

Analytical Report n4



Analytical Report 4: Open Data in Cities

This study has been prepared by Capgemini Invent as part of the European Data Portal. The European Data Portal is an initiative of the European Commission, implemented with the support of a consortiumⁱ led by Capgemini Invent, including Intrasoft International, Fraunhofer Fokus, con.terra, Sogeti, 52North, Time.Lex, the Lisbon Council, and the University of Southampton. The Publications Office of the European Union is responsible for contract management of the European Data Portal.

For more information about this paper, please contact:

European Commission

Directorate General for Communications Networks, Content and Technology
Unit G.1 Data Policy and Innovation
Daniele Rizzi – Policy Officer
Email: daniele.rizzi@ec.europa.eu

European Data Portal

Gianfranco Cecconi, European Data Portal Lead
Email: gianfranco.cecconi@capgemini.com

Written by:

Wendy Carrara
Wander Engbers
Margriet Nieuwenhuis
Eva van Steenberg

Last update: 15.07.2020

www: <https://europeandataportal.eu/>

@: info@europeandataportal.eu

DISCLAIMER

By the European Commission, Directorate-General of Communications Networks, Content and Technology. The information and views set out in this publication are those of the author(s) and do not necessarily reflect the official opinion of the Commission. The Commission does not guarantee the accuracy of the data included in this study. Neither the Commission nor any person acting on the Commission's behalf may be held responsible for the use, which may be made of the information contained therein.

Luxembourg: Publications Office of the European Union, 2020
© European Union, 2020



OA-BF-20-004-EN-N

ISBN: 978-92-78-41898-4

ISSN: 2600-0601

doi: 10.2830/992513



The reuse policy of European Commission documents is implemented by the Commission Decision 2011/833/EU of 12 December 2011 on the reuse of Commission documents (OJ L 330, 14.12.2011, p. 39). Except otherwise noted, the reuse of this document is authorised under a Creative Commons Attribution 4.0 International (CC-BY 4.0) licence (<https://creativecommons.org/licenses/by/4.0/>). This means that reuse is allowed provided appropriate credit is given and any changes are indicated.

ⁱ At the time this report was first issued the consortium consisted of: Capgemini Invent, Intrasoft International, Fraunhofer Fokus, con.terra, Sogeti, the Open Data Institute, Time.Lex, and the University of Southampton.

Executive Summary

Open Data is a valuable source for solving civic problems, improving transparency and closing the gap between local government and its citizens. The World Council on City Data introduced 17 different themes including around 100 indicators relating to the standardisation of city data. Urban planning is one of those focus areas of high value to most cities, as cities are facing considerable population growth that puts pressure on the municipality's economy. The huge amount of data that cities gather can help solve those problems more efficiently. Transportation and emergency situations are other topics directly related to high population density in cities. Users can highly benefit from the development of mobile applications helping citizens and first responders to plan their journey using alternative routes if necessary. Cities are starting to look at the benefits of Open Data.

Numerous European, national and local projects have been completed in recent years. Open Data Day was first organised on 5 March 2010 and is now repeated every year on the same day. Other European funded projects focusing on the standardisation of city data and piloting those initiatives in European cities are e.g. Open Cities, CitySDK and the iCity project. On a national level, Finland is working on the 6Aika project that aims to connect and stimulate collaboration between six Finnish cities. There are many larger European cities that are not part of a specific project or network where Open Data initiatives are initiated by the municipality itself. The most tangible proof of an Open Data initiative is the development of a dedicated Open Data city portal. Here eight cities are assessed in more detail.

The best practice cities that are assessed are Amsterdam, Barcelona, Berlin, Copenhagen, London, Paris, Stockholm and Vienna. They all have a municipality website and Open Data portal, but only Amsterdam, Barcelona, London and Vienna also have a specific Smart city website. The development of a city strategy or re-use guidelines is not common, but London is one of the cities that just launched its own Data for London strategy.

Transportation among most popular data domains in cities

The amount of data made available differs per city, in this case between 175 datasets in Paris and 935 datasets in Berlin. The most popular data domains are available for five of the eight cities with transportation being among the top data domains. Some city portals include the most downloaded dataset as well, which is often related to transportation. Most of the cities are harvested by the national portal, but not all. Different Open Data city initiatives and events are discussed in more detail.

Going beyond Open Data, cities want to become smart. A smart city uses technology to enhance quality, performance and interactivity of urban services, to reduce costs and resource consumption and to improve contact between citizens and government. Open Data can be combined with sensor data from streetlights or cars to increase energy efficiency and reduce travel time. The eight cities serve as inspiration for other cities what they could achieve by thinking big. However, cities are recommended to start small and take one step at a time on their Open Data Journey.

1. Introduction to city data

'The EU stands out in engineering skills, a problem-solving approach and quality of life. Europe's technology for cities will be the standard for sustainability in the rest of the world.' - Commissioner Oettinger

Cities and their citizens worldwide are discovering the power of Open Data, for example in understanding how it helps solving civic problems.¹ The data made available creates an opportunity for citizens to comment on public sector decisions made or ask questions about spending behaviour, thereby improving transparency and stimulating democracy. However, public data is a bit more abstract and distant for an individual citizen to connect with compared to, for example, local spending data, public transport networks and housing issues. Citizens observe direct changes when Open Data is used in their living environment to improve (real-time) public transport information or improve air quality.



Numerous initiatives emerge that connect different cities via a European or global network to stimulate standardisation and share best practices. The World Council on City Data is an example of a global organisation promoting the standardisation of city data and thereby creating smarter cities.² The first international standard, ISO 37120, was published in May 2014, showing that the potential of Open Data for cities is recognised only recently. The standard includes 100 indicators that measure a city's social, economic and environmental performance. Those indicators are divided between 17 different themes that are shown in Table 1.

Overview of city themes		
Economy	Governance	Telecommunication and innovation
Education	Health	Transportation
Energy	Recreation	Urban planning
Environment	Safety	Wastewater
Finance	Shelter	Water and sanitation
Fire and emergency response	Solid waste	

Table 1 – Different city data themes³

Urban planning is an important theme specifically related to the local government level. Cities are facing considerable population growth and density, increasing pressure on the current system with accompanying economic burdens and related budget cuts. Therefore, cities must find ways to boost their efficiency and reduce costs while ensuring a good quality of life for all citizens.⁴ The solution to this problem can be found in the massive amount of data that cities gather. If one only looks at urban planning, one can identify already all the related (municipal) services in deciding on the location of parks, maintaining lampposts, drawing up cycle paths, positioning parking spots, trees, building schools, construction sites, bridges, houses, speed cameras, etc. An example of the location of schools, bridges and tunnels in Vienna on a map is shown in Figure 1.

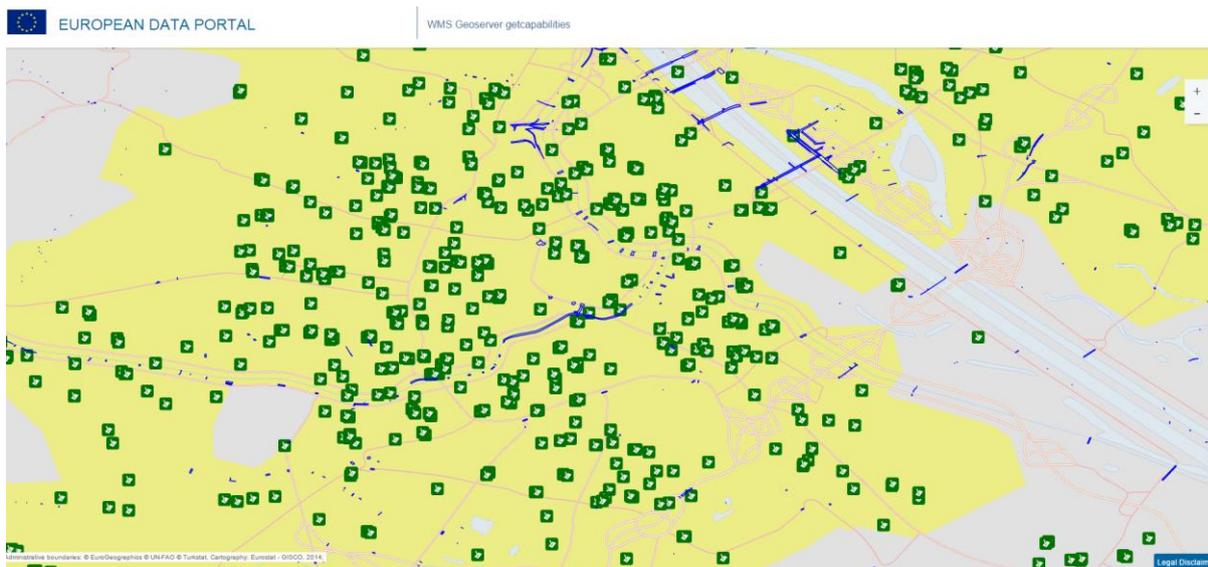
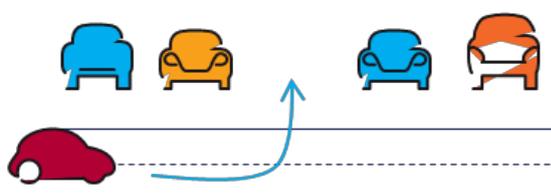


Figure 1 – Location of schools, bridges and tunnels in Vienna⁵

Transportation is another area many cities have to deal with. Populated areas face significantly more transportation related challenges compared to more rural areas. Those include congestion issues, higher risk of the occurrence of accidents, and air pollution.⁶ The growing population and higher travel demands are partly causing those negative effects. The release of data on transportation, air quality and on the location of traffic accidents enables the development of mobile applications that can help inhabitants to better plan their travel. Thereby, the city data theme on transportation is directly related to broader topics such as the environment and sustainability.

Open Data can also play an important role in fire and emergency response situations. If citizens are at an emergency location one minute earlier to provide CPR after a warning built in a mobile application using Open Data, 7,000 lives a year can be saved by giving CPR earlier.⁷ With Open Data it is possible, for example, to calculate the likelihood of a fire taking place in a specific area. To make this calculation, data is needed about when and how buildings are constructed, the inhabitation, and the history of emergencies in the particular neighbourhood.⁸ Transportation data can guide the fire department as fast as possible to the emergency location. The data should include very detailed and building block specific information coming from the local authorities.

One of the first European cities that started an Open Data initiative is London. In January 2010, Mayor Boris Johnson announced that London would be the first Open Data city in Britain and launched the London Data Store. To further highlight the amount of data cities gather, the first data released included crime rates, planning decisions, traffic accidents and house prices.⁹ The difference between Open Data on a national and local level is that local data allows tailoring initiatives to a local situation. This might seem trivial; however, it is often overlooked. For example, the scarcity of parking spots is an issue that many large cities face, whereas the amount of parking spots on the



national or regional level may be seen as sufficient. The average motorist loses a total of 2,549 hours during his life looking for a parking spot.¹⁰ Cities that release (real-time) parking information stimulate the development of mobile applications that guide users

directly to a free spot. Finding a parking spot faster does not only reduce time wasted by the driver, but the shorter drive also reduces air pollution. Just one of the many examples of the benefits Open Data offers to inhabitants of cities. Figure 2 below offers an overview of the controlled parking zones across the London Borough of Camden.

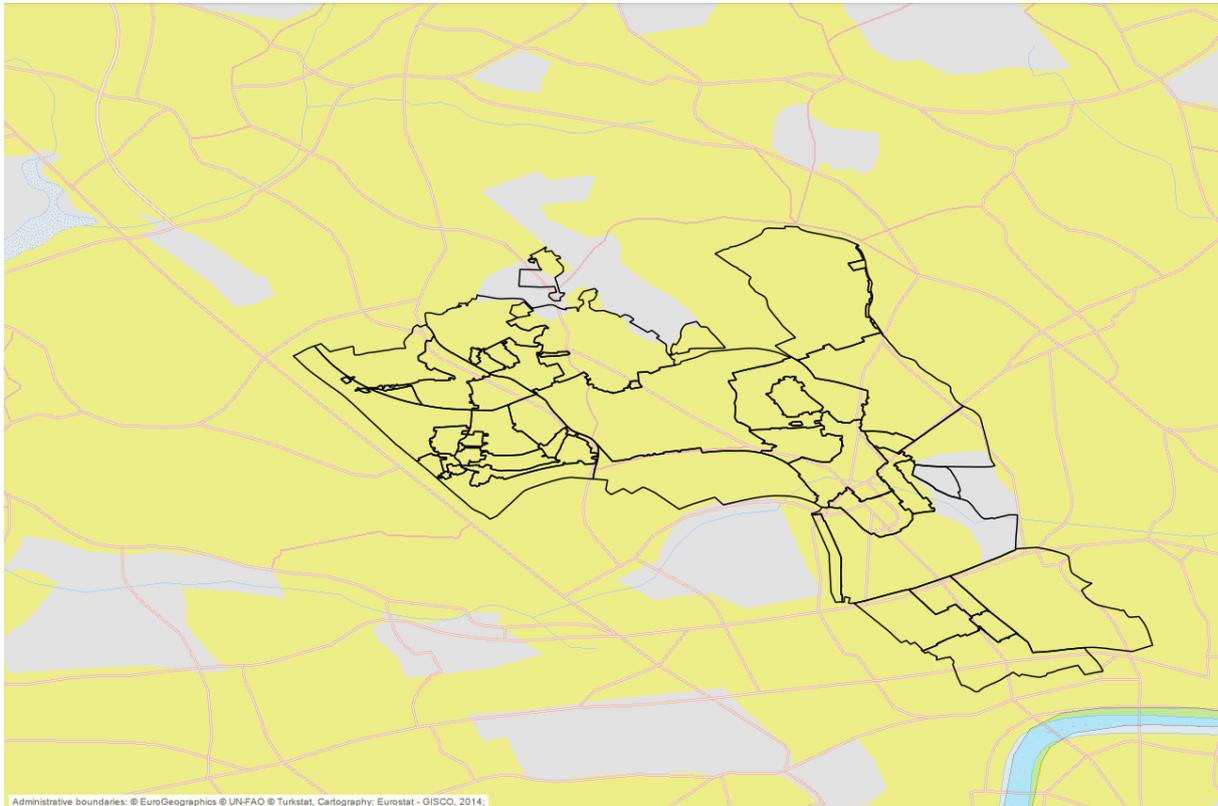


Figure 2 – Location of Controlled Parking Zones across the London Borough of Camden¹¹

As the technology, quality, and quantity of Open Data is evolving rapidly, it is the right time to start a city based Open Data initiative; to learn from best practices and develop a smart city. In the United States, the President’s Council of Advisors on Science and Technology released a report entitled ‘Technology and the Future of Cities’.¹² They state that citizens are more open to new ways of moving through their living environment when it is based on more advanced technology. The best approach to start an Open Data programme is to start small with a pilot in a specific area of the city. The lessons learned from this area could then be extended to other areas in the city or applied to other cities afterwards.

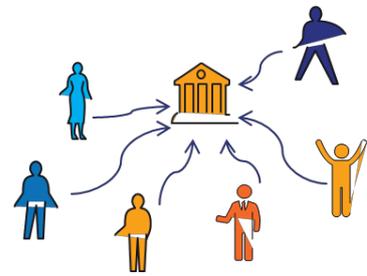
Now is the right time for European cities to start exploring the benefits of using Open Data

The availability of more advanced technology and more data makes it much easier for cities to start their own initiative based on the most pressing problems of their city. Furthermore, numerous European level initiatives emerge including a few pilot cities, for example to test software solutions or develop city specific tools.

2. City level initiatives in Europe

In 2010, the global event 'Open Data Day' was launched. On that day, cities around the world organised local Open Data events. Ever since, on 5 March, citizens and businesses come together to release data, write applications or create visualisations. The success of Open Data Day is underlined by the increase in number of initiatives as cities are more and more interested in making use of the data they collect to help solve key societal challenges they face. While 60 cities joined the global event in 2010, hundreds of cities joined in 2016. So, what is the current state of Open Data in European cities?

The European Commission (EC) funds several Open Data projects at the moment. One of the first European projects was called Open Cities which ran from 2011 until 2013.¹³ The aim of Open Cities was to investigate how different innovation methodologies (open, user driven) can be applied in the public sector. The project consisted of six different streams, including one stream specifically focusing on Open Data and how to make it available for commercial and private use for innovative mobile services. This led to a pilot in seven major European cities: Helsinki, Berlin, Amsterdam, Paris, Rome, Barcelona and Bologna. For example, crowdsourcing was used to solve problems like the limited amount of bike storage at public spaces in Amsterdam. One of the output documents of the project is the Crowdsourcing Cooking Book for Cities which provides guidelines for cities that want to start their own crowdsourcing pilot.¹⁴



Another project partly funded by the EC focusing on cities was CitySDK. This project provided a "service development kit" for cities and developers aiming at harmonizing application programming interfaces (APIs) across cities.¹⁵ The project started in January 2012 and ended in October 2014. The aim was to help cities to open their data by providing the technological tools they needed. During the development of the CitySDK, the three focus areas were participation, mobility and tourism. The eight European cities that participated in this project are currently among the frontrunners in the field of Open Data, namely Amsterdam, Barcelona, Helsinki, Istanbul, Lamia, Lisbon, Manchester and Rome.

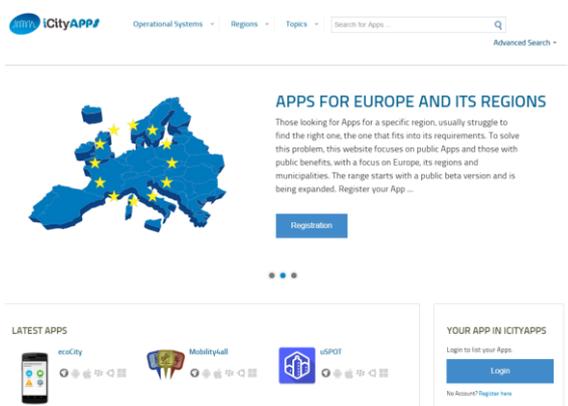


Figure 3 - iCity appstore website

The third European level project that is worth mentioning is the iCity project that started in 2012 and was completed in 2015.¹⁶ The iCity project looked beyond the concept of Open Data by offering an approach of Opened Information Systems. A platform for private and third parties was provided to co-create an ecosystem with services of public interest using different techniques to engage with re-apps, including Living Labs. The four cities that participated in this project are Barcelona, Bologna, Genoa and London. The iCity appstore website shows a few mobile applications that were created as part of the iCity project.¹⁷

There are also projects on a national level aimed at stimulating collaboration between cities, for example the six largest cities of Finland are working on a shared strategy called 6Aika.¹⁸ This collaboration focuses on three areas in the development of an open ecosystem for city services: Open Innovation Platforms, Open Data and Interfaces, and Open Participation. Although Open Data is only part of the overall strategy, it is of great importance. The six cities open up their data stores to be utilised by the entire city community.¹⁹ The opening up and utilisation of data creates innovations, as companies and developers can use data as raw material for new services. The Open Data and Interfaces focus area puts particular emphasis on opening up data that benefits business.

Activating businesses and developers to utilise the data is key to the successful implementation of the focus area.

The number of cities actively involved in Open Data differs per country. Especially larger European cities are now starting their own initiatives to release more data via a dedicated city portal. Those initiatives are not part of larger coordinated projects, but arise from a local desire for a smarter and more innovative city. The city portal is the most tangible result of an Open Data initiative. It is either linked to the website of the municipality or a standalone website. The next chapter will describe and compare the Open Data maturity in eight European cities in more detail.



3. Open City Data best practices – from Amsterdam to Vienna

The eight cities that are chosen to be discussed in more detail are Amsterdam, Barcelona, Berlin, Copenhagen, London, Paris, Stockholm and Vienna. Five of those eight cities were involved in at least one of the European funded projects described earlier. Those cities are chosen as best practices, because of the diversity in initiatives that are taking place. They serve as examples for other cities to show what to think of when planning a city Open Data programme. Before delving into the details of their Open Data activities, a few characteristics are presented. An overview of the number of inhabitants, population density, average age of the inhabitants and GDP per capita in euro is provided per city as a basis in Figure 4.

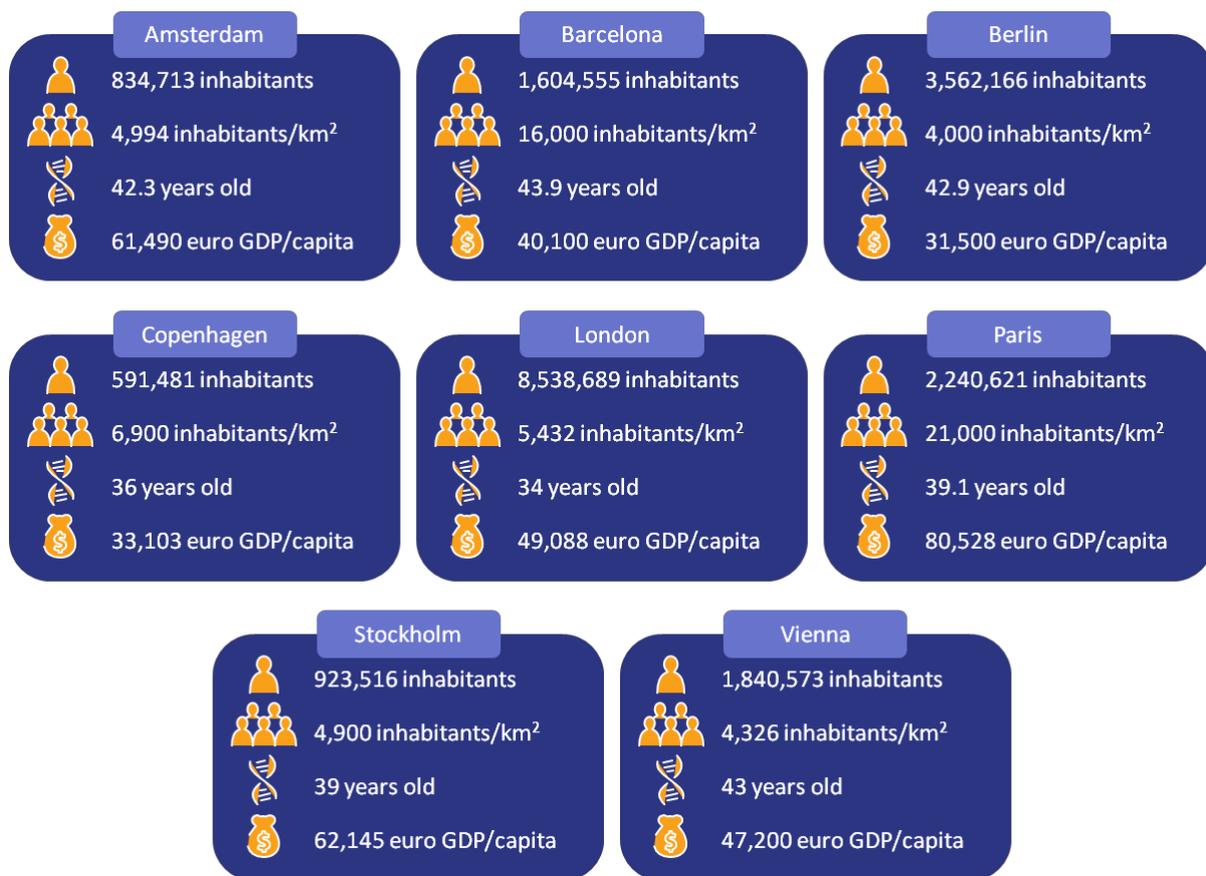


Figure 4 – Demographics of the cities

The figure shows that the number of inhabitants in those cities ranges between 591,000 in Copenhagen and 8,539,000 in London. On average, the population in London is the youngest with 34 years whereas the highest GDP per capita can be found in Paris²⁰. Paris is also the most crowded city with on average 21,000 inhabitants living in one square kilometre. Annex I – City fiches includes a more comprehensive overview of the current status of the eight cities using so-called ‘City fiches’.

Online Presence

By visiting the different websites of the cities’ municipality, Open Data portals and smart city initiatives, one learns much more about the activities that take place. However, the approach of the various cities to establish an online footprint differs. Amsterdam, Barcelona, London and Vienna are all present online with their regular municipality website and a dedicated city Open Data portal.

However, these cities also maintain a specific Smart City website. Re-users of Open Data are able to stay informed about the latest developments via those digital channels, but are often also able to interact with the Open Data team via the features offered by the Open Data portal. Barcelona, Copenhagen and Vienna all offer the possibility to share ideas on what data should be open. Thereby, they are able to prioritise the release of datasets based on the requests they receive. The Open Data portal of Berlin has its own Twitter account and tweets about the release of new datasets on the city portal whereas the Open Data Paris Twitter account is mainly focusing on city related news and events. Stockholm shares a lot of information online about the city development plans for the upcoming years, including becoming a Smart City as well.

Elaborating a Strategy

Cities do not necessarily need to prepare separate documents in addition to the national Open Data strategy and policy that already do exist, but an action plan is needed to plan the implementation of an Open Data programme at city level.

London recently released its city data strategy called '[Data for London](#)'. It consists of six different themes as shown in Figure 5, each of which are built around what the city wants to achieve in that field and the priority actions that need to be taken to ensure the desired outcome will be realised. For example, one priority action for 'Strategy Theme 3: Recognising the Value of City Data' is to create value-cases showing how city data results in social, environmental, economic, and financial value.



Figure 5 - Six strategy themes of Data for London

Stockholm published their action plan in 2011 entitled '[Re-use of Open Data - City of Stockholm](#)'. Updates of the various strategies, including the Smart City strategy, are currently under development. Berlin has a general eGovernment strategy for the years 2015 to 2017 including Open Data.²¹ It includes continuous publishing databases in machine-readable formats and improving existing datasets. Governmental documents should be released more to improve transparency. The other cities did not publish specific documents, but some focus areas are described online.

Barcelona indicates that their data should:

-  Be easily accessible;
-  Stimulate the creation of new services with social & commercial value;
-  Improve competition in city services where administration spends its budget;
-  Improve relationship between citizens and local administration;
-  Teach staff and students about Open Data.

Those different points could be easily applied on a national level as well, but are specifically focusing on the local situation to bring local government closer to the inhabitants. It is important to set goals around the desired outcomes of the Open Data initiative, but availability and quality of data are two of the requirements for being successful. Therefore, Vienna primarily wants the data to be released in machine-readable and open formats.

Making Data Available

All eight cities have a dedicated city Open Data portal. How much Open Data do these cities really publish? What types of data are made available? The city with the highest amount of datasets on the portal is Berlin with 935 datasets divided into 22 categories. The city with the lowest number of datasets on the portal is Paris, which still includes 175 datasets. Some of the city portals indicate the most popular data domains in terms of publication and are shown in Figure 6.

Amsterdam	Copenhagen	London	Paris	Vienna
Transportation	Geospatial	Demographics	Transportation	Transportation
Tourism & Culture	Transportation	Employment	Administration	Environment
Health	Children & adolescents	Health	Culture	Geospatial
Urban development	Statistics	Transparency	Urban development	Administration
Environment		Housing		

Figure 6 – Data domains with the most datasets

Transportation is among the most interesting data categories for all the cities included. The fact that a lot of mobile applications are built with Open Data focusing on planning one's trip with public transport, help one navigate through the city or guide one to a free parking spot are proof of that. In Barcelona, the 'TMBAPP' application from Transports Metropolitans de Barcelona provides access to all the information you need to use the bus and metro services in Barcelona.²² Another transport related application is 'Berliner Fahrradunfälle' which shows the location of bicycle accidents on the map of Berlin.²³ The bus information is also available in real-time besides the regular bus schedules. This process is a virtuous circle. The release of more transportation data enables re-use of data for mobile applications. The existence of multiple transportation applications on the other hand is proof to the public sector that transportation data is useful to developers and citizens and should be released more.

On a national level, the most popular datasets are comparable between countries. Countries have their own specific problems, but there is always a lot of information available around government spending, demographics, and statistics. Looking at the city level, the general statistics around inhabitants become less important than the information about the city infrastructure, energy consumption or urban development plans. Culture is an odd man out in this context, as there seems to be a culture paradox. Culture and media are among the data domains coined as low priority in a variety of international studies²⁴, but it is among the most popular data domains in Amsterdam and Paris, as those cities have chosen to focus more on culture and tourism.

The city portals contain information about the most downloaded datasets as well. In Barcelona, citizens are most interested in street trees of Barcelona. Citizens of Berlin searched mostly for Verkehrsverbund Berlin-Brandenburg (VBB) timetable data from December 2015 to December 2016 in February 2016. The geographical map is most downloaded in Copenhagen. The citizens of Paris and Stockholm are most

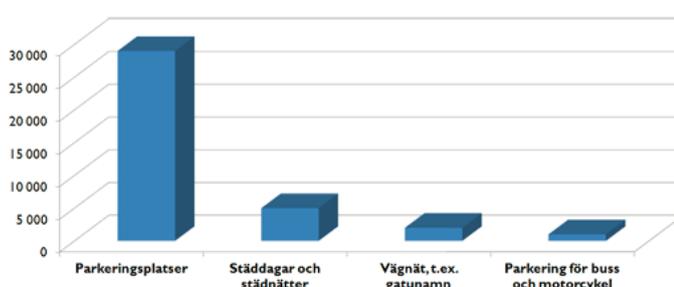


Figure 7 – Most downloaded datasets on <http://open.stockholm.se>

interested in parking spaces whereas real-time public transport information is most popular in Vienna. The most downloaded datasets are in line with the most popular data domains transportation and geospatial data.

One interesting discovery is that not all the city portals have their data harvested by the national Open Data portal.

- 🇩🇪 Berlin is harvested by <https://www.govdata.de/>,
- 🇩🇰 Copenhagen by <http://portal.opendata.dk/>,
- 🇫🇷 Paris by <https://www.data.gouv.fr>, and
- 🇦🇹 Vienna by <https://www.data.gv.at/>.

For Amsterdam and London, only a small amount of datasets seems to be harvested by the national portals. Barcelona and Stockholm are not included on their respective national Open Data portals at all. Austria could serve as a role model looking at centralising access to data, as the national portal aims to harvest all data from local and regional portals to act as a single point of access to Austrian data for the European Data Portal.²⁵ This approach is visualised in the picture shown in Figure 8.



Figure 8 – Harvesting process in Austria

Dive deep into Open Data initiatives

Now we know that all eight cities have their own local Open Data portal, but on what initiatives are they currently working?

Amsterdam is one of the leaders looking at an intelligent transport system improving capacity and managing traffic flows. In 2012, Amsterdam won the World Smart Cities Awards thanks to its Open Data Programme for transport and mobility.²⁶ The city is now releasing all its data on traffic and transportation to interested parties. Data about parking, taxi stands, cycle paths, stops for touring cars, and real-time information on traffic jams is all public. More recently, Amsterdam opened a Data Lab that serves as a meeting point for the municipality of Amsterdam to gather and share data in collaboration with universities, schools, organisations and companies.

Barcelona was chosen as the Smartest City in the world in 2015.²⁷ For this contest, different cities were compared on a number of aspects such as smart grids, smart traffic, smart lighting, social cohesion, and technological capabilities. Barcelona was able to stay ahead of New York, Singapore, Rio de Janeiro, and London in this comparison. The city developed the ‘Smart City Campus-22@’ which is an area bringing together companies, universities, entrepreneurs, and research centres working in ICT, ecology and urban-planning.²⁸ The aim of this area is becoming a benchmark technology centre for smart cities. Another initiative in Barcelona is a portal called ‘Apps4bcn’ providing the best applications for discovering and enjoying the city for residents and tourists.²⁹ Furthermore, an Open Data roadmap for politicians that details the next steps of the Open Data programme is currently being developed. Barcelona recently had a change of government in its City Council and this government is currently working on new Open Data guidelines.

Berlin has a specific section on their portal providing an overview of the applications built with Open Data, comparable to the application website of Barcelona.³⁰ It currently holds 32 different applications and it always welcomes new, Berlin related, applications. Berlin held an Open Data survey of which the results were published in January 2016.³¹ They came up with 10 recommendations for the Open Data practice in Berlin that are shown in Figure 9. Those points are the activities that the city of Berlin will be working on further. Although they have 935 datasets available, they still identified a gap in data supply. The team is currently waiting for an update of the eGovernment Act including Open Data before they can move forward with the city’s Open Data initiative.

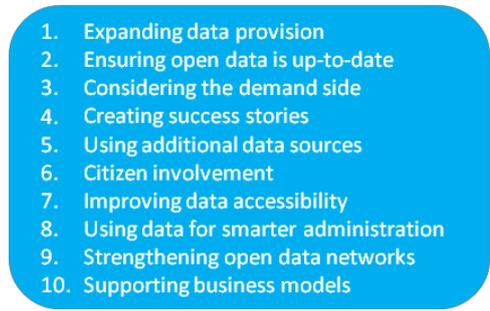
- 
1. Expanding data provision
 2. Ensuring open data is up-to-date
 3. Considering the demand side
 4. Creating success stories
 5. Using additional data sources
 6. Citizen involvement
 7. Improving data accessibility
 8. Using data for smarter administration
 9. Strengthening open data networks
 10. Supporting business models

Figure 9 - 10 Recommendations for Open Data Practice in Berlin

Copenhagen is very active in the field of Open Data related initiatives. The city has its own Copenhagen Solutions Lab which is a new governing body for Smart City projects across all sectors in the city creating triple helix partnerships. Triple helix partnerships are collaborations between the academic world, the industry and the public sector. One of the initiatives they introduced is the Smart Citizen Borgerpanel which allows citizens to participate in testing and developing new innovative solutions and digital technologies.³² Citizens in the panel stay informed about new Smart City developments. Copenhagen also has its own area in the city called Street Lab to test Smart City solutions in a dedicated urban space.³³ The initiative just started in 2016 as public-private cooperation running until 2018. Another initiative launched recently is ‘Copenhagen Connecting’.³⁴ The aim of this programme is to deliver better and faster solutions through intelligent use of data. The current city data portal is a beta version. The official first version is being developed.

London has the London DataStore since 2010 created by the Greater London Assembly and contains over 500 datasets.³⁵ Every month, 50,000 visitors go to the DataStore website. The website also offers room for discussion through a series of blogs for people involved in using Open Data. London just launched their strategy *Data for London* as mentioned before. Furthermore, London is taking part in the Smart Cities and Communities Lighthouse programme under the Horizon2020 programme. The project aims to demonstrate how innovative uses of technology can improve the lives of their residents.³⁶

Paris has its own initiative 'meetup' group called Paris Open Innovation.³⁷ This group organises meetings around an Open Innovation approach for the City of Paris including Open Data, Smart City, citizen participation, and digital services. The meetings are held regularly and so far, 12 activities have taken place. The city of Paris is also collaborating with a few partners on an open innovation project called DataCity.³⁸ They have an open call aimed at encouraging citizens and entrepreneurs to solve different city problems using Open Data. The solutions the candidates propose can be tested in Paris itself which functions as a test environment in real conditions. In total, five projects will be selected in May 2016 and will receive a grant of up to 30,000 Euro to enable the start of the experiment.

Stockholm is just starting its initiative to become a smart and connected city. So far, not many examples are available. However, multiple strategies are under development. The city has defined a vision to become the smartest city in the world by 2040.³⁹ Their GrowSmarter project is focusing on stimulating city uptake of smart solutions in collaboration with Barcelona and Cologne.⁴⁰ Twelve smart solutions are tested in those cities, spread across three focus areas: low energy districts, integrated infrastructures, and sustainable urban mobility.

Vienna wants to be one of the best cities when looking at quality of life, infrastructure and innovation.⁴¹ On the smart city portal of Vienna, multiple city projects are explained in the field of Education & Research, Health & Social Services, Building Activity & Living, Transportation & Urban Planning, Environment & Climate Protection, People & Society, and Politics & Administration. Those different projects are also visualised on a map. To mention one of those projects, Social City Vienna is a platform for social innovation.⁴² The platform will bring different public sector stakeholders and citizens closer together, and improve the information flow between them. An example of a social initiative is 'Stadtmenschen Wien' whereby inhabitants of Vienna volunteer to support their neighbours that are in difficult life situations.⁴³ The project unites the community as they are working more closely together.

Raising Awareness around Open Data - Organisation of Events

Cities also organise numerous events every year as means to raise awareness around Open Data. Some of those events are international, but most of them are either national or local. The topics differ from specific Open Data events or Hackathons to smart city and innovation events. An overview of the upcoming types of events is given below.

Open Data

Conferences about Open Data are usually open to everyone. In general, the latest developments in the field of Open Data are presented, the most pressing barriers are discussed with the community to come closer to a solution, and best practices are showcased. Those examples can originate from the city or country itself or from other countries that either completed a project or provide an update about an initiative that is currently running. In Copenhagen, the [North Europe Meeting](#) of Research Performing Organisations and Research Funders was held on 17 March 2016. It provides a forum for discussion around Open Access and Open Data policies to give room for alignment and monitoring. Open Government Data is also an important part of the [Effizienter Staat](#) conference that will take place in Berlin on 10 and 11 May 2016. It is organised by the collaborating countries Germany, Austria, Switzerland and Liechtenstein. Berlin is also planning the Berlin Open Data Day

that is expected to take place on 8 June 2016, but more information is not yet available. The [12th International Conference](#) on Terminology and Knowledge Engineering will be held in Copenhagen. The three day event, 22 – 24 June 2016, will focus on Term Bases and Linguistic Linked Open Data.

Hackathons

Hackathons specifically focus on developers and entrepreneurs. The event often has a specific data domain theme that is chosen by the municipality as a focus area, for example culture or transport. The data available for the Hackathon is released by public sector organisations, but can also be supplemented with company data that is made available for the event. In Paris, a [Hackathon](#) was organised between 15 and 17 January.⁴⁴ The subject of this Hackathon was Security, following the recent terrorist attacks that took place in Paris. Ten initiatives improving city security were selected by the jury. Another interesting event to mention takes place on 11 July 2016 and is the [Hackatrain](#) that will ride from Amsterdam to Berlin with people on board that are developing applications and will arrive at Berlin on 12 July 2016 just in time for the [Tech Open Air](#) conference that will end on 15 July 2016.⁴⁵

Smart cities

There are also events organised going beyond Open Data. Smart City events focus on city data, tools and techniques, citizen empowerment, and new technologies that enable the creation of a smart city; a city that is working more efficient. Amsterdam and Stockholm are both organising at least two smart city events in 2016. On 10 March, the [Smart City Dialogue](#) took place in Amsterdam. London will hold the [Smart to Future Cities & Urban IoT](#) event on 26 and 27 April 2016. At the same time, Stockholm is organising [Smart Cities – Sustainable & Attractive Communities](#) from 26 to 29 April 2016. Another smart city event in Amsterdam is organised from 7 until 10 June 2016 and called the [Smart City Event](#). Paris is also organising its own event called '[Smart Countries and Cities Congress Paris](#)'. In Vienna, the [Digital Days 2016](#) are planned from 19 – 21 October 2016 focusing on making Vienna a more digital city. The second one in Stockholm is from 2 to 3 November and called [Nordic Smart Cities](#). Furthermore, Barcelona also holds its own smart city event every year, the [Smart City Expo](#), which will be organised from 15 until 17 November 2016.

Other emerging cities

Another city that is increasingly involved in Open Data is Helsinki. Forum Virium is an innovation unit within the city of Helsinki organising monthly 'Helsinki Loves Developers' meet-ups.⁴⁶ Developers have a place to meet fellow developers and city officials to learn more about the projects people are working on. Furthermore, Helsinki organises competitions for developers who create applications with public sector data. The best known example of an application is BlindSquare – guiding people with visual impairment through the streets – that won both the Apps4Finland award and European Open Cities app challenge in 2012.

Rome is running its Open Data project called Open Data Roma Capitale.⁴⁷ They invite everyone to request datasets or share their applications to gather use cases via e-mail. The 46 applications developed so far are displayed on a separate page on their website. Rome is also part of the 'Smarticipate' project next to London and Hamburg focusing on how the urban environment can be improved best.⁴⁸ The partners of the project help developing applications and services allowing citizens to engage in a dialogue with the smart city they live in.

Manchester is also rapidly growing in the field of Smart Cities. The city recently received a 10 million Pound fund for their project helping the UK to become a world leader in the adoption of Internet of Things technologies.⁴⁹ This project should inspire other cities around the world to create smarter cities and communities. In Manchester, a large number of public bodies openly share their data, for example the Manchester city council, the Association of Greater Manchester Authorities and Transport for Greater Manchester.⁵⁰

The examples described in this chapter show the emergence of different Open Data and Smart City initiatives in cities throughout Europe. However, what is the relation between Open Data and becoming a smart city?

4. Smart city programmes as drivers for Open Data

Cities want to be smart, with Berlin, Barcelona and London being among the leading cities. However, a smart city is not a narrowly defined concept. While the use of technology to increase efficiency and empowerment of residents are recurring themes, the concrete implementation may remain unclear. A smart city uses information and communication technologies (ICT) to enhance quality, performance and interactivity of urban services, to reduce costs and resource consumption and to improve contact between citizens and government.⁵¹ Cities understand that a truly 'smart city' cannot be built only through top down initiatives, but will need the involvement of its residents. The key to making a city smart is to centre the initiative on people and openness. The citizens create the culture that shapes the city's characteristics, including the sense of community and the diversity; thereby ensuring the collective wellbeing of its citizens.⁵² Open Data is a key feature in most smart city initiatives. The core problem that occurs when cities want to become smarter is their information processing capacity rather than finding the information.⁵³ In other words, cities need to develop the right infrastructure to handle the amount of data before they can start thinking about solving data-related problems. This also means digitising data processing and integrating data management across several different services. Cities should start by setting up a data management system that allows easy storage and release of data as Open Data. Another quick win for cities is to start making more use of the data they collect. This might seem trivial; however, untapped amounts of data are stored by cities and seldom re-used.



Going beyond Open Data, simple examples of the use of Internet of Things (IoT) to make a city smarter are connected streetlights.⁵⁴ The sensor detects movement and is only switched on when someone is passing by to preserve energy. It also provides a notification to the municipality when a light bulb is broken. Another more advanced example of the use of IoT to develop smarter cities can be found in the automotive sector. The modern cars citizens use to

commute everyday include temperature sensors, GPS, recordings of traffic jams and monitoring of pollution levels. If the car manufacturer provides this information to the city, it enables cities to create and develop better traffic management systems and enhanced pollution control combined with the public sector data that is already available. Thereby, you create a smart city based on IoT data.

Going beyond the data generated by cars and the release of real-time public transport schedules, data from ticketing systems can be used for predictive maintenance to identify which ticket vending machines and entrance gates are used the most. It is possible to predict when the machine will start having technical problems that can be fixed by the right organisation that is already in place. There are numerous other objects and personal devices that contain smart meters or sensors from which the data can be combined with Open Data to improve overall city performance.

Transport is just one example of an important topic in the continuous growth of cities. Another one is housing. Cities have to carefully plan their urban development many years ahead to adapt to the

expected increase in number of inhabitants. Therefore, it is interesting to look at Smart housing. ‘Alle wollen nach Berlin’ or ‘everyone wants to go to Berlin’ is a phrase often heard in Germany at the moment. Berlin’s popularity is visible by looking at its growth figures. By 2030, Berlin will grow with an additional 250,000 residents⁵⁵ while it currently has 3,562,166 inhabitants, thus accounting for a 7% increase. Moreover, Berlin will need 137,000 new housing units by 2025. With this challenge ahead, the Berlin city council decided that smart housing would be one of the key pillars of its smart city strategy. One initiative of this smart housing programme in Berlin is called Bürger baut Stadt (citizen builds city).⁵⁶ This website provides a central access point to all information related to the development plans of the city council to foster citizen participation. Citizens have four weeks to share their ideas about whether they agree that, for example, a new apartment block should be built in a specific area. Initiatives like this empower residents to be (more) actively involved in the decision making process.

In Austria, the technical university of Vienna is working on smart cities since 2007.⁵⁷ On the website, larger European cities with between 300,000 and 1,000,000 inhabitants were assessed in 2015. The benchmark was held for the fourth time including around 90 cities comparing the current status of their Smart Economy, Smart People, Smart Governance, Smart Mobility, Smart Environment, and Smart Living initiative. As Figure 10 shows, Amsterdam, Copenhagen, and Stockholm all score above average.

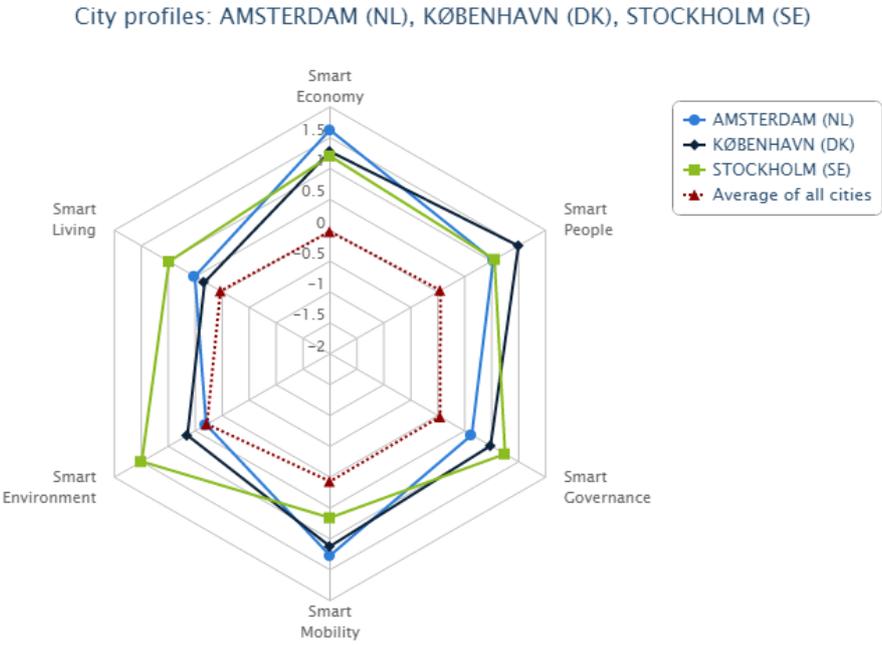


Figure 10 – Benchmark of European smart cities⁵⁸

The sample of cities is chosen based on two criteria: medium sized and covered by accessible and relevant databases. More than 80% of the 90 indicators needed to be accessible in order to include the city in the benchmark. The city profiles can be explored in more detail on the website <http://www.smart-cities.eu/>.

5. Start small, think big

Open Data in cities is becoming a popular topic. After a first series of projects at European level, the amount of partnerships and city initiatives are growing rapidly. The eight city examples discussed show the potential value of sharing more data as Open Data to develop a more effective city. Those big cities are already advanced with multiple activities underway. Here are a few recommendations to start a city data initiative. Think small and step by step to ensure long term success! So what can we learn from those examples?

-  Map the data your city currently has and check what could be published and how to go about doing that.
-  Develop a city portal or website to publish data on. You can also just start with a dedicated webpage on your municipality's website.
-  Communicate about your Open Data plans and the benefits they will bring for your citizens and businesses.
-  Start by sharing data that the inhabitants of your city ask for, and prioritise those.
-  Raise awareness within your own city town hall: your own administration might be eager to benefit and re-use the data as well!
-  Organise events like hackathons to promote your data and engage with developers.
-  Identify challenges your city is facing and share the data you have about these topics to run focused hackathons.
-  Run a pilot project in a small area of your city to test your first Open Data initiative.
-  Monitor your success to show your citizens the value of the initiatives taken.
-  Is this all working out well? Discover the world of smart cities by combining Open Data with more advanced technologies as Internet of Things, and interact with stakeholders.

Do you want your city to be among the top eight cities by 2020? Learn from those best practices and start your own initiative!

To learn more about Open Data, explore the links below:

-  **Do you need help as a data publisher on where to start? Go through the Goldbook for data publishers with everything you need to know:**
<http://www.europeandataportal.eu/en/content/providing-data/open-data-goldbook>
-  **Do you prefer to learn more about the basics of Open Data first explaining the most important topics? Start following the 13 eLearning modules:**
<http://www.europeandataportal.eu/elearning/en/>
-  **Do you know what Open Data is yourself, but you want some guidance how to teach your colleagues? The Training Companion is what you need:**
<http://www.europeandataportal.eu/en/content/training-library/training-companion>
-  **Do you like to discover different analytical reports, studies and use cases? The library is a goldmine full of Open Data related content:**
<http://www.europeandataportal.eu/en/content/training-library/library>
-  **Share how you are publishing or re-using Open Data! Tell us your story via the portal:**
<http://www.europeandataportal.eu/en/content/using-data/tell-us-your-story>

Annex I – City fiches

Amsterdam – City specifics and Open Data



<h4>Amsterdam online</h4> <ul style="list-style-type: none"> City Open Data portal: http://data.amsterdam.nl/ Amsterdam municipality: https://www.amsterdam.nl/ Smart city project: http://amsterdamsmartcity.com/ Cultural Amsterdam: http://www.iamsterdam.com/nl/ 	<h4>Context</h4> <ul style="list-style-type: none"> 834,713 inhabitants [01/01/2016] 1st largest city of the Netherlands Population density of 4,994/km² [01/01/2015] Average age of the inhabitants is 42.3 Average GDP per capita is 61,490 euro in 2009 	
<h4>Policies & regulations</h4> <ul style="list-style-type: none"> City's priorities: <ul style="list-style-type: none"> Dynamic and inspirational capital Good place to live and work International character 	<h4>Open Data strategy</h4> <ul style="list-style-type: none"> A specific Data Point facilitates 3 different topics: <ul style="list-style-type: none"> Internal data sharing Shared data Open Data Focus on improved internal data sharing 	<h4>Licensing</h4> <ul style="list-style-type: none"> Free of charge Open licence CC BY 4.0 or CC0 1.0 licence
<h4>Portal features</h4> <ul style="list-style-type: none"> 663 datasets API accessible 5 popular topics: Tourism & Culture, Care & Wellbeing, Traffic & Infrastructure, Urban development and Public Spaces and green Example Apps for Amsterdam Possibility to share and read ideas of others 	<h4>Top datasets & domains</h4> <p>Top data domains:</p> <ol style="list-style-type: none"> Economy & labour market Basic data Mobility Spatial planning Health & Well-being 	

Amsterdam – Activities and partners



<h4>Events 2016</h4> <ul style="list-style-type: none"> 10 March: Smart City Dialogue 26 – 27 May: The Next Web conference 2016 7 – 10 June: Smart City Event 11 July: Hackatrain 	<h4>Partnerships</h4> <ul style="list-style-type: none"> Amsterdam Economic Board Waag Society Vrije Universiteit Universiteit van Amsterdam 2CoolMonkeys 	
<h4>Smart City areas</h4> <p>Smart Mobility, Smart Living, Smart Society, Smart Areas, Smart Economy, Big & Open Data, Infrastructure, Living Labs</p>	<h4>Integration portal</h4> <ul style="list-style-type: none"> The Open Data portal of Amsterdam is partly harvested by the national portal https://data.overheid.nl/ 	<h4>Social media</h4> <ul style="list-style-type: none"> Twitter: https://twitter.com/adamsmartcity
<h4>Initiatives</h4> <ul style="list-style-type: none"> Apps4Amsterdam: initiative that organises app development contests App boot camps: seminars around what Open Data is 	<h4>Next steps</h4> <ul style="list-style-type: none"> Amsterdam just opened a Data Lab to further interact with Open Data re-users 	

<h3>Barcelona online</h3> <ul style="list-style-type: none"> City Open Data portal: http://opendata.bcn.cat/opendata/en Barcelona municipality: http://ajuntament.barcelona.cat/en/ Smart city project: http://smartcity.bcn.cat/en eGovernment: http://w110.bcn.cat/portal/site/eGovernment Open Government: http://governobert.bcn.cat/en/ 	<h3>Context</h3> <ul style="list-style-type: none"> 1,604,555 inhabitants [01/01/2015] 2nd largest city of Spain Population density of 16,000/km² [1/1/2015] Average age of the inhabitants is 43,9 [1/1/2014] Average GDP per capita is 40.100 euro in 2012 	
<h3>Policies & regulations</h3> <ul style="list-style-type: none"> Mandatory Spanish Transparency law including Open Data in action on 1/1/16 City's priorities: <ul style="list-style-type: none"> Fight against inequality Economic recovery Sustainability 	<h3>Open Data strategy</h3> <ul style="list-style-type: none"> Data should be easily accessible Create new services with social & commercial value Improve competition in city services where administration spends its budget Improve relationship between citizens and local administration Teach staff and students about Open Data 	<h3>Licensing</h3> <ul style="list-style-type: none"> Free of charge Open licence CC-BY 3.0 or CC BY-ND 3.0 licence
<h3>Portal features</h3> <ul style="list-style-type: none"> 330 datasets Topics: Administration, Economic and Business, Population, Territory, Urban environment Barcelona's Open Data users club Portal updates section and interviews to users Open Data on a map by citizens and City Council Request dataset 	<h3>Top datasets & domains</h3> <ol style="list-style-type: none"> Street trees of Barcelona Information on traffic per street with the actual weather in relation to the usual weather and predicted weather in 15 minutes Information on traffic conditions per street Real-time traffic information on public roads Definition of the itineraries and the specification of the sections that compose List of event daily 	

<h3>Events 2016</h3> <ul style="list-style-type: none"> 22 – 25 February: MWC16 Mobile World Congress Barcelona 10 – 12 May: Health 2.0 Europe 2016 10 – 15 July: IEEE International Symposium on Information Theory 15 – 17 November: Smart City Expo 	<h3>Partnerships</h3> <p>The partnerships differ. The administration of the municipality of Barcelona specifies the services in a tender and the company that wins the tender provides the services. This tender process repeats itself, so the partner differs per time period.</p>	
<h3>Smart City areas</h3> <p>Public and social services, Environment, Mobility, Companies and business, Research and Innovation, Communications, Infrastructures, Tourism, Citizen cooperation, International projects</p>	<h3>Integration portal</h3> <ul style="list-style-type: none"> The Open Data portal of Barcelona is not harvested by the national portal http://datos.gob.es/ 	<h3>Social media</h3> <ul style="list-style-type: none"> Twitter: https://twitter.com/BCN_TIC LinkedIn: https://www.linkedin.com/grps/OpenDataBCN-4941209 Newsletter (quarterly): http://opendata.bcn.cat/opendata/en/newsletter
<h3>Initiatives</h3> <ul style="list-style-type: none"> http://apps4bcn.cat/: portal providing the best applications for discovering and enjoying the city for residents and tourists. 	<h3>Next steps</h3> <ul style="list-style-type: none"> Development of a roadmap for politicians New government of Barcelona City Council is working on new Open Data guidelines 	

<h3>Berlin online</h3> <ul style="list-style-type: none"> City Open Data portal: http://daten.berlin.de/ Berlin municipality: http://www.berlin.de/ Smart city project: http://www.berlin-partner.de/en/the-berlin-location/smart-city-berlin/ 	<h3>Context</h3> <ul style="list-style-type: none"> 3,562,166 inhabitants [12/2014] 1st largest city of Germany Population density of 4,000/km² [12/2014] Average age of the inhabitants is 42.9 Average GDP per capita is 31,500 euro in 2014 	
<h3>Policies & regulations</h3> <ul style="list-style-type: none"> Berlin eGovernment Act <ul style="list-style-type: none"> One part related to Open Data 	<h3>Open Data strategy</h3> <ul style="list-style-type: none"> First German city with Open Data Portal Provision of Common Datasets by the Berlin administration Open Data Strategy 2012 <ul style="list-style-type: none"> Most of the topics are completed No need for new strategy right now 	<h3>Licensing</h3> <ul style="list-style-type: none"> Creative Commons Attribution German 3.0
<h3>Portal features</h3> <ul style="list-style-type: none"> 935 datasets 22 categories API accessible Presentation of >30 Open Data based applications Section on 'How to publish data' 	<h3>Top datasets & domains</h3> <p>Top searched datasets:</p> <ol style="list-style-type: none"> Verkehrsverbund Berlin-Brandenburg (VBB) timetable data from December 2015 to December 2016 OpenStreetMap data for Berlin List of common first names in 2015 VBB timetable data from February to December 2016 	

<h3>Events 2016</h3> <ul style="list-style-type: none"> 29 March – 2 April: #HEGEMONIEHACKEN 26 – 28 April: Open Source Data Centre Conference 5 May: Open Tech Summit Berlin 2016 10 – 11 May: Effizienter Staat 8 June: Berlin Open Data Day 	<h3>Partnerships</h3> <ul style="list-style-type: none"> Open Knowledge Foundation 	
<h3>Smart City areas</h3> <p>Energy technologies, Transport, Mobility, Logistics, Information and communication technologies, Healthcare industries</p>	<h3>Integration portal</h3> <ul style="list-style-type: none"> The Open Data portal of Berlin is harvested by the national portal https://www.govdata.de/ 	<h3>Social media</h3> <ul style="list-style-type: none"> Twitter Open Data: https://twitter.com/opendataberlin Facebook: www.facebook.com/Open-Data-Berlin
<h3>Initiatives</h3> <ul style="list-style-type: none"> Some of the applications shown on the portal are the result of Hackathons. Those applications function as a stimulation for data publishers. In contact with Technology Foundation Berlin that held a survey around Open Data re-use. Informal group for German speaking region meeting twice a year. Contact with Vienna and London. 	<h3>Next steps</h3> <ul style="list-style-type: none"> Waiting for the update of the eGovernment Act which is a task of the government. However, there are new elections in September 2016. Not sure if it is possible to get the Act approved before. More than 3000 potential data publishers, but no timeline when they should publish their data right now. Want to build a small Open Data dashboard on the portal with most downloaded datasets, active publishers. Open Data should be way to modernise the public administration. 	

Copenhagen – City specifics and Open Data



<h3>Copenhagen online</h3> <ul style="list-style-type: none"> City Open Data portal: http://data.kk.dk/ Copenhagen municipality: http://international.kk.dk/ Smart city project: http://cphsolutionslab.dk/ 	<h3>Context</h3> <ul style="list-style-type: none"> 591,481 inhabitants [2015] 1st largest city of the Denmark Population density of 6,900/km² [2015] Average age of the inhabitants is 36 Average GDP per capita is 33,103 euro in 2014 	
<h3>Policies & regulations</h3> <ul style="list-style-type: none"> National strategy: Open Data Innovation Strategy <ul style="list-style-type: none"> Create easier and more uniform access to PSI Legal and privacy challenges Business model change 	<h3>Open Data strategy</h3> <ul style="list-style-type: none"> Develop Open Data platform Communicate about platform and create value Raise awareness on Open Data Improve portal 	<h3>Licensing</h3> <ul style="list-style-type: none"> Free of charge Open licence Standard licence provided
<h3>Portal features</h3> <ul style="list-style-type: none"> 217 Datasets 18 Organisations 5 Categories API accessible Tags Interaction with citizens: login possible to create datasets, groups and other interesting things 	<h3>Top datasets & domains</h3> <p>Top downloaded datasets:</p> <ol style="list-style-type: none"> Base map 3D model of buildings and terrains Traffic for both bikes and cars Parking Bottle and glass containers 	

Copenhagen – Activities and partners



<h3>Events 2016</h3> <ul style="list-style-type: none"> 24 – 25 May: ServDes 2016 22 – 24 June: Conference on Terminology and Knowledge Engineering - Term Bases and Linguistic Linked Open Data 	<h3>Partnerships</h3> <ul style="list-style-type: none"> Realdania Danish architecture centre Technical University of Denmark Hitachi Cisco systems 	
<h3>Smart city areas</h3> <p>Energy Consumption, Energy Production, Green Mobility, City Administration</p> <p>Initiatives</p>	<h3>Integration portal</h3> <ul style="list-style-type: none"> The Open Data portal of Copenhagen is harvested by the national portal http://portal.opendata.dk/ CKAN architecture 	<h3>Social media</h3> <ul style="list-style-type: none"> Twitter Open Data Copenhagen: https://twitter.com/datakkdk Twitter Smart City Copenhagen: https://twitter.com/cphsolutionslab
<h3>Initiatives</h3> <ul style="list-style-type: none"> Smart citizens Borgerpanel Street Lab Copenhagen Data Copenhagen Connecting: economic feasibility analysed to be 4.4 billion annually 	<h3>Next steps</h3> <ol style="list-style-type: none"> The portal is currently in beta and is under constant development Copenhagen Climate Adaptation Plan 	

London – City specifics and Open Data

<h3>London online</h3> <ul style="list-style-type: none">City Open Data portal: http://data.london.gov.uk/London municipality: http://www.cityoflondon.gov.ukSmart city project: http://smarterlondon.co.uk/	<h3>Context</h3> <ul style="list-style-type: none">8,538,689 inhabitants [2014]1st largest city of the United KingdomPopulation density 5,432/km² [2014]Average age of the inhabitants is 34 [2014]Average GDP per capita is 49,088 in 2008	
<h3>Policies & regulations</h3> <ul style="list-style-type: none">In 2013 the Greater London Authority (GLA) published a Code of Practice in the Use of StatisticsThe GLA has created an Open Data CharterThe Charter is GLA's commitment to providing, promoting and using Open Data	<h3>Open Data strategy</h3> <ul style="list-style-type: none">Three key principles<ul style="list-style-type: none">The GLA as an Open Data catalyst and promoterThe GLA as Open Data providerThe GLA as a user of Open DataData for London strategy	<h3>Licensing</h3> <ul style="list-style-type: none">Open Government license for Public Sector InformationFree of charge
<h3>Portal features</h3> <ul style="list-style-type: none">638 datasets16 categories50 publishersAPI accessibleInteraction with citizens: log in possible, city data analysed, case studies presented, request a dataset and a communityClear schedule of releasing data	<h3>Top datasets & domains</h3> <p>Top data domains:</p> <ol style="list-style-type: none">DemographicsEmploymentHealthTransparencyHousing	

London – Activities and partners

<h3>Events 2016</h3> <ul style="list-style-type: none">12 – 13 April: Smart IoT London26 – 27 April: Smart to Future Cities & Urban IoT8 – 9 October: Open Data Science Conference	<h3>Partnerships</h3> <ul style="list-style-type: none">Funded by the GLA, which in turn is serving the Mayor of LondonEIT Digital, a leading European open initiative organisation	
<h3>Smart city areas</h3> <p>Capture and use data, Connecting people and creating communities, Navigation and transportation, Metering, monitoring and analysis</p>	<h3>Integration portal</h3> <ul style="list-style-type: none">The Open Data portal of London is partly harvested by the national portal http://data.gov.uk	<h3>Social media</h3> <ul style="list-style-type: none">Twitter London Datastore: https://twitter.com/LDN_dataTwitter Smart London: https://twitter.com/smarterlondon
<h3>Initiatives</h3> <ul style="list-style-type: none">There are currently two Smart London Initiatives<ol style="list-style-type: none">Smart London Districts NetworkSmart London Infrastructure NetworkSensing London – Sensors measuring a range of physical parameters. That data is analysed by data scientists.London Living Lab – City scale environment instrumented to enable experiments to be carried out in situ.	<h3>Next steps</h3> <ul style="list-style-type: none">The six upcoming steps of Data for London:<ul style="list-style-type: none">Develop London's Data MarketOrganising City Data for ImpactRecognising the Value of City DataBuilding Public AcceptanceActive and Effective GovernanceTechnology Roadmap	

<h3>Paris online</h3> <ul style="list-style-type: none"> Paris Open Data portal: http://opendata.paris.fr/ Paris municipality: http://www.paris.fr/ Smart city project: http://villeintelligente.idee.paris/debat2015 	<h3>Context</h3> <ul style="list-style-type: none"> 2,240,621 inhabitants [2012] 1st largest city of France Population density of 21,000/km² [2012] Average age of the inhabitants is 39.1 Average GDP per Capita is 80,528 euro in 2012 	
<h3>Policies & regulations</h3> <ul style="list-style-type: none"> Open Data policy since 2010, open data portal since 2011 Open data clause in public tenders since 2014 	<h3>Open Data strategy</h3> <ul style="list-style-type: none"> To be used by local administrations; To be used by the public, in particular: <ul style="list-style-type: none"> Researchers Developers Journalists and citizens Enterprises 	<h3>Licensing</h3> <ul style="list-style-type: none"> Free of charge Open licence <ul style="list-style-type: none"> Open Data Paris ODbL
<h3>Portal features</h3> <ul style="list-style-type: none"> 175 datasets Topics: Administration, Citizens, Culture, Environment, Movements, Finance, Services, Urbanism Open Data users club Portal updates section Open Data on a map Request dataset 	<h3>Top datasets & domains</h3> <p>Top downloaded datasets:</p> <ol style="list-style-type: none"> Car sharing locations and parking locations in Paris Bicycle sharing locations, real-time availability Information on remarkable trees per street List of first names 2004 - 2015 List of WiFi hotspots in Paris 	

<h3>Events 2016</h3> <ul style="list-style-type: none"> 19 May: Ville intelligente & connectée 9 – 19 June: Futur en Seine 	<h3>Partnerships</h3> <ul style="list-style-type: none"> OpenDataSoft Paris Region Lab SNCF JCDecaux Autolib 	
<h3>Smart City areas</h3> <ul style="list-style-type: none"> Smart and durable Paris: <ul style="list-style-type: none"> Social media strategy Digital accessibility Innovation eGovernment 	<h3>Integration portal</h3> <ul style="list-style-type: none"> The Open Data portal of Paris is harvested by the national portal https://www.data.gouv.fr/fr/ 	<h3>Social media</h3> <ul style="list-style-type: none"> Twitter: https://twitter.com/opendataParis
<h3>Initiatives</h3> <ul style="list-style-type: none"> Paris Open Innovation <ul style="list-style-type: none"> http://www.meetup.com/Paris-Open-Data-Innovation-Meetup/photos/20041242/434247811/ Frequently organises events Data City <ul style="list-style-type: none"> Open Data developers incubator http://www.datacity.paris/ 	<h3>Next steps</h3> <ol style="list-style-type: none"> Promote the Data City candidates for awareness creation 	

<h3>Stockholm online</h3> <ul style="list-style-type: none"> City Open Data portal: http://dataportalen.stockholm.se/dataportalen/ Stockholm municipality: http://www.stockholm.se/ Open Stockholm: http://open.stockholm.se/ 	<h3>Context</h3> <ul style="list-style-type: none"> 923,516 inhabitants [31/12/2015] 1st largest city of Sweden Population density of 4,900/km² [31/12/2015] Average age of the inhabitants is 39 years Average GDP per capita is 62,145 euro in 2014 	
<h3>Policies & regulations</h3> <ul style="list-style-type: none"> City development: <ul style="list-style-type: none"> Sustainable efforts The Smart City European Green Capital 2010 Suburban development The Stockholm Royal Seaport 	<h3>Open Data strategy</h3> <p>Action plan 2011 'Re-use of Open Data - City of Stockholm': Official documents in electronic form, Implementation of PSI Directive, Act on re-use of documents (PSI Act), Implementation of INSPIRE Directive, Law on spatial environmental information, Regulation on geographical environmental information</p>	<h3>Licensing</h3> <ul style="list-style-type: none"> Open data is mainly shared with the public domain
<h3>Portal features</h3> <ul style="list-style-type: none"> 544 datasets API accessible Popular topics: Cultural and archive data, Population data, Traffic and parking data, Environmental Data, Activities and satisfaction surveys, Geodata Using the 5-star model to indicate data quality 	<h3>Top datasets & domains</h3> <p>Top downloaded datasets:</p> <ol style="list-style-type: none"> Parking spaces Daily cleaning and housekeeping Roads, excluding street names Parking for bus and motorcycle 	

<h3>Events 2016</h3> <ul style="list-style-type: none"> 26 – 29 April: Smart Cities – Sustainable & Attractive Communities 2 – 3 November: Nordic Smart Cities 	<h3>Partnerships</h3> <p>Triple helix partnerships, which means collaboration between the industry, academics and government</p>	
<h3>Smart City areas</h3> <p>Producing strategy for Stockholm as a Smart and Connected city, begin implementation of strategy</p>	<h3>Integration portal</h3> <ul style="list-style-type: none"> The Open Data portal of Stockholm is not harvested by the national portal http://oppnadata.se/ 	<h3>Social media</h3> <ul style="list-style-type: none"> Twitter municipality: https://twitter.com/stockholmsstad Twitter Smart city: https://twitter.com/smartsthlm
<h3>Initiatives</h3> <ul style="list-style-type: none"> According to the soon to be decided strategy, in all areas leading to: <ul style="list-style-type: none"> A cohesive society An environmental sustainable city An economically sustainable city An democratically sustainable city 	<h3>Next steps</h3> <p>Six steps that are part of Action Plan:</p> <ol style="list-style-type: none"> Surveying the existing open data Develop a checklist for audit A special website / portal will be designed Access rules, methods, and file / document format's Inventory of possible data and documents Investigate the criteria for charging fees 	

<h3>Vienna online</h3> <ul style="list-style-type: none"> City Open Data portal: https://open.wien.gv.at/site/ Vienna municipality: https://www.wien.gv.at/ Smart city project: https://smartcity.wien.at/site/en/ 	<h3>Context</h3> <ul style="list-style-type: none"> 1,840,573 inhabitants [1/1/2016] 1st largest city of Austria Population density of 4,326/km² [1/1/2016] Average age of the inhabitants is 43 Average GDP per capita is 47,200 euro in 2013 	
<h3>Policies & regulations</h3> <ul style="list-style-type: none"> Australian Government declared her commitment to Open Data end 2013 by three key principles: <ul style="list-style-type: none"> Informing Engaging Participating 	<h3>Open Data strategy</h3> <ul style="list-style-type: none"> The City of Vienna has committed itself to the concept of Open Government Data The main prerequisite for data to be included is their machine readability in open formats. Open and freely accessible data allow for a broad and democratic exchange of knowledge The data catalogue is being expanded continuously 	<h3>Licensing</h3> <ul style="list-style-type: none"> Free of charge Open licence CC-BY 3.0 AT
<h3>Portal features</h3> <ul style="list-style-type: none"> 299 datasets 14 different topics There is a news section, updated regularly Data can be requested by a contact form 	<h3>Top datasets & domains</h3> <p>Top downloaded datasets:</p> <ol style="list-style-type: none"> Public transport, real-time and scheduled Public toilets Tree cadastre Event calendar Drinking fountains Parking in Vienna 	

<h3>Events 2016</h3> <ul style="list-style-type: none"> 25 April: Aufbereitungen von Verwaltungsdaten mit modernen Tools und Visualisierungswerkzeugen 28 – 30 April: Linuxwochen Wien 2016 19 – 21 October: Digital Days 2016 	<h3>Partnerships</h3> <ul style="list-style-type: none"> Siemens AG Österreich Vienna University of Technology Energieinstitut der Wirtschaft GmbH Austrian Institute of Technology GmbH 	
<h3>Smart City areas</h3> <p>Education and Research, Health and Societal Services, Building activity and living, Transportation and Urban Planning, Environment and Climate Protection, People and Society, Politics and Administration / ICT</p>	<h3>Integration portal</h3> <ul style="list-style-type: none"> The Open Data portal of Vienna is harvested by the national portal https://www.data.gv.at/ 	<h3>Social media</h3> <ul style="list-style-type: none"> Twitter: https://twitter.com/smartcityWien Facebook: https://www.facebook.com/SmartCityWien RSS Feed: https://smartcity.wien.gv.at/site/en/feed/
<h3>Initiatives</h3> <ul style="list-style-type: none"> PUMAS: mobility concept for the corridor Vienna – airport region Mobile health Boutiquehotel Stadthalle: City hotel with a zero-energy balance Campus WU: Room for a University of the Future AnachB - smart from A to B SternE – renewable energy in the main wastewater treatment plant 	<h3>Next steps</h3> <ul style="list-style-type: none"> Continue working on the numerous Smart City initiatives 	

End notes

- ¹ <http://www.forbes.com/sites/teconomy/2014/09/12/how-open-data-is-transforming-city-life/>
- ² <http://www.dataforcities.org/wccd/>
- ³ <http://www.dataforcities.org/wccd/>
- ⁴ <https://ec.europa.eu/digital-agenda/en/blog/open-and-smart-cities-common-future>
- ⁵ http://www.europeandataportal.eu/data/en/dataset/stadt-wien_schulenstandortwien
- ⁶ <http://www.journals.elsevier.com/transportation-research-part-c-emerging-technologies/call-for-papers/data-driven-smart-city-enabled-traffic-system-modeling/>
- ⁷ European Union (2015) Creating Value through Open Data.
http://www.europeandataportal.eu/sites/default/files/edp_creating_value_through_open_data_0.pdf
- ⁸ <http://beyondtransparency.org/chapters/part-4/beyond-open-data-the-data-driven-city/>
- ⁹ Smart Cities Open Data Guide (2015), <http://smartcitiescouncil.com/resources/smart-cities-open-data-guide>
- ¹⁰ European Union (2015) Creating Value through Open Data.
http://www.europeandataportal.eu/sites/default/files/edp_creating_value_through_open_data_0.pdf
- ¹¹ <http://www.europeandataportal.eu/mapapps/?lang=en&type=WMS&dataset=9932dcc7-6cb9-4d9b-95c9-73795d7616b9>
- ¹² <https://www.whitehouse.gov/blog/2016/02/23/pcast-releases-technology-and-future-cities-report-president>
- ¹³ <http://opencities.net/>
- ¹⁴ http://opencities.net/sites/opencities.net/files/content-files/repository/Crowdsourcing_Cooking_Book_RN_en_KG.PDF
- ¹⁵ <http://www.citysdk.eu/about-the-project/>
- ¹⁶ http://www.icityproject.eu/sites/default/files/iCity_factsheet.pdf
- ¹⁷ <http://www.icityappstore.eu/>
- ¹⁸ <http://www.hel.fi/www/uutiset/en/helsinki/6aika>
- ¹⁹ <http://6aika.fi/focus-areas/>
- ²⁰ http://franceurbaine.org/sites/default/files/presse/Communiqu%C3%A9s%20de%20presse/etude_pib_grandes_villes_pdf_20224.pdf
- ²¹ <http://www.berlin.de/sen/inneres/moderne-verwaltung/e-government/artikel.263227.php>
- ²² <http://apps4bcn.cat/app/tmbapp-metro-bus-barcelona/111#>
- ²³ <http://daten.berlin.de/anwendungen/berliner-fahradunf%C3%A4lle>
- ²⁴ **OECD (2006)**, *Digital broadband content: Public Sector Information and Content*. Paris: Directorate for Science, Technology and Industry.
Online available at: <http://www.oecd.org/sti/36481524.pdf>
- ²⁵ <https://www.data.gv.at/suche/daten-hinzufuegen/>
- ²⁶ <http://theknowledgeexchangeblog.com/2015/07/17/how-data-and-smart-city-infrastructure-can-support-transport-planning/>
- ²⁷ <http://www.barcinno.com/smart-city-barcelona/>
- ²⁸ http://barcelonacatalonia.cat/b/?page_id=3933&lang=en#&panel1-3
- ²⁹ <http://apps4bcn.cat/>
- ³⁰ <http://daten.berlin.de/anwendungen>
- ³¹ https://www.technologiestiftung-berlin.de/fileadmin/daten/media/publikationen/160128_TSB_OpenDataBerlin.pdf
- ³² <http://cphsolutionslab.dk/borgerpanel/>
- ³³ <http://cphsolutionslab.dk/portfolio/street-lab/>
- ³⁴ <http://cphsolutionslab.dk/copenhagen-connecting-wins-world-smart-city-award-2014/>
- ³⁵ <https://www.london.gov.uk/what-we-do/business-and-economy/science-and-technology/smart-london/london-datastore-smart-london>
- ³⁶ <https://www.london.gov.uk/press-releases/mayoral/londons-smart-technology-drive>
- ³⁷ <http://www.meetup.com/Paris-Open-Data-Innovation-Meetup/>
- ³⁸ <http://reseaudurable.com/datacity-lopen-data-au-service-de-la-smart-city-a-paris/>
- ³⁹ <http://www.grow-smarter.eu/lighthouse-cities/stockholm/>
- ⁴⁰ <http://www.grow-smarter.eu/solutions/>
- ⁴¹ <https://smartcity.wien.gv.at/site/en/initiative/>
- ⁴² <http://www.socialcity.at/>
- ⁴³ <http://www.socialcity.at/aktionsfelder/gemeinschaft/stadtmenschen-wien/projekt.html>
- ⁴⁴ <http://www.paris.fr/necmergitur>
- ⁴⁵ <http://toa.berlin/>
- ⁴⁶ <http://www.citylab.com/tech/2014/04/how-helsinki-mashed-open-data-regionalism/8994/>
- ⁴⁷ <http://dati.comune.roma.it/cms/it/progetto.page>
- ⁴⁸ <https://www.wetransform.to/news/2016/02/09/dear-smart-city-where-do-we-start/>
- ⁴⁹ <http://www.urbantransformations.ox.ac.uk/event/smart-cities-communities-shaping-the-future/>
- ⁵⁰ <http://www.theguardian.com/media-network/2015/oct/14/manchester-barcelona-smart-cities-open-data>
- ⁵¹ <http://www1.nyc.gov/site/forward/innovations/smartnyc.page>
- ⁵² <https://theodi.org/smart-cities>
- ⁵³ <http://www.cmswire.com/internet-of-things/open-data-will-fuel-growth-of-smart-cities/>
- ⁵⁴ <http://datasmart.ash.harvard.edu/news/article/the-urban-internet-of-things-727>
- ⁵⁵ http://www.berlin-partner.de/fileadmin/user_upload/01_chefredaktion/02_pdf/02_navi/21/Strategie_Smart_City_Berlin.pdf
- ⁵⁶ <http://buergerbautstadt.de/>
- ⁵⁷ <http://www.smart-cities.eu/>
- ⁵⁸ <http://www.smart-cities.eu/?cid=5&ver=4>