [immigrant community](#). There are also other examples of services designed to facilitate the daily activity of [disabled people](#) or [the elderly](#).
3.2.2. Environmental sustainability

Open data can have a direct impact on environmental sustainability in different ways:

- Facilitating access to information on pollution and environmental impact.
- More detailed monitoring of energy efficiency.
- Creating awareness of our impact on the environment.
- Providing the basis for the creation of environmental protection campaigns.

Here are some international reference examples.

### New Zealand

Data provided through platforms such as Landcare, LINZ or LCDB has served to improve several environmental aspects such as sustainable agriculture programmes, improved quality of water used on breeding farms, planning of wind energy facilities, monitoring of fishing areas or the development of reusable environmental maps.

### United Kingdom

Thanks to open data, new services have been prepared for flood prevention and warning. There are also other very useful services in areas such as efficient energy management in communities or air quality monitoring.

### Netherlands

Open data has been used in this case to monitor the quality of rainwater and track in detail the relationship between air quality and mortality in several residential areas.
3.3. Economic impact

In this section we will see some examples of how open data can contribute to generating economic impact in different ways.

3.3.1. Macroeconomic impact

Open data can have a direct influence on the economy in many ways:

- Facilitating the creation of new companies that re-use the data as raw material.
- Making existing businesses more efficient and reducing costs through better planning.
- Improving and optimizing the economic planning of the country itself.

Here are some international reference examples.

United Kingdom

In a recent study, a total of 270 commercially active companies have been identified in the country in which open data forms part of their business model and which have total profits of over one hundred billion euros and 500,000 employees in all. There are also several studies that estimate the potential of the economic benefits of the sector, with figures of more than ten billion euros between direct and indirect benefits. In addition, through the government initiative OS Open Data an improvement to the GDP of around 30 million euros is estimated thanks to the improvements in productivity and increased tax collection.

Spain

The latest report on the infomediary sector published by ONTSI estimates a total valuation of the sector of around 500 million euros. There are also other similar studies from the perspective of private enterprise, as well as sectorial studies such as the potential of meteorological data in the energy industry.
The Open Data 500 project lists hundreds of companies that routinely use open data from public directories as part of their business model. The website of the official open data initiative also includes several case studies of companies for which the use of this data has been a key aspect in their success.

### 3.3.2. Entrepreneurs and new businesses

Open data can also act as an element for business vitalisation that can lend support to the start-up of new businesses by using government administration data as a primary resource. Here are some international reference examples.

#### United Kingdom

There is an entrepreneurial incubation programme exclusively aimed at companies that are based on open data, which currently has 18 companies in total and more than 70 people with a total turnover of approx. 5 million euros. Additionally, in the specific area of geoinformation alone almost one million euros has been invested in the financing of 28 new business ventures from 2010 to 2015, including their own incubator, the Geovation Hub.

#### United States

Entrepreneurs in the USA have managed to generate a whole catalogue of applications available through the official open data initiative that exploit government data in multiple ways to offer a variety of new services and applications. There are also other entrepreneurship initiatives through data focused on more specific sectors, such as health care that is now on the rise.

#### Spain

In Spain we can find a whole network of emerging companies whose business model is based at least in part on the exploitation of open data, with examples as diverse as EuroAlert, Fundera, Open Coast, Gnoss, Deyde or Tabulae. Also the Finodex incubator has provided financing to 26
new companies that make use of open data. More than a hundred innovative applications and services are also available in the national data catalogue.
4. MAIN CONCLUSIONS AT GLOBAL LEVEL

The open data movement is currently at a **turning point**. Globally we have been experiencing a rapid spread of open data initiatives that continue to grow continuously. The levels of data availability and the impact that is being achieved are, however, not yet satisfactory.

The conclusions of the Barometer's analysis include a set of general recommendations for further progress in the global open data agenda.

![Image](image.png)

**Figure 3. General recommendations to advance in the open data agenda.**

4.1. Aspects related to data quality

Finally, we will review the main problems that have been detected regarding data availability (in a total of 1,380 datasets analysed in the study) for each of the analysed indicators, including also some brief recommendations on how to address them for future improvement. Examples of how to properly implement each of the recommendations are also available through the datasets highlighted in section 2 of this report.

4.1.1. Machine readable formats

**Only half of the analysed datasets are available in some type of format that is readable by machines and reusable.** This makes data re-use much more complicated or even impossible in some cases where the volume of data available is such that any non-automatic analysis is directly impracticable.
Most popular formats are as follows: xls (x), csv or tsv, xml, json and dbf or mdb database dumps. While all formats are easily reusable, xls spreadsheets - the most used - is a proprietary format that could again limit its use. In addition, a lot of information has also been detected in other formats that, although technically they could be considered machine readable, are not directly reusable such as for example: pdf, html, ods, txt, jpeg or png.

It is also worth noting that data publication through programming interfaces (APIs) is still not an extended practice in government administrations, although it could greatly facilitate access and use of data.

**RECOMMENDATION:** Always use machine readable and reusable formats, which are also open and follow the reference data model whenever they are available.

### 4.1.2. Gratuity and completeness

Most of the data that has been located in the analysis (90% of the total) is available completely free of charge. However, that also means that 10% of the information is only fully accessible after having paid certain access fees, although in these cases sometimes some basic subset of the data is also offered in open format.

This mainly affects certain datasets that are considered to have a high commercial value, and they are therefore also a relevant source of revenue for administrations, such as data on property or business records.

**RECOMMENDATION:** Data access must always be complete and free to maximise the number of beneficiaries, promote equal opportunities and maintain a neutral position regarding the market.

### 4.1.3. Open licences and re-use

The use of open licences is the main feature that defines open data. However, less than 18% of the government data analysed has an explicit open licence. In many cases it is practically impossible to find out under what licence or conditions the data is being published, since there is
no information about it. In other cases there are official guidelines or policies on how to act, but they are simply not being implemented in practice.

In general, there is also a great inconsistency among the different departments or administrations of the same government when dealing with the licences used for data publication, leading to the possibility that they may even become incompatible with each other.

### 4.1.4. Information updating and sustainability

Most of the data (almost three quarters) published by the government can be considered reasonably updated. Nevertheless, there are big differences among the update status of the different datasets, for example 95% of data related to budgets, but only 47% in data related to health.

It is also generally very difficult to locate information on the procedure and timing of future data updates, given the lack of references. This can cause serious doubts about the sustainability of the published data, giving rise to reluctance regarding its re-use in other products or services.

**RECOMMENDATION:** Always establish clear and public guidelines on the publication and updating of data; state them adequately and put them into practice.
5. LIST OF FIGURES AND MAPS

Figure 1. Study areas of the Open Data Barometer

Figure 2. Quality indicators of the Open Data Barometer

Figure 3. General recommendations for moving forward in the open data agenda.

Map 1. Open data initiatives in transport

Map 2. Open data initiatives in health.

Map 3. Open data initiatives in education.

Map 4. Open data initiatives related to criminality rates.

Map 5. Open data initiatives in the environment.

Map 6. Open data initiatives related to voting results.

Map 7. Open data initiatives related to public procurement.