

# OPEN CITIES

## OPEN INNOVATION Mechanisms in Smart Cities

### Handbook on Open Innovation

An overview on the methods, best practices and recommendations  
for working with Open Innovations methods within public administrations



Co-funded by the  
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# OPEN CITIES

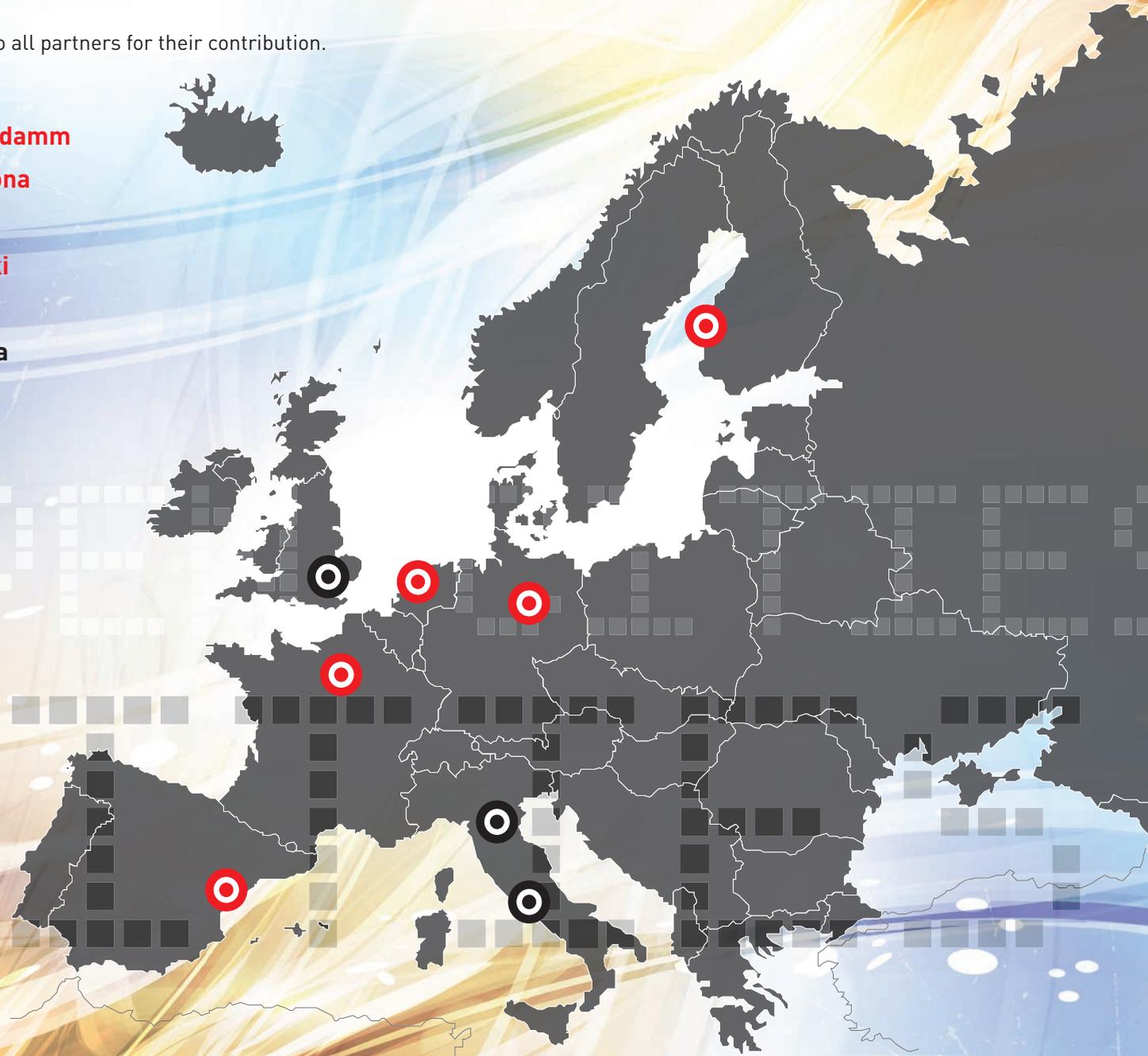
## CONTENT

Open Cities partners.....	Page 02
Open Cities.....	Page 03
The project .....	Page 04
General Recommendations on Open innovation processes .....	Page 05
Open Sensors Network .....	Page 06
Best Practice – OpenCities: OSN Platform .....	Page 07
Recommendations.....	Page 07
Test Bench for Innovative Apps and Services.....	Page 08
Best Practice – Elodepart.....	Page 09
Recommendations.....	Page 09
Urban labs.....	Page 10
Best Practice – Open Cities „The Urban Lab Challenge 2012“ .....	Page 11
Recommendations.....	Page 11
Crowdsourcing.....	Page 12
Best Practice – AmsterdamOpent.nl.....	Page 13
Recommendations.....	Page 13
Open Data.....	Page 14
Best Practice – www.wheelmap.org.....	Page 15
Recommendations.....	Page 15
Imprint .....	Page 16

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## OPEN CITIES

### OPEN INNOVATION Mechanisms in Smart Cities

Demands for more transparency and citizens' participation in political and urban processes have become more and more popular all over Europe within the last years. Citizens show increased interest in getting better access to administrative information and thus increasing their competences in administrative decision making.

Political decision makers as well as administration bodies undertake ongoing efforts to transfer concepts of openness and participation to their sphere. Initiatives for Open Data spread all over Europe, crowdsourcing instruments that go beyond traditional forms of public petitions and civic protests are increasingly being used by administrations – mostly on a local basis - to find best ideas and solutions for citizens life.

Open Innovation within public administrations aims to transfer this trend to openness into innovation processes. Innovation is understood as a crucial aspect in the development of a city, a region and a country. To be innovative is seen as one of the most important factors in the globalised competition of economies. As the EU Innovation Union programme under Europe 2020 strategy states innovation is the key to growth, competitiveness and smart living in the 21st century.



Europe needs to continue its tradition of successful inventions that supported the improvement of life. New challenges in the areas of climate, energy, food security, health and an ageing population demand new smart and innovative solutions. European governments under-

take strong efforts in supporting entrepreneurs and companies in developing innovative services and products.



## THE PROJECT

The EU funded project “Open Cities - OPEN INNOVATION Mechanisms in Smart Cities” supports administrations in the European metropolis of Amsterdam, Barcelona, Berlin, Helsinki and Paris in testing these procedures in their workflow. The participating city administrations are cooperating with partners from science and industry in these cities. By integrating associated partners from London, Bologna and Rome the impact of the project has been extended. The project ran from autumn 2010 until the end of 2013, worked with an overall budget of 5.8 Million Euro and was coordinated by ESADE Business School in Barcelona.

With these pilots testing methods of open innovation within public administration bodies the partners aim to achieve the effects of transparency,

participation and collaboration not only among administration staff but also among citizens. Administrative processes will be presented more transparently to the public allowing wider participation and thus identification of citizens as stakeholders of the city.

By addressing companies and developers, cities foster the development of innovative solutions, services and products and thus strengthen the economic power and competitiveness of local creative industries and other branches. By the project’s support of companies in creating innovative services not only the development of user or citizen centred solutions that improve the quality of life in cities is fostered but also the ties binding cities, companies and citizens are strengthened.

The different approaches and methods of Open Innovation are reflected in the structure of the project that consists of six work packages. Apart from project management and dissemination, crowdsourcing, open data, open sensor networks and test bench for innovative apps and services are components of the project.

In this handbook the single methods will be explained, each is illustrated with a best practice and rounded up with recommendations for open innovation processes within public administrations.

In the following we will start with some general advices on working with Open Innovation methods.

## GENERAL RECOMMENDATIONS ON OPEN INNOVATION PROCESSES

When it comes to implement open innovation processes into the work within public administrations experiences show that the basic condition is the establishment of a culture of openness for new innovative ways of working and finding smart urban solutions.

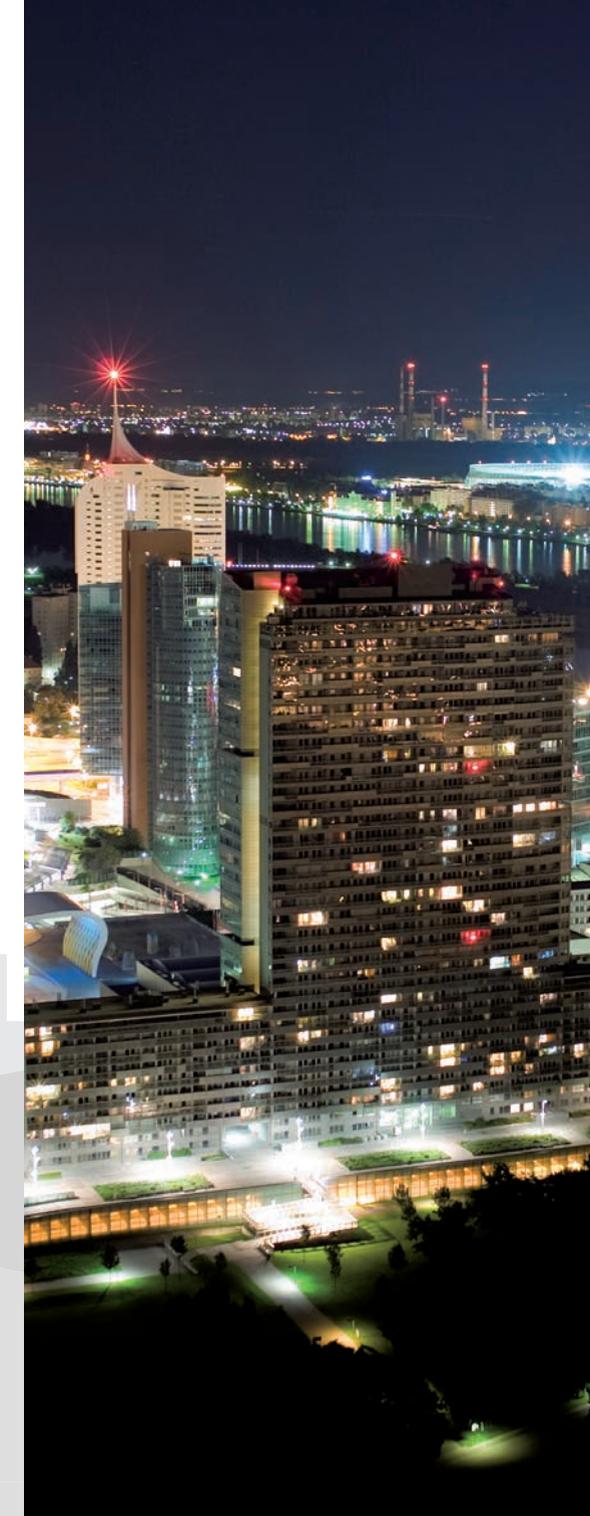
Open innovation promotes collaborative communities and utilises stakeholders outside of the city hall to perform tasks and provide resources in supported innovation processes. Policy makers should promote a complete civic innovation ecosystem that includes a diverse set of external collaborators. It is crucial to recognise and integrate these groups into the ecosystem: all relevant city managers and internal civic departments, interested citizens or “civic innovators”, the developer community that has the competencies to develop innovative solutions and applications, venture capitalists who judged, incentivised, and support solutions, brokers or intermediaries that provide the ability to connect to collaborators and work between the city external agents.

Therefore it is essential to clearly identify the urban challenge, the related questions and which civic groups are involved so far. Public administrations should support a platform that connects

the different stakeholders and eases their collaborative work as well as oversee the management of Open Innovation projects to ensure the sustainability of the effort.

In order to promote value capture for collaborators, the market for innovations should be made as large as possible. Policy makers should broadly market solutions within the city and furthermore endeavour to reuse existing solutions rather than develop proprietary ones. Policy makers should encourage open applications and solutions.

Policy makers should match their organisational potential and the expected outcomes to the appropriate innovation strategy. Several instruments for engaging external actors for civic innovation have been proven successful so far, amongst which are hackathons and application development contests as well as civic accelerators. Learn more about the successful concepts that were tested in the Open Cities project on the next pages.





## OPEN SENSORS NETWORK

A Wireless Sensor Network (WSN) consists of spatially distributed autonomous wireless sensors to monitor physical conditions, such as temperature, sound, vibration, pressure, motion or pollutants, and to cooperatively pass their data through the network to a single or replicated data-processing location. An Open Sensor Network (OSN) is a Wireless Sensor Network that manages Open information in an Open environment. An OSN stands for an interoperable sensor network, where many vendors or entities can connect their sensor solutions and those sensors interact with other ones or with the centralised data system using standard communications. The Open Sensor Network connects the sensor with the data repository where the information is processed and stored, as it uses public data from different sensors and forwards the gathered information to the central point within a wireless environment.

Public urban administrations are responsible to gather, store and publish information about citizens and the city as such. City councils face great opportunities and challenges at the same time when they publish these Open Data in order to make it possible for third entities to create new services. These new services create a new market that

encourages the urban economy. Sensor networks are already widely used in the fields of mobility, transport, environment, geography, meteorology and tourism. They are decisive in realising the ideas of a smart city by providing basic data on the usage of energy, pollution, geodata, traffic and many more.

Possible future services that are based on OSN include mobile applications that support citizens using public transports by displaying real time information on arrival and departure or traffic information for car drivers. Another field is the measurement of air pollution, temperature, and humidity or light sensors. The areas of mobility & transport, environment, geography & meteorology, and tourism already provide a large variety of sensor networks and they offer infinite possibilities for developing mobile applications (Apps) which would be fed by Open Data from the OSN.

A number of European cities have established sensors that detect traffic density and some initiatives to monitor the arrivals of the public transports already. These sensors provide the opportunity to implement applications that help citizens to move in the cities. Most European cities work with sensors that monitor the environmental conditions.

In the cities pollution, temperature, humidity and light sensors are installed that provide information that could be used to develop info applications to the citizens or to be added to other applications as a mashups. All the mobility and environmental sensor networks could be interconnected with the OSN platform in order to provide external parties a single point to consume this data.



## BEST PRACTICE

### OpenCities: OSN Platform

(<http://opencities.upf.edu/web/index.php/en/>)

In the scope of this project Universitat Pompeu Fabra has developed the Open Sensor Network Platform which is distributed under the Apache License 2.0. It allows the storage of data from both static and dynamic sensor network, and provides the necessary tools to developers so they can build applications and services from these data. The platform follows the GeoJSON standard and the metadata can be downloaded in RDF format.

## RECOMMENDATIONS

Usability is a key factor for the acceptance and use of Open Data platforms, either containing static or dynamic data. Users will get involved more easily if the mechanisms to upload and download data (e.g. produce them and consume them) are accessible and easily understandable.

When public administrations start to work with an Open Sensor Network it is crucial to modify their mindset and plan the processes profoundly. Along with there should be a procedure, talking in terms of a quality system, accompanying the whole process, from data generation to their publication, as well as the commitment of the management.

An Open Sensor Network, as all wireless networks, has requirements and limitations that administrations must take into account when it comes to data format, listing of factors, data time period, data size, data access and data freshness. An Open Sensor Network manages dynamic data information that requires continuously updating and continuously changing. It has to manage a high volume of transactions from the sensors to the central point.

An Open Sensor Network requires a high degree of scalability. It has to support

hundreds of sensors and must accept the upgrade of new ones without affecting the whole system.

An Open Sensor Network requires a high degree of stability. It has to guarantee high reliability and possible problems in some sensor must affect the whole system. An Open Sensor Network must guarantee low latency in transaction as some applications could require near real-time data gathering.

Despite the fact that information is mostly public, a wireless network must guarantee a certain degree of security, and therefore some signalling and system messages must be encrypted. However, the Open Data are public once they have been processed and adapted to a standard format, not in the early stage when they are obtained directly from the sensor.

An Open Sensor Network must accept a connection from different vendor interfaces in order to offer sensor heterogeneity and standardisation and multi-vendor compatibility. It has to offer standard connections in order to interact with Third Party architectures.



## TEST BENCH FOR INNOVATIVE APPS AND SERVICES

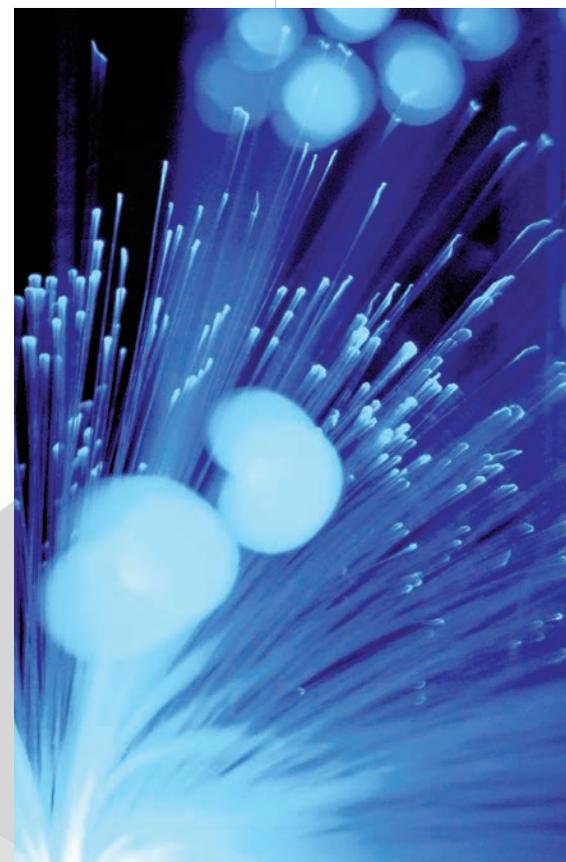
The rising presence of audio visual formats on the Web, popular online games and rich applications cause a growing demand for higher speed and bigger bandwidth for the transfer of data. Broadband innovation requires experimentation with a large variety of technologies, and access to a wide range of potential service providers and users, from early on in the development phase. This often surpasses the capacity of a single firm or even a single sector of firms. Therefore, local, regional, national and European administrations establish a growing number of joint tests and experimentation facilities as tools to foster broadband innovation. Besides that technological and innovation support, these facilities are set up for gaining an understanding of the management of technological platforms in an Open Innovation context as well as an understanding and guiding of the social and economic changes related to digital technologies and ICT developments. This refers to experimental settings, often imitating real life user contexts. A Test Bench For Innovative Apps and Services is a platform that is realising these objectives.

Providing a platform that suits the growing demand of businesses working in the areas of digital contents is crucial

to support them in their market entry by facilitating real-size experimentation before the commercial development of a project. This support primarily targets services in the fields of digital contents and information technology encompassed by the business clusters of culture, press and media, digital design, e-learning and e-training, image, sound and interactivity, 3D, knowledge engineering, video games, open source software, collaborative technology & intelligence, robotics and communicating objects, and mobile lifestyle & services etc.. In order to realise the match between technology, society and economy, adequate environments need to be created in various projects, more in particular environments that facilitate the interplay between different innovation stakeholders: engineers, users, business people, social scientists and policy.

By using the Test Bench For Innovative Apps and Services and therefore the possibility to fine-tune their innovative on-line and mobile services and digital contents, companies benefit from a cost-saving fast and experienced centred test environment. Current trends show consumers are no longer looking for products, new technologies or sustainable services only but prefer rich applications that come along with the

products and services characterised by audio-visual experiences. The companies developing those services are being well supported in meeting the challenges of innovation and creating value – and finding the key to survival and growth right from service delivery to building new business models.



## BEST PRACTICE

### Elodepart – An environment for linked open deliberation and e-participation for the city of Vanves

The Open Cities partners in Paris Cap Digital and Institut Télécom provided a test bench to the company Ontopica. Ontopica develops innovative e-participation solutions enabling citizens and employees to get involved in decision making processes via the internet. The increasing noise exposure during the last years brought up new initiatives that are concerned with the assessment and management of environmental noise resulting in noise actions plans. Elodepart gives a flexible and extensible infrastructure for the realisation of those plans, including citizens in the decision making process. The platform provides a bidirectional communication channel between citizens and decision makers based on approved methodology to develop a common concept to assess and control environmental noise, to prevent, to anticipate or to minimize damaging effects and disturbances through environmental noise.

Public administrations thus are able to take clustered feedback into account for the planning of noise reduction activities (walls, flight routes adjustment, and subvention of noise proof windows).

#### The platform provides following opportunities

- interactive noise maps is published to assess environmental noise exposure
- participants propose ideas on how to reduce noise
- the proposals will be assigned to action plans with short, middle and long-term scope
- proposals will be prioritised by the participants („crowdsourced scenario“).

#### The project beta tester realised following tasks

- report at first several noise disagreement meets in their every day life
- be source of proposition to improve the challenges pointed out
- comment, to support, to disagree, ... on stated noise report
- get feedback or give feedback depending their degree of expertise.

## RECOMMENDATIONS

For working with a Test Bench For Innovative Apps and Services and related beta testers it is recommended to establish a central portal that provides all necessary instruments and communication channels for the participating stakeholders such as SMEs, the supporting administration and the service agent that is organising and realising the test bench.

A dedicated community management helps to meet all the needs of the participating stakeholders.

Extending your communication and marketing activities to the targeted community via popular social networks outranges your scope and the impact of your project.

In order to reach a sufficient number of beta testers it is recommended to carefully think about the incentives that should attract them, make sure that you meet the needs of your target groups.



## URBAN LABS

Urban Labs is a process that describes the implementation of Living Labs methodologies into Smart Cities by public administrations. Urban Labs as a method of Open Innovation allows city administrations to use the city as a laboratory and thus to carry out tests and pilot projects on products and services for urban life, which are in the pre-market stage, thus improving services to citizens and making their city smarter in the sense of innovative and efficient infrastructure, mobility environment, quality of life, modern administration and engaged citizens.

The benefits come to the local economies when companies try and test their services with citizens as users and in a real life environment and thus improving their chances for a better market access and competitiveness. By integrating scientists and research institutions public bodies support the collaboration between companies and science, a promising way when you target innovation processes.

When using Urban Labs as a tool for urban development city governments can improve relationships to their citizens by supporting, assembling, activating and associating participants as citizens of their neighbourhood, initiating and

installing citizens' participation and commitment to community and their environment. Technological driven innovative developments such as sensor networks connected with a sustainable user-centric design supports cities in addressing the various challenges of the future. By initiating collaborative projects the cities bring together relevant stakeholders of the city: citizens, companies and scientific institutions.

This process of cooperation is enlarging perspectives what even might bring up new ideas and innovations. By coming together in an early stage of a development you will ensure to cover the needs of all partners. Thus the city learns more about the requirements of their companies and citizens and can improve their services. And companies get a deep and early insight into the needs of their customers when it comes to urban services.

Potentials for synergies and future collaborations that work without public funding can be identified, new business models can be found. By using the new technological developments within the Urban Lab programmes administrations get deep insights into the possibilities and challenges of the future urban life.



© Barcelona Activa

## BEST PRACTICE

### Open Cities ,The Urban Lab Challenge 2012' winner project LPW (Leaves Performative Walls)

In 2012 the Open Cities partner Barcelona Activa awarded the project LPW - Leaves Performative Walls in the competition „The Urban Lab Challenge“. The competition aimed at companies, SMEs and entrepreneurs in the energy efficiency sector offering innovative projects or services that involved an improvement in the energy demand of municipal buildings, incorporating criteria of self-sufficiency and reduction in carbon emissions.

The innovative LPW system developed by JAP and PGI Engineering proposes to use the walls of buildings to generate energy and improve air quality. The winning proposal consists of a series of photovoltaic wall panels in the form of leaves or branches which, once installed on the walls of buildings and visually blending in with their surroundings and the urban vegetation, promote energy self-sufficiency through renewable sources and contribute to the improvement of air quality in the city thanks to the chemical composition of their materials.

The prize allows the developing companies to implement a pilot project in a municipal building close by one of the most famous sights in Barcelona. Thus the administration supports the transformation of the city of Barcelona into an urban laboratory where innovative products and services are implemented. Yet since 2008, the City council uses Urban Lab as a tool to facilitate the use of public spaces for pilot projects, at a stage prior to their commercialisation, with a clear benefit to citizens.

## RECOMMENDATIONS

Political commitment is a must for the success of an Urban Lab.

The required governance structures must be well defined first at local level, then at transnational level. These structures should have multiple sector coverage.

Urban Lab Challenges with an international approach (eg: international call, addressing transnational challenges) can be easily scalable if the implementation of pilots is done locally.

Search for solutions through the launch of specific challenges reaches greater efficiency and impact.

A public procurement commitment from the authorities increases the success of Urban Lab challenges.

Flexibilisation of the legal framework on Innovative Public Procurement from policy makers will unlock the potential of public procurement as an innovation and economic promotion mechanism.



## CROWDSOURCING

Especially for companies in the field of technology it seems to be crucial to open their processes of product development to the outer world. Gathering consumers' ideas has become a very popular method for innovative companies for some years now.

Recent global developments have revealed increasing demands of the citizens addressing their governments and administrations to become more participatory, transparent and accountable. The institutions have acknowledged crowdsourcing as a tool to improve the relationship to their citizens by integrating them into political decision making. By opening political processes to the peoples' opinion administrations reflect the principles of transparency and participation.

Crowdsourcing has been discovered as a method to face the phenomenon of shrinking public trust in their honesty and effectiveness as well as growing pressure from their citizens for improved access to government decisions and decision-makers.

In the last decades it has become more usual for administrative bodies to open their working processes – by collaborating with external experts, establishing steering committees and exchanging of experiences. This often happens as a mix of online – and offline formats. Real life meetings or workshops support the administrations in finding ideas and solutions.

Addressing the citizens by asking for their support in finding ideas and solutions has evolved to be a widely accepted method in of urban development or related questions. Online voting and contests become more and more accepted and helpful instruments for solving problems of governments and administrations.

Recent technological developments allow realising this sourcing of the citizens' crowd on digital platforms – what is on the one side facilitating participatory processes but on the other side

establishing new barriers – competency in the use of the internet is crucial for certain forms of online voting.

To meet the democratic principle of equality governments have to ensure that all citizens can participate in the voting or contests. Other challenges for the initiators of a crowdsourcing process might be related to managing of the crowd, quality or limitations of ideas. It is crucial for a successful crowdsourcing to design the activity properly to prevent excessive demands and frustrations.

Thus the challenge needs to be clearly defined, a clear target group, unmistakable questions or tasks, effective incentive mechanisms, good management of submissions, a significant degree of control on crowd.

Yet crowdsourcing involves numerous benefits such as time and cost saving in labour to access creative resources outside the boundaries of the administration. The administration staff thus broadens their minds, their knowledge and competencies by getting new insights from the crowd.



## BEST PRACTICE

### AmsterdamOpent.nl

The municipality of Amsterdam experiments with crowdsourcing on the platform AmsterdamOpent.nl to learn how interaction with civilians can support local policies. In addition to the website [www.amsterdamopent.nl](http://www.amsterdamopent.nl) there is also a Facebook application which allows users with a Facebook profile to submit their ideas by Facebook. In 2010 AmsterdamOpent already experimented with three social crowdsource questions. The platform then brought up 100 ideas, and initiated around 150 co-creation discussions between the crowd and policy maker. Some of the ideas will be executed in collaboration with the municipality.

Amsterdam acquired an own crowdsourcing tool. In the software tool there is also functionalities provided for the civil servants who published the challenges, to rank, select or reject ideas. The project appeared to be a big success, based on the usage of Web 2.0 communities and an open quick interaction with the public for civil servants in Amsterdam.

## RECOMMENDATIONS

Cities need an intense ICT and social media coaching on crowdsourcing. The market in technology adapts very fast, therefore outsourcing it to professional bureaus is a feasible and quick solution.

Maintaining a city owned crowdsourcing platform is appealing but very costly in terms of resources and often it lacks the needed flashy design. Best option is to arrange it through Commons (shared interfaces, codes).

Arranging an immediate response from the policy maker is very well appreciated, only in practise that is often not feasible.

To get a policy crowdsourced is already difficult, there should be a support, commitment for the implementation and there should be high level policy representative that could act as a spokesman of the challenge (ambassador).

Strict planning of the challenge and clear communication about it is essential.

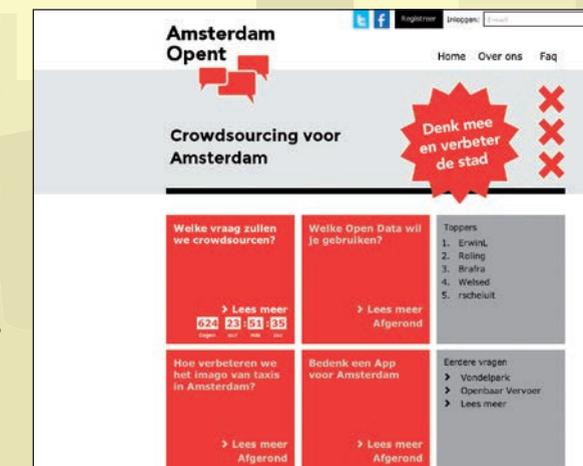
Make participation as user friendly as possible (less passwords, firewalls) , like post-its in Change by us.

Promote the usage of the platforms through share-it-buttons, and on events will not attract enough participants.

Select appealing rewards (tangible) and the one that appeals the target audience.

Benchmark and collaborate with other cities on what is already available with crowdsourcing technology.

Follow up best practices and plasticizers like Digital Agenda crowdsourcing challenge in 2012 about web based entrepreneurship and enhancement of their activities.





## OPEN DATA\*

When the European Commission published its Directive on the reuse of public sector information (PSI) in 2003 many member states, including France, the United Kingdom, Germany, Netherlands and Spain began to promote and implement open data policies. The directive provided an EU-wide framework for governments, at all levels, to begin opening data. Since then, ten years of e-Government programmes across all levels of the EU public sector has led to the development of ICT infrastructure in public administrations. We now have the chance to open up policy documents, digital registers, statistics and maps for reuse. The reuse of public sector information (PSI) has a great economic potential. The European Commission estimates the economic value of the PSI market at approximately €40 billion per annum\*\*.

The 2013 revision of the European Commission Directive on the reuse of public sector information will further enable the opening of public sector data in a harmonised and more transparent way, and create the conditions for generating value, both economic and social, from this data. In order to establish a transparent, accountable and innovative administrative management system, governments are transforming their public

services in a more open, accessible and collaborative way. The focal foundation for this alteration is achieved via initiatives, which promote the exchange of information between the government and the public – concretely by the establishment of open data. Open data refers to a practice of making data freely available online in a standard and re-useable format for everyone to use.

Local authorities are playing a leading role in implementing open data policies and driving forward open data movements. City governments, together with different stakeholders, are increasingly tapping into this to deliver new services, improve liveability, stimulate business and engage and empower citizens. Open data stimulates the transformation of city authorities into modern open government that is capable of leading, responding to and reaping benefits from the expanding digital agenda. City halls collect extensive data about its residents and the city. “Data” in this case means everything from statistics to election results, to the locations of schools or parking lots. The data provided within open data portals allow citizens to access all public information obtained during the management of public affairs, in standard and re-useable formats.

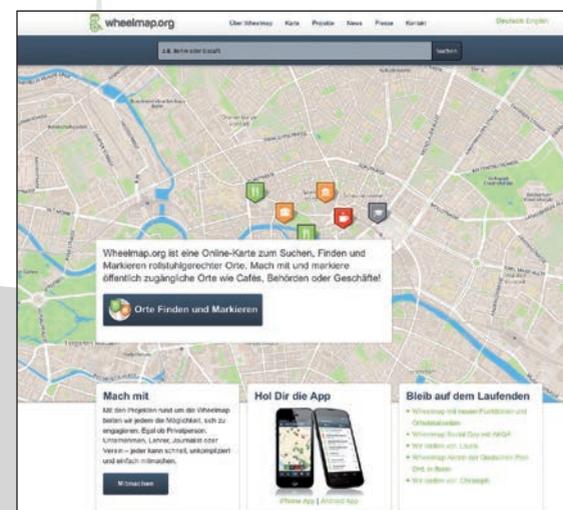
The social benefits of open government vary from citizen engagement to increased transparency and accountability, or enhanced communication channels. For instance, citizens gain greater insights into how their tax payments are being spent. Furthermore more knowledge can be created in a distributed way by citizens or organisations that deliver new or improved services based on the huge database that the government opens up. Real-time availability of information also increases the potential to set up a broader range of services.

Beyond the social aspects of this progress, open data also supports public sector innovation by diminishing bureaucracy and friction in data exchange and demolishing competitive advantage gained by proprietary access to data. Innovation is most likely to occur when data is available online in open, structured, computer-friendly formats for anyone to download. As a consequence, open government encourages new means of interaction between government and public. To foster innovation, government entities vastly use “contests” to encourage citizen to collaborate. Open data is furthermore crucial for innovation as developers use government data to build novel applications.

## BEST PRACTICE

[www.wheelmap.org](http://www.wheelmap.org)

A Berlin-based social agency for disabled people launched in 2010 with the aim of identifying problematic areas for disabled people on a city map (e.g. entrances, lifts and other points with poor access for wheelchairs). The project collected official information about public buildings and public transport stops, private buildings, shops, cinemas and other areas. The group ‘SozialHelden’ (‘social heroes’) developed and opened this collection on an internet platform (wheelmap.org). This map not only helps disabled people but also, for example, parents with prams, and can be more efficient than transport agencies in informing citizens about dysfunctional lifts at stations.



## RECOMMENDATIONS\*

An open data policy with clear aims and goals is needed to ensure a clear direction and means to measure success.

Focus on issues of high local relevance that have the greatest potential to raise interest. Thus gaining citizen feedback before opening data is a useful means.

Agreement and support for open data policies is needed amongst politicians and city management, thus they should be addressed with a clear open data policy that is supported with case studies and success stories from other cities in order to convey the economic and social value of opening data.

All city departments should be involved in developing approaches to address disclosure and access to data. Developing common criteria for amongst dedicated data management teams and contact officers can help. Additionally, it is crucial to educate staff to understand what open data is, and on legal and technical issues, such as the use of software specific data modelling techniques.

A vibrant community of citizens and stakeholders – such as companies, interest groups, NGOs, individual citizens and

students – is relevant for the development of open data initiatives. In order to promote the data and bring the right people together, the city administration should support their engagement through e.g local hackathons and data demonstration days.

Many issues of data protection are overcome by ensuring the data is aggregated to the correct level before publication to protect the privacy of the individual. It is also important to communicate to people that that open data refers to data that is not subject to valid privacy concerns.

The quality of data and a reluctance to open data should be embraced as an opportunity to receive feedback and improve quality.

The availability of legal support is crucial in the context of open data due to the inherent complexity of the matter and the need to undergo legal scrutiny before publishing every dataset. In addition, legal advice is required on the most appropriate licences to apply to disclosed data.

\* partly taken from “Open data guidebook - Final report of the EUROCIITIES working group on open data”, for further information on the principles of open data, see: <http://www.opengovdata.org/home/8principles/annotations>.

\* partly taken from “Open data guidebook - Final report of the EUROCIITIES working group on open data”  
\*\* [eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=SEC:2011:1229:FIN:EN:PDF](http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=SEC:2011:1229:FIN:EN:PDF)

# IMPRINT

Senate Department for Economics, Technology and Research

Division Communication, Media, Creative Industries

Initiative: Project Future (Projekt Zukunft)

<http://www.berlin.de/projektzukunft/>

Editor: Nadine Barthel

Release: November 2013

Layout: Hirnbrand, Christian Alexis Thonke

Print: X-Press Berlin



## PARTNERS

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