



State-of-the-art report on methodologies

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1 INTRODUCTION

This deliverable presents the first version of state-of-the-art (SOTA) on existing methodologies, approaches and initiatives related or addressing Public Sector Information (PSI) sharing, collaboration between public bodies and solution providers. It is part of the activities of the WP T1 - Methodology: open data sharing and innovation networks:

T1.1	Evaluate existing methodologies: PSI sharing, collaboration between public bodies, and with solution providers	LIST describes and compares experiences from various approaches from partners and other (trans)national PSI initiatives as a basis for guidance on PSI publication and collaboration between public bodies that all release data at different spatial scales (regional, local) and in various domains (water, energy, transport, etc.). LIST reviews approaches to engage solution providers and public-private collaboration, particularly through innovation networks, eg. tenders, contests, workshops.
T1.1.1	State of the art report on methodologies	State of the Art review of experiences with PSI initiatives on: PSI publication, inter-governments collaboration between data suppliers, and public-private collaborations.

The SOTA addresses the following issues:

- Open data release
- Open data ecosystems and business models
- Open data re-use
- Service innovation
- Open data incubators, and
- Open data initiatives

2 OPEN DATA RELEASE

This section addresses open data release related issues:

- Open data definition and the EU-PSI directive
- Open data release methodologies
- Technical issues, such as infrastructures, standards, data formats, licensing, etc.,
- Assessment of open data projects maturity, and
- The Share-PSI Best practices.

2.1 OPEN DATA DEFINITION

The commonly agreed and used definition of “open data” is the following:

“Open Data is data that can be freely used, re-used and redistributed by anyone - subject only, at most, to the requirement to attribute and share-alike.”¹

Open data is often considered as a subset of open government. (Yu & Robinson, 2013) estimate that this concept is torn between civic participation and service innovation. Although BE-GOOD is clearly positioned on the service side, it is useful to mention the studies conducted on civic participation because the problems faced have often similar characteristics.

2.1.1 PSI-Directive

The Directive on the re-use of public sector information (Directive 2003/98/EC, known as the 'PSI Directive')² entered into force on 31 December 2003. It was revised by Directive 2013/37/EU which entered into force on 17 July 2013.

It provides a common legal framework for a European market for government-held data (public sector information). It is built around two key pillars of the internal market: transparency and fair competition.

It focuses on the economic aspects of re-use of information rather than on the access of citizens to information. It encourages the Member States to make as much information available for re-use as possible. It addresses material held by public sector bodies in the Member States, at national, regional and local levels, such as ministries, state agencies, municipalities, as well as organisations funded for the most part by or under the control of public authorities (e.g. meteorological institutes). Since 2013 content held by museums, libraries and archives falls within the scope of application as well.

The Directive covers written texts, databases, audio files and film fragments; it does not apply to the educational, scientific, and broadcasting sectors.

Not all the data made available under the PSI-directive is open data as the directive admits the principle of charges for re-use (in principle limited to the marginal costs of the individual request)

And that some data may require requests for re-use (to be processed within a specific timeframe, 20 days for standard cases).

¹ <http://opendatahandbook.org/guide/en/what-is-open-data>

² <http://ec.europa.eu/digital-single-market/en/european-legislation-reuse-public-sector-information>

2.2 RELEASE METHODOLOGIES

The following publications may be useful both for planning a long-term open data initiative and for seeking solutions to a very specific release issue. These guidelines and methodologies provide consistent advices-though partially and sometimes at different scales.

Methodology	Provider	Comments
How to build an Open Data Strategy	European Data Portal Website	Very basic guidelines on the technical side, it deals rather with strategic implementation of an open data policy.
Open data Field Guide	Socrata	Although they were tailored for the US context, the recommendations are broad enough to be useful in various contexts, especially concerning the organisational issues
Open data handbook	Open Knowledge Foundation	Broad strategic and technical guidelines
Open data in government, how to bring about change	Open Data Institute	Best practices more than methodology. It addresses however the complex issue of culture change
Open data readiness assessment	World Bank	Questions based methodology. Might be useful when faced with specific issues.
Meloda	Rey Juan Carlos university	Addresses almost only the technical issues. An API allows the
Open data certificates	Open Data Institute	An API allows you to test and evaluate the data that could be opened.
COMSODE's methodology	COMSODE project	The project gave birth to a platform for publishing data as open data. But the related methodology can be useful even outside the use of this platform and it is well balanced between technical and organizational issues.

Table 1: Open data release methodologies

2.3 TECHNICAL ISSUES

This section addresses the technical issues related to open data release and provision: architectures, catalogues, standards and licensing.

2.3.1 Architectures

Several works have been achieved to propose dedicated architectures in the context of Open Data. Some of them just provide dedicated, specific architecture for the purpose of the project, other ones have tried to elaborate a common high level architecture to be instantiated and adapted.

This work³ argues that one doesn't find any recommendations or guidelines on the general architecture of an open data platform. Different reasons can be provided:

³ J. Stråle and H. Lindén, "An evaluation of platforms for open government data," 2014.

- Platform requirements can differ between projects and data formats influence hardly the adopted architecture.
- Sometimes, there is no need to use a platform.
- If only one architecture is recommended, there is a risk to hinder the innovative thinking.

In this work, one establishes a set of criteria to evaluate Open Data platforms that can be used in our context.

- Whether open source or not
- Formats and types of data sources
- Data output formats
- Visualizations
- Quality of documentation
- Provided instructions on how to install and use the platform

This⁴ identifies and describe the requirement that data supplier must fulfil for being harvested by the European Data portal. The technical requirements are summarized as follow:

- Access: authentication, API access, FTP access, Publishing Datasets to the EDP Metadata Repository
- Interface supported
 - DCAT-AP interface
 - Metadata Model and categorization
 - Requests follows the OAI-PMH⁵ protocol
 - Categorization mapping
 - CKAN API
 - One uses an adapted Data Set model that enrich the initial CKAN one.

In this work one proposed a checklist of 9 questions:

⁴ S. Intrasoft, Fraunhofer Fokus, con terra, “European Data Portal Search Datasets: Data Supplier Guidelines,” no. November, pp. 1–4, 2015.

⁵ <https://www.openarchives.org/pmh/>

	Requirement	Value	Comment
1	Make sure that your portal provides metadata!		Only metadata can be harvested, not the data itself!
2	Which metadata standard is used?	CKAN/INSPIRE/DCAT-AP	If other, please provide a detailed description of the scheme used
3	Which representation of the metadata is used?	XML/JSON	
4	Which API is used to retrieve the data?	CKAN/OAI-PMH/dump file	
5	Is authentication required to access API?	yes/no	
6	Include complete vocabulary for categorization, or other fields that use a defined vocabulary (for example update frequency)		With translation, if applicable
7	Use standard date/time formats	ISO8601	
8	Is differential or incremental harvesting supported?	yes/no	Incremental or differential harvesting allows for harvesting of datasets that were changed after a certain date only
9	How often can/should the site be harvested?	daily/weekly/monthly/etc.	

Table 2: Checklist of requirements for successfully harvesting a data supplier site

Another interesting work tries to propose a technical framework to ensure that publication of datasets is done in a consistent, persistent and truly open way⁶. The technical framework is composed of five key components:

1. Open Data License

- o All Open Data should be associated with Creative Commons Attribution (CC-BY)

2. Recommended Formats

3. Metadata Schema.

- o All Open Data must be associated with standardized metadata.
- o DCAT AP is adopted as standards.
- o Each meta data belongs to one of these 3 categories
 - Mandatory
 - Recommended
 - Optional
- o This Metadata improve the semantic and clarify the meaning of the data by answering these questions:

⁶ D. of P. E. and Reform, *Open Data Technical Framework Developed in collaboration with the Public Bodies Working Group on Open Data*. 2015.

- What is the dataset called?
- What is the subject matter?
- Where can I locate the dataset?
- When was it produced and last updated?
- From what sources was the information compiled?
- Are there any restrictions on their use?

4. Recommended Standards.

- Try to use reputable standards as: ISO, W3C, OASIS, etc.
- In the context of the proposed framework, recommended data standards are proposed. (Cf: table 5 in the document)

5. Recommended Unique Resource identifiers

2.3.2 Open data catalogues

This work⁷ provides a summary of the key technical issues and options to develop Open Data catalogue. One proposed common characteristics which are:

- Data access and storage.
 - The data and the metadata could be stored in the same server or different ones.
 - Use of Dublin Core/DCAT
- User experience: searching tools, Geographic search, data visualization ...
- API
 - Search/Query data catalogue
 - Multiple formats
 - Data/Metadata updating possibilities via API
- Integration facilities
 - Extensibility
 - Analytics

The author establishes some technology considerations which are:

- Software Delivery Model: Decision makers should select one model from (Open source, Self-Managed, Cloud Hosting, and SaaS).
- Scalability. One should anticipate the need to scale the service.
- Data Management model: one has to select between “All-in-One” model and the “Federated one”.
- Communities of support which are important during the development and the maintenance.

⁷ T. Herzog and W. Bank, “Technology Options for Open Government Data Platforms Common Characteristics of Open Data Catalogs,” pp. 1–8, 2014.

2.3.3 Standards

This article⁸ provides a complete Technical Standards Manual (TSM) that defines policies, standards and guideline required to develop the New York City Open data portal. On the technical side of the project, one proposes to follow these technical recommendations:

- **Integration Architecture.** A decoupled architecture is proposed that is based on existing infrastructure and technical capabilities.
- **Data sets.** This elements is divided into two parts
 - Date contents in which one define formally the coding aspect of the data (the used data types (ex: ISO-8601 for time and date), geospatial Data.
 - Metadata. Each data is associated with both the last version of the metadata DublinCore and the metadata element “Frequency”.
- **Data Sets Publishing.** The process of publishing identifies the best technical approach to automate delivery to the public.
 - Allow data access with a DBMS.
 - Allow file transfer
 - Establish an Enterprise Service Bus to facilitate the date sharing.
 - It is preferable that agency may self-host a part of the public data in the special cases.
 - The data should be machine readable.
- **Maintenance.** The data must be maintained for accuracy, timeliness, and accessibility.
 - Data should be updated frequently
 - Data structure should be kept during a normal update.
 - Ensure the content support by answering comment and inquiring feedbacks.

2.3.4 Licensing

First, a European public open data initiative must comply with the European PSI directive⁹, with its national transpositions¹⁰ and with national legal frameworks concerning open data and PSI at large.

Choosing an open data license is among the roots of the open data principles. For example, it is one of the minimum requirements for getting one (out of five) stars in the classification proposed by Tim Berners Lee¹¹.

To comply with the basic requirements of the open definition, three kinds of licenses are eligible:

- Public domain, which means practically no constraint;
- Attribution;
- Share-alike.

There is however a consensus that share-alike licenses jeopardise a high degree of commercial re-use of the data.

The Open Data Institute¹² and the Open Knowledge Foundation¹³ provide basic guidelines about licensing and the open definition website maintains a list of conformant licenses¹⁴.

⁸ IODC, “The benefits and challenges of measuring open data,” 2015. [Online]. Available: <http://opendatacon.org/the-benefits-and-challenges-of-measuring-open-data/>.

⁹ <http://eur-lex.europa.eu/legal-content/FR/TXT/?uri=celex:32013L0037>

¹⁰ <http://eur-lex.europa.eu/legal-content/FR/NIM/?uri=celex:32013L0037>

¹¹ <http://5stardata.info/en/>

¹² <https://theodi.org/guides/publishers-guide-open-data-licensing>

¹³ <http://opendatacommons.org/licenses/>

¹⁴ <http://opendefinition.org/licenses/>

2.4 ASSESSMENT OF OPEN DATA PROJECTS

In this section, one deals with the concept of assessment or evaluation of the quality an Open Data project. There is a lack of evaluation frameworks. The metrics for evaluating success are not obvious to determine, nor to calculate. According to (Lee et al., 2011) the first proposed measures tended too much to focus on compliance in terms of release of the data. An open data initiative should be assessed at three stages: capabilities (prior to the launch), implementation and impact.

Measuring Open Data involves assessment and ranking of the projects and initiatives¹⁵. A common Assessment Framework for Open Data is developed¹⁶ and has been refined. This report addresses several important questions:

Motivations for open data assessment

- Benchmark and comparison between countries
- Learning
- Support management
- Improve quality
- Risks management
- Identify progress opportunities

What do we mean by open data assessment?

- Technical¹⁷ assessment of datasets;
- Assessment and ranking of Open Government Data (OGD) initiatives;
- Providing quantitative metrics of open data outcomes and impacts;
- Providing qualitative judgments on performance of an open data initiative;
- Developing qualitative case studies about open data use and impacts

A list of projects which are working on aspects of Open data assessment is proposed (Table 3)

¹⁵ IODC, "The benefits and challenges of measuring open data," 2015. [Online]. Available: <http://opendatacon.org/the-benefits-and-challenges-of-measuring-open-data/>

¹⁶ J. M. & F. H. (2014) Caplan, R., Davies, T., Wadud, A., Verhulst, S., Alonso, "Towards common methods for assessing open data: workshop report and draft framework," pp. 1–15, 2014.

¹⁷ C. A. Framework, W. Foundation, and G. Nyu, "Towards a Common Assessment Framework For Open Data : Framework draft - June 2014 This document summarises a proposed Common Assessment Framework for open data , developed through a workshop hosted by the Web Foundation and GovLab NYU in May 201," no. May, pp. 1–3, 2014.

Study & description	Methods	Unit of analysis	Coverage
The Open Data Barometer www.opendatabarometer.org A multi-dimensional index of open data readiness, implementation and impact developed by the Web Foundation and ODI.	Expert survey and secondary data. Assessment based on quantitative data. Also gathers and reports on qualitative assessments	Countries (focussing on national governments)	77 Countries in 2013. Target of 80+ countries in 2014. Broad range from across the world. Includes all G8 countries, but only partial OGP, OECD etc.
Open Data Index & Open Data Census https://index.okfn.org/ and http://national.census.okfn.org/ A regular assessment of whether key datasets are available as open data.	Ongoing crowdsourcing with expert review to create an annual index. Checklist with qualitative justifications.	Countries. A municipal census is also taking place in many countries.	70 Countries in 2013
UN E-Government Survey http://unpan3.un.org/egovkb/ The 2014 E-Gov Survey includes questions on open data.	Desk research with structured survey. Quantitative data.	National web portals	193 countries.
Open Data Monitor http://opendatamonitor.eu/ New EU project to look at automated assessment of open data.	Automated analysis of data portals providing 'real-time' statistics. Methods under development.	National open data catalogues.	EU (no data yet)
Open Data Certificate https://certificates.theodi.org/ Platform for data publishers to assess and improve the quality of their own open data.	Self-assessment with guided questionnaire. Reports 'level' of open data quality.	Datasets	Four different countries so far. Strongest in UK
OECD Framework http://www.oecd-ilibrary.org/governance/open-government-data_5k46bj4f03s7-en	Government survey completed by officials.	Countries	OECD Countries
Open Data 500 http://www.opendata500.com/ Assessment of the value of open data in the private sector	Desk research & survey of companies. Linking commercial activity with source datasets.	Companies	USA. Expanding to other countries.
Health Sector Indicators http://thegovlab.org/?s=NHS	Various quantitative and qualitative indicators	Sector (health)	UK. Applicable to other countries.

Table 3: Projects working on assessment of open data

2.4.1.1 Open data maturity model

Developed by the Open Data Institute (ODI)¹⁸, the Open Data Maturity Model is a way to assess how well an organisation publishes and consumes open data, and identifies actions for improvement. The model is based around five themes and five progress levels. Each theme represents a broad area of operations within an organisation. Each theme is broken into areas of activity, which can then be used to assess progress.

The five themes cover the whole area of the assessment:

1. Data management processes. The key business processes that underpin data management and publication including quality control, publication workflows, and adoption of technical standards.

¹⁸ L. Dodds and A. Newman, "Open Data Maturity Model," no. March, 2015.

2. Knowledge & skills. The steps required to create a culture of open data within an organization by identifying the knowledge sharing, training and learning required to embed an understanding of the benefits of open data.
3. Customer support & engagement. The requirements for an organization to engage with both their data sources and their data re-users to provide sufficient support and feedback to make open data successful.
4. Investment & financial performance. The requirements for organizations to have insight into the value of their datasets and the appropriate budgetary and financial oversight required to support their publication.
5. Strategic oversight. The requirements for a clear strategy around data sharing and re-use, and an identified leadership with responsibility and capacity to deliver that strategy.

As observed by the ODI report on the assessment tools, current frameworks show still some lacks, mostly in these fields: “culture change, operational management, data management systems and estimating impact”¹⁹.

2.5 SHARE-PSI BEST PRACTICES

Share-PSI²⁰ is a pan European network offering advice on implementation of the [European Directive on the Public Sector Information](#), better known as the *(Revised) PSI Directive*.

It [comprises](#) many of the government departments responsible for implementing the (Revised) PSI Directive across Europe along with standards bodies, academic institutions, commercial organisations, trade associations and interest groups. A series of workshops in 2014 and 2015 identified what does and doesn't work, what is and isn't practical, what can and can't be expected of different stakeholders.

Advice is offered as a set of [Best Practices](#)²¹. Each of these is a standalone document that is based on one or more case studies presented during the workshop series. Best Practices are supported by evidence of their implementation, details of which are provided in one or more guidance documents that are produced by EU Member States. These are referred to within the Share-PSI network as *Localised Guides*. Each guide is tailored to a specific EU Member State or region, bearing in mind the local legislative, administrative and infrastructural environment in which the (Revised) PSI Directive is implemented. As well as geographically localised guides, other guidance documents exist for specific sectors such as geospatial and business data.

The Share-PSI network operates in parallel with, but is constituted separately from, the W3C [Data on the Web Best Practices Working Group](#). The latter is concerned solely with providing advice on the [technical aspects of sharing data on the Web](#). The Share-PSI network partners have contributed to this work and have developed further advice on non-technical aspects of implementing the (Revised) PSI Directive.

The Share-PSI Best Practices are listed in Annex 01 – Share-PSI Best Practices.

¹⁹ <http://theodi.org/method-report-assessment-tools-for-open-data-initiatives>

²⁰ <https://www.w3.org/2013/share-psi/>

²¹ <https://www.w3.org/2013/share-psi/bp/>

3 OPEN DATA ECOSYSTEMS AND BUSINESS MODELS

The literature places an increasing emphasis on the concept of ecosystem. It is a biological metaphor that can serve different purposes:

- 1) A framework to describe an existing situation that allows to identify actors, their motives, their roles, to disambiguate some processes...
- 2) But ecosystems are not just descriptive, they “can also be seeded, modelled, developed, managed, that is, intentionally cultivated for the purpose of achieving a managerial and policy vision.” This requires from the public actors to adopt a strategic ecosystem thinking²² and four stages:
 - a) To identify the stakeholders;
 - b) To understand the existing/potential relationships among them;
 - c) To estimate the resources needed by each entity;
 - d) To find and analyse some indicators of the health of the ecosystem as a whole.

Open data ecosystems are still an ongoing field of research. Some ecosystems models have been proposed. Even if they share common elements at their roots, current models show a wide heterogeneity. This heterogeneity can be seen in the content of the models, the granularity of the components, goals, actors, relationships...

Three kinds of models are developed: general ecosystem models, open data ecosystems, value creation models and business models.

3.1 GENERIC ECOSYSTEMS

The open data ecosystem can be seen in part as a product of other ecosystems. (Harrison et al., 2012) agree and contend that the emergence of interdependencies, which drive shape and health of an ecosystem, needs the prior existence of other kinds of ecosystems.

Basically, according to (Poikola et al., 2010), an ecosystem is: “a functioning whole in a given area²³” and refer to the dynamic interaction between different actors in an area.

(Harrison et al., 2012) include as part of ecosystems a definition of information ecology “system of people, practices, values, and technologies in a particular local environment”, draw a research agenda and give some characteristics of the ecosystem, drawn from the biological metaphor. It consists in the interaction of several organisms, creating a complex arrangement by the interdependency of and between organisms and resources; dynamic – seeking equilibrium through motion rather than stasis; populated by keystone species which are mostly mediators.

(Zuiderwijk et al., 2014) insist in particular on: business ecosystems, innovation ecosystems (« collaborative arrangements through which firms combine their individual offerings into a coherent, customer-facing solution »), information ecosystem and digital ecosystems.

3.2 OPEN DATA ECOSYSTEMS

By nature, the first kind of ecosystem model is very broad, encompasses only a part of a complex reality, and often describe the actors and their relationships in a very generic, if not blurry, way.

²² According to (Harrison et al., 2012).

²³ Public data, <http://www.vinnova.se/PageFiles/181505160/57392397-Public-Data.pdf>

(Zuiderwijk et al., 2014) build on a very broad definition from the state of the art and define an open data ecosystem as “a multi-level and multidimensional entity where raw material, as far as distribution and developing are concerned, is the target of cooperation”.

(Immonen et al., 2016) propose a model drifted from (and thus consistent with) the value chain generation model. It is grounded on three fundamental elements: data, services and applications around which the different stakeholders organize their relationships.

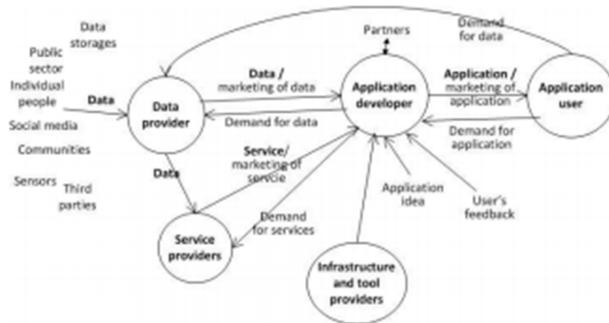


Figure 1: Initial actors and their relationships in the open data ecosystems

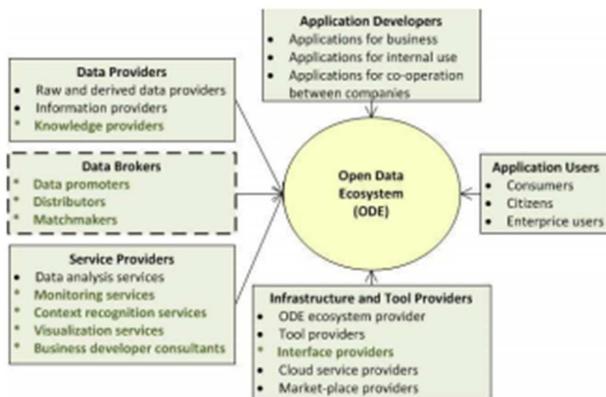


Figure 2: The roles of actors in the refined outline of the ODE

Other models are very similar but choose to focus on the functions without linking them to specific actors and emphasizing a bit more on the policy dimension of the ecosystem (Dawes et al., 2016) :

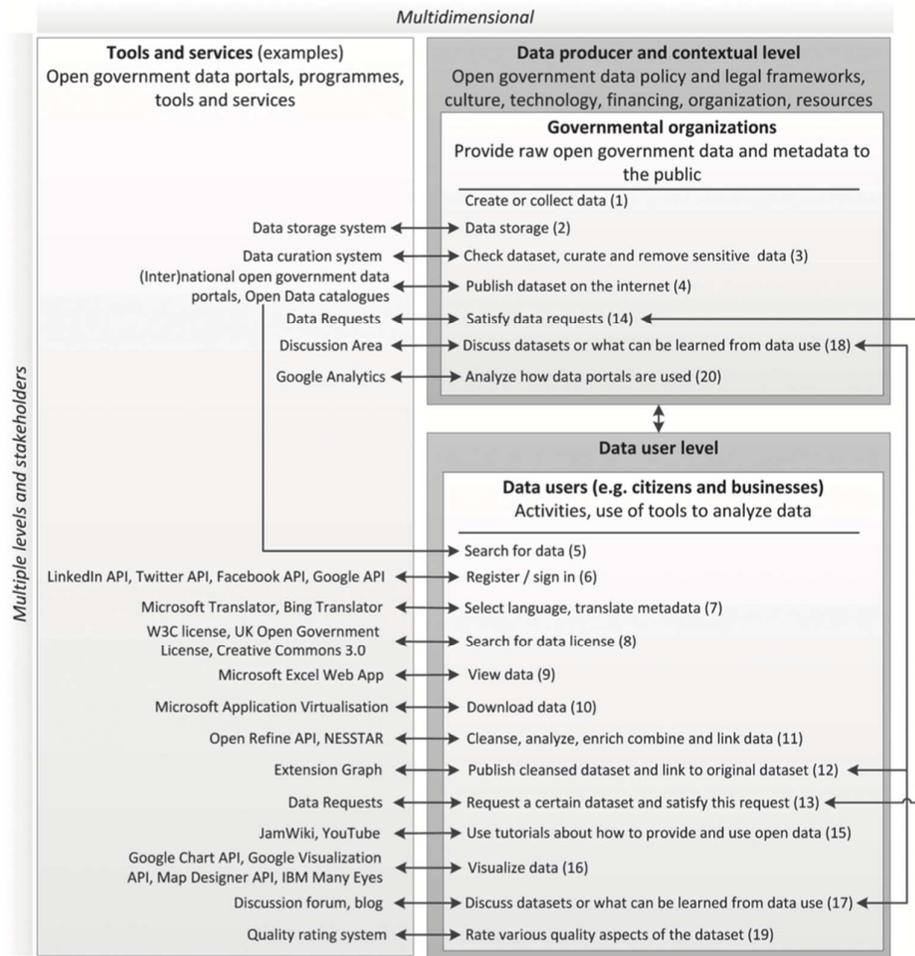


Figure 4: Elements of an open government data ecosystems derived from the literature

This kind of model allows to answer different questions and to make more comprehensible to all the participants the very specific difficulties that can encounter the re-users. It is therefore always a steering tool, but for concrete problems.

Several factors currently limit the practical use of ecosystems:

- It can be observed that there is a certain gap between these models, some being very general and some others (too) specific.
- As general as they are, given the variety of situations and purposes, it is uneasy to find a model fitting a specific case study. It is moreover difficult for the current models to include some themes, for example the impulses given to the ecosystems through the public procurement or the specificities of the co-creation process.
- Comprehensive methodologies are not yet available to implement this tool for every phase of an open data initiative.
- The main challenges faced by the ecosystem are “policy, technology, financing, organization, culture, and legal framework” (Zuiderwijk et al., 2014).
- There are centrifugal forces which can decrease their efficiency: its stakeholders are also “likely to be members of hierarchical organizations, with their own unique norms and traditional top-down authority practices, providing additional complexity to the encompassing ecosystem.” (Harrisson et al., 2012).

3.3 OPEN DATA VALUE NETWORK AND BUSINESS MODELS

This section addresses the typical roles and actors involved in open data ecosystems, and their business models.

3.3.1 Actors / Roles

The open data value network is simultaneously simple and complex: the chains between suppliers of open data and demanders of services are short, but almost every entity can link to every other entity, and key roles can also be played by any combination of individuals, businesses and public sector bodies (Hammel et al., 2012)²⁴.

3.3.1.1 Suppliers

Suppliers are organisations that publish their data via an open interface to allow others to use and reuse it. They give away their data for free under no or very few restrictions.

Most of the data comes from government or government-related businesses. Some private sector companies are also publishing their data.

3.3.1.2 Enablers

Enablers are organisations that facilitate the supply or use of open data without dealing with open data directly themselves. Such business models are directly revenue-generating and also encourage greater supply of open data by providing cost-effective solutions for businesses that may not have the funds to invest in bespoke platform developments or data analytics.

Data management and storage companies, platform and software providers, crowdsourcing hosts, and advisory services are typical open data enablers.

3.3.1.3 Developers

Developers are organisations and software entrepreneurs that design, build and sell web-based, tablet or smartphone applications for individual consumption. Such applications typically use more dynamic types of open data, which are updated frequently. Examples include the myriad personal transportation planning applications for web, tablet or smartphone, which use real-time data from cities transport networks.

Transport data, crime data, and health data are probably the three types of data where software developed on the back of that data is going to have the greatest impact.

The following two business models were identified:

1. Single-purpose apps provide real-time services such as information about weather, quality of restrooms, vehicles, houses, and pollution. These apps often provide a single function, based on one type of open data provided. The app processes the data and presents it visually for the ease of the users.
2. Interactive apps: In addition to single-purpose apps, this type of business model provides users the opportunity to add content. Ratings are often included, as is additional information such as complaints.

3.3.1.4 Enrichers

Enrichers use raw and aggregated open data to enhance their existing, large pool of data to provide an enhanced version of their service.

²⁴ “Open growth: Stimulating demand for open data in the UK”. Deloitte, December 2012. <http://goo.gl/jyPtKE>

Enrichers are organisations (typically larger, established businesses) that use open data to enhance their existing products and services through better insight. Such products and services are not entirely dependent upon open data.

Examples include insurers and retailers seeking to use open data to gain a better understanding of their customers' risk profiles and demographics. While revenues do not come directly from open data, businesses can save money by using it to make their operations more efficient or can increase sales or premium rates for higher quality products and services.

3.3.1.5 Aggregators

Aggregators are organisations that collect and aggregate open data and, sometimes, other proprietary data, typically on a particular sectoral theme, find correlations, identify efficiencies or visualise complex relationships.

These insights are subsequently provided as value-added services to businesses and consumers, and also, in some cases, back to government. While 'freemium' pricing can be used (basic data is provided for free while premium data is charged for), this is by no means the only revenue-earning mechanism. Many data marketplaces charge subscription fees for access to their unique insights; some also charge suppliers to publish their data, have a pay-per-use pricing model for API access or earn revenue from advertising.

Two business models are identified:

1. Information aggregators take many published open data sources and combine and process them for subsequent presentation to the users. An example is a transportation planner that aggregates information from various transport modalities and companies. Often interoperability is a challenge that requires agreements among data providers.
2. Comparison models: This type of business model aggregates open data from various sources for the purpose of comparing the performance of entities with each other. For example, it can be used to compare schools and other public organizations. The data can originate from official sources (school inspection) or from users (criminal chart) and used by citizens (in determining a school for their children or a place to live) and public organizations (in developing measures to improve schools or for crime interventions).

3.3.2 Open data value network

The open data value network²⁵ represents the direct and indirect value exchanges between the actors / roles of the ecosystem:

²⁵ . Valorisation des données ouvertes : acteurs, enjeux et modèles d'affaire. S. Turki, M. Foulonneau. Open data, Big data : quelles valeurs, quels enjeux ? Document Numérique et Société – 5ème conférence 4-5 mai 2015 Rabat, Maroc.

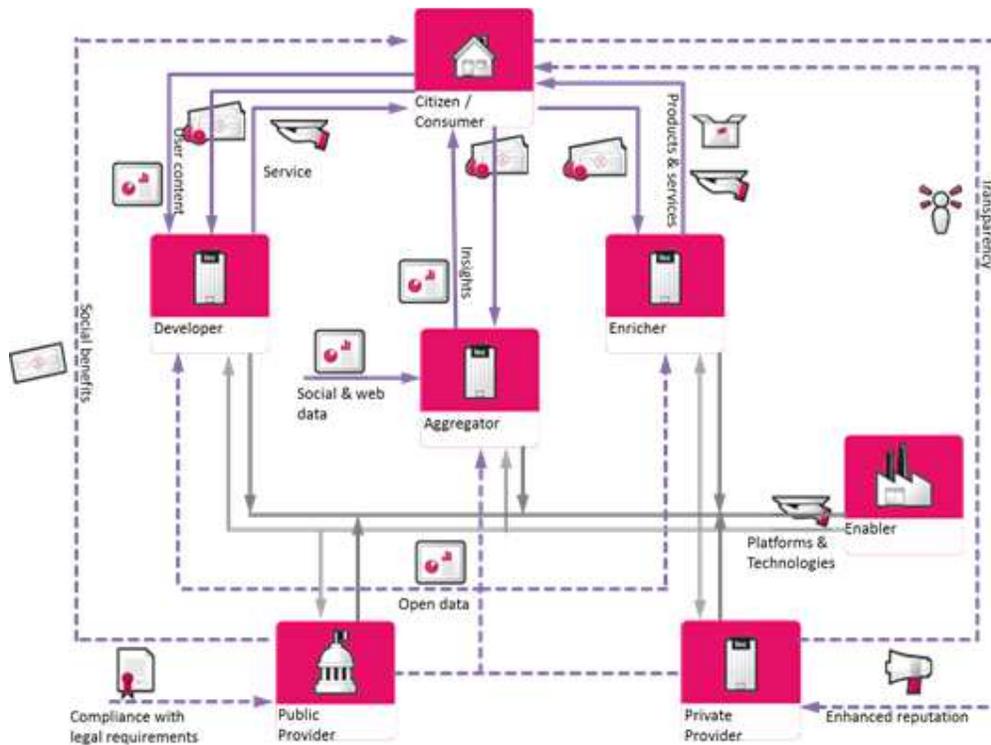


Figure 5: Open data value network

3.3.3 Open data business models

Here are summarized the identified business models for each actor / role in the open data value network:

Role	Business models
Provider	<ul style="list-style-type: none"> • Cost avoidance • Sponsorship • Freemium • Dual licensing • Support and services • Charging for changes • Increasing quality through participation • Supporting primary business
Enabler	<ul style="list-style-type: none"> • Infrastructural Razor & Blades • Demand-Oriented Platform • Supply-Oriented Platform
Developer	<ul style="list-style-type: none"> • Premium product / service • Freemium product / service • Open source like • Free as Branded Advertising • White label development • Appel à contribution
Enricher	<ul style="list-style-type: none"> • Enhancement of existing product / service
Aggregator	<ul style="list-style-type: none"> • Information aggregation • Comparison model

Table 4: Open data business models

3.4 ECOSYSTEMS SUSTAINABILITY

From the gap identified between the promises of innovation that are expected from open data and a less favourable reality, (Jetzek, 2015)²⁶ seeks to overcome one of the obstacles to value creation by insisting on the setup of the ecosystem over time. She draws on the concept of “open data value paradox”, grounded on the idea that uncertainty is one of the most disabling factor of economic activity. Faced with the difficulty of measuring the benefits of open data, she contends that government entities should view open data as an option, considering it according to the logic used in economics of real options. Sustainable ecosystem building should thus focus on a robust data marketplace.

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https://www.researchgate.net/profile/Thorhildur_Jetzek/publication/279923773_Innovation_in_the_Open_Data_Ecosystem_Exploring_the_role_of_real_options_thinking_and_multi-sided_platforms_for_sustainable_value_generation_through_open_data/links/559e5bac08aeb45d17165068.pdf

4 OPEN DATA RE-USE

The Open Data Toolkit designed under the auspices of the World Bank, provides four stages in terms of engagement:

- **Early engagement.** This stage corresponds roughly to the early stages of an open data project. This is conceived to rise an interest while actors are presumed to have a low level of awareness
 - Sensitization workshops, roundtables
 - Scrape-a-thon, which are kinds of low-maturity hackathons
- **Capacity development,** which aim is to rise the knowledge of various audience concerning data, metadata, standards, business models... This should involve :
 - Workshops to foster data literacy. This could involve confronting actors from different fields with issues that are not necessarily within their domain.
 - E-learning courses, consistent with the spread of MOOCs
- **Use, re-use.** This includes policies to facilitate or guide reuse.
 - Hackathons
 - Challenges et competitions & prototypes, this stage rather match the goals of Be-Good
- **Further development.** Rather than a stage, it should be considered as the pool of policies put in place to ensure the long term effects and sustainability of the open data project.
 - Participate in the open data conferences or organizations, such as the International Government Partnership²⁷.
 - Maintain interest around the data by building long-term relationships with communities such as the ODI, the OKFN.

Even if tailored for the civic participation side of open data, the four models identified by (Sieber & Johnson, 2015) are interesting since they allow to analyse the modes of reusers engagement under the lens of the intentions shown by public bodies as they release their data. In the case of Be-Good programme, the intentions are close to the second and in some cases to the fourth models.

Benefits and challenges of four models.

Model	Benefits	Costs	Key references
Data over the wall: Government publishing of open data via an online portal	Standardize organizational data and realize other efficiencies; reduce requests for data; promote economic development; increase transparency and trust; limit role of government to open data provision	Technical maintenance; licensing, confidentiality; release of easiest data only; vulnerable to neoliberalism; difficulty in development of metrics and no guarantees for realizing value	O'Reilly (2011), Linders (2012), Alexopoulos, Spiliotopoulou, and Charalabidis (2013), Charalabidis, Loukis, and Alexopoulos (2014)
Code exchange: Government supports use of open data to fill needs	Actively engage in local economic development; reduce costs of app development; reduce/shift service delivery; benefit from customized innovation	Possible misappropriation; privatization; increased difficulty for analytics; data flows aligned with private interests; participation re-envisioned as consumption and limited to entrepreneurs; duplication of services where citizen reports do not flow to government	Huijboom and van den Broek (2011), Linders (2012), Janssen and Zuiderwijk (2014), Johnson and Robinson (2014)
Civic issue tracker: Government accepts direct feedback from citizens on limited range of issues	Obtain more immediate data and citizen feedback from citizen sensors; ease citizen reporting; promote social networking	Reliance upon data of suspect accuracy and provenance; loss of expert staff; increased requests for services; increase digital inequity; disrupt organizational routines	King and Brown (2007), Brabham (2009), Dawes and Helbig (2010), Nath (2011), Linders (2012), Nam and Pardo (2014), Offenhuber (2015)
Participatory open data: Government-citizen co-production of data	Explicitly promote transparency, rights and democratic objectives; increase trust with civil society; provide check on government; promote social connectedness	Exposure of government errors or malfeasance; declining public trust; participation reduced to image management, public venting or public consultation	Linders (2012), Zuiderwijk, Janssen, Choenni, Meijer, and Alibaks (2012)

Table 5: Benefits and challenges of four models

4.1 OPEN / PUBLIC INNOVATION

The idea of open innovation is part of the roots of open data. It acknowledges that new ideas are widely distributed and advises organizations to transform their internal innovation processes to enable interaction with external sources of innovation. As stated by (Chan, 2013), “some government agencies are jumping onto

²⁷ <http://www.opengovpartnership.org/>

the open innovation bandwagon to develop e-services, with little knowledge of the strategies to effect participation from desirable external partners”. It seems that the operationalization of an open innovation strategy requires user engagement and ecosystem thinking.

4.2 DRIVE THE RE-USE AND ENGAGE WITH THE RE-USERS

“Engage with users to assess their expectations for data and information sharing, together with their capabilities for information consumption and creation [...]”²⁸.

4.2.1 Hackathons

Hackathons, civic apps challenges and other kinds of competition have been promoted since the beginnings of the open data movement. Promotion activities pass through the dialogues established with re-users through the platform, through social networks. Citizens’ involvement allows also to ask them what they want as services. Alongside hackathons first devoted to the reusers, this involvement could take the form of a competition similar to the one launched by Transilien-SNCF that asks its users to imagine what could be future applications in the field of mobility, and engaging only in a second step a competition where developers have to create a selection of these applications²⁹. It could be considered as simple implementation of the co-creation principles. Deepening the idea of involvement of citizens and reusers, open data could help to achieve co-production of data, these stakeholders would indicate their needs to public bodies which would take them into account even before the capture of data. That would increase the potential for reuse and economic value that is drawn of it.

The main limit face by hackathons concerns one of the founding principles of open data: “if you build it, they will come”. These naive assumptions about the value generation mechanisms. Even concerning the civic participation side of open data, a field where we would expect more success, because a fairly well-established tradition of voluntary participation exists, the results have not been those expected (Lee et al., 2015)³⁰. As they are designed, hackathons can only solve simple and short-term issues which are rarely those that generate the most value. That is why there is a need of more mature and complex models, which can be drawn from service innovation.

²⁸ <http://www.mdpi.com/1999-5903/4/4/900/htm>

²⁹ Retrieved from <http://opendata.transilien.com/concours-openapp/>

³⁰ <http://cacm.acm.org/magazines/2016/1/195725-open-data-and-civic-apps/fulltext>

5 SERVICE INNOVATION

This sections addresses service innovation.

5.1 SERVICE INNOVATION PATHWAY³¹

Before it becomes an innovation, an idea has to gain its spurs! Does it have a market, technological or research potential? Is it worth investing in its development?

The lifecycle of an idea is composed of 3 phases of their life: birth, maturation, evaluation. This is an iterative process.

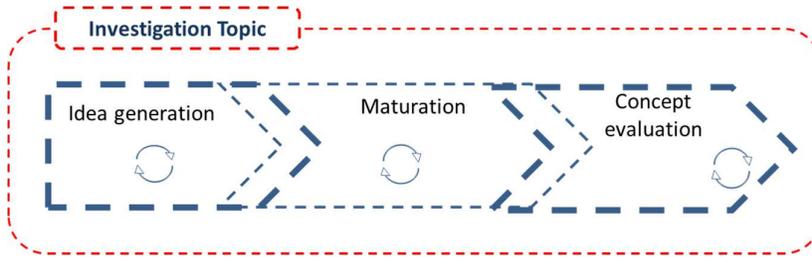


Figure 6: Service innovation pathway

The ideation phase corresponds to the birth of the idea. An idea can be born spontaneously or from the systematic exploration of various fields of innovation. It can be triggered by a stimulus at the occasion of a call for ideas or an ideation contest.

The maturation phase consists in exploring the idea related issues, validate its options or not, make some watch, confront it... The idea maturation can be individual - the leader explores his idea in his personal space, with dedicated tools; shared - the leader shares his idea with specific persons, requesting specific contributions; or open - the idea is then available to all (at a department, enterprise or cluster level).

When the idea has reached a level of maturity satisfying its leader, the potential of the idea can be assessed by a group of experts who can decide to invest in its development – this is the evaluation phase.



Figure 7: Service definition dimensions

³¹ Vidou, G. (2013). “The Service Value Pathway: the 3-6-3 tool”, The XXIV ISPIM Conference, Helsinki, 2013.

During the idea lifecycle, some aspects of the idea should be addressed in order to avoid missing elements: synopsis, context, target, resources, service system, innovativeness and sustainability. The Synopsis is the minimum level of description of the service, the summary of the concept. The context dimension describes the context in which the service is delivered (time, space technological components, regulatory context: norms, standards...).

The target describes the customers of the service and why they would buy it.

The resource brick describes the type of resources required to deliver the service (human resources: skills and competences, technological resources, process & organizational resources, norms and standards, partners, financial resources...).

The service system brick describes how the resources are combined to deliver the service to the target in the context (key activities, key partners as stakeholders)

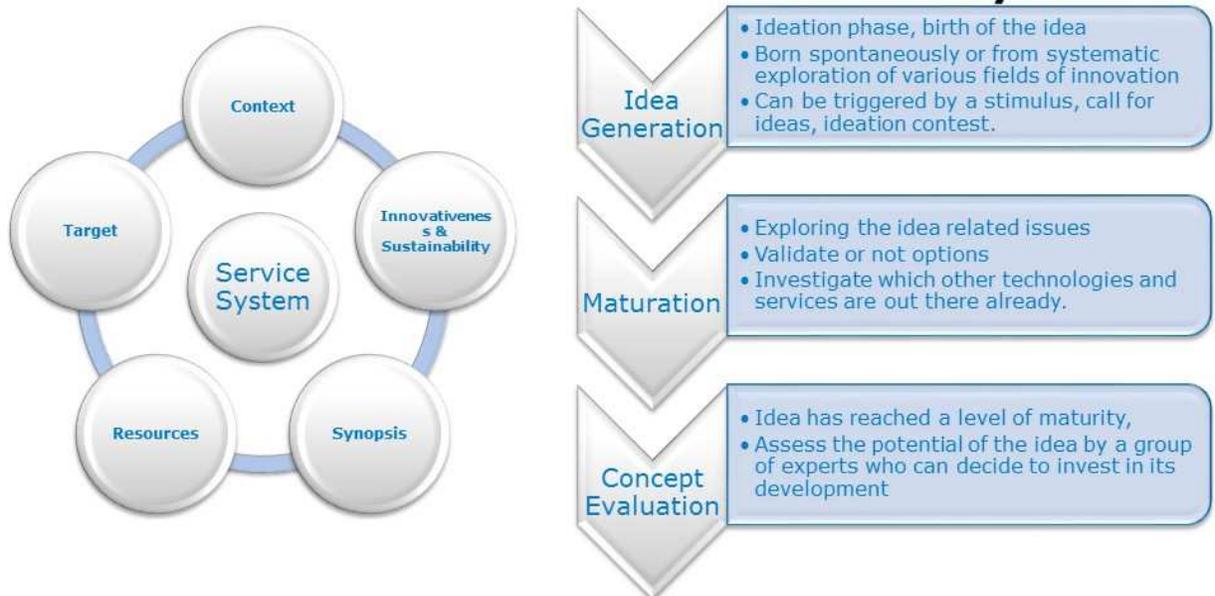
The innovativeness and sustainability highlights the innovative aspects of the service system through its ingredients and the expected economical, societal & environmental impacts.

For each dimension, elements can be at different levels of maturity to support the progressive maturation of the service (basics: simple description based on assumptions or insights; argued: detailed and comprehensive description, checked: detailed description, thought through, literature or fact checked).

BE-GOOD



Service Value Pathway



Synopsis: summary of the concept of the service

Context (time, space technological components, regulatory context, etc.)

Target: customers of the service and the reason why they would buy it

Resources required (HR, technologies, organization, partners, financial resources...).

Service system: way in which resources are combined (key activities, key partners as stakeholders)

Innovativeness and sustainability: innovative aspects of the service system, expected impacts.

Figure 8: Summary of the service value pathway

5.2 SERVICE DESIGN (IDEATION, MATURATION)

5.2.1 Business model canvas

The Business Model Canvas³² is a strategic management and lean start-up template for developing new or documenting existing business models. It is a visual chart with elements describing a firm's or product's value proposition, infrastructure, customers, and finances. It assists firms in aligning their activities by illustrating potential trade-offs.

The Business Model Canvas was initially proposed by Alexander Osterwalder based on his earlier work on Business Model Ontology.

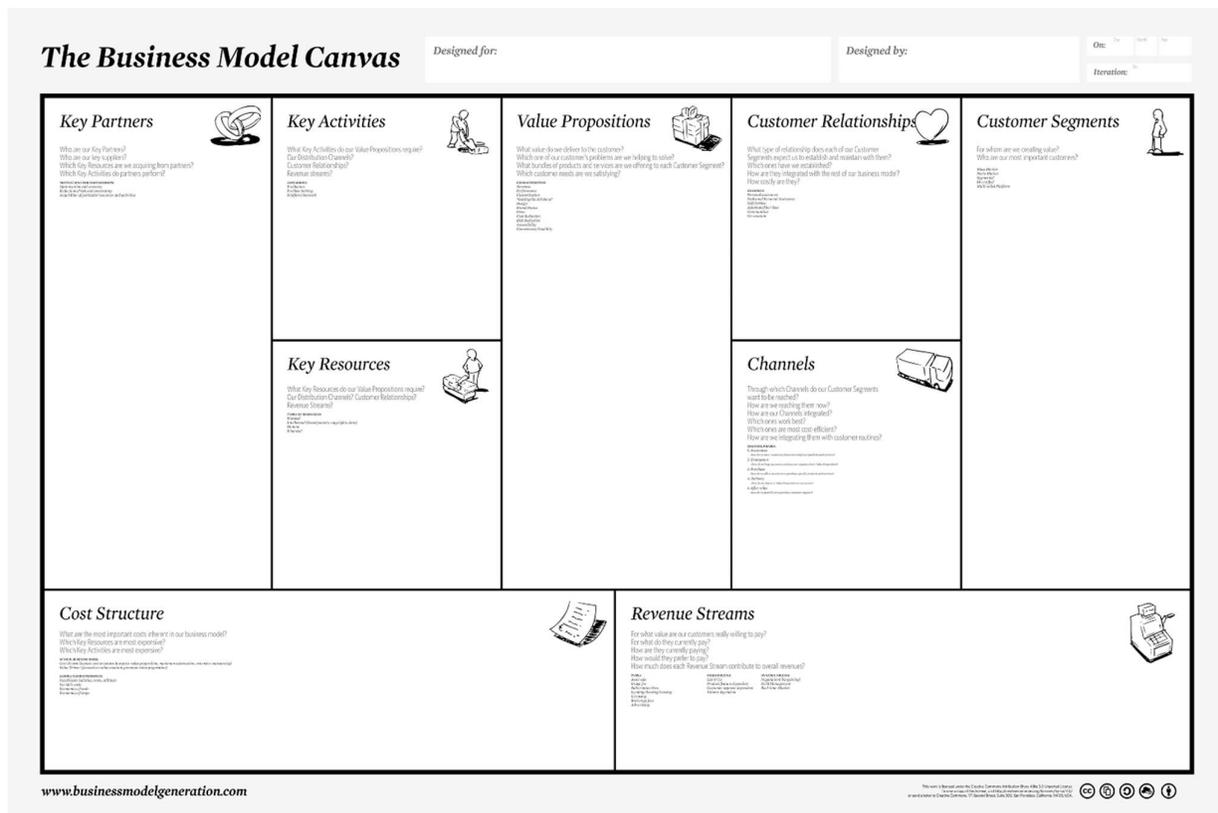


Figure 9: Business model canvas

The Business Model Canvas addresses the 9 following dimensions:

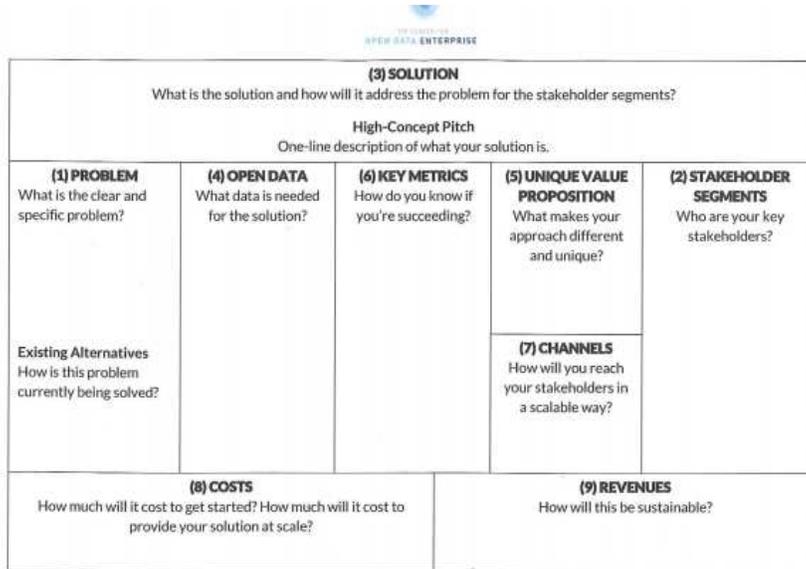
1. The value proposition of what is offered to the market;
2. The segment(s) of clients that are addressed by the value proposition;
3. The communication and distribution channels to reach clients and offer them the value proposition;
4. The relationships established with clients;
5. The key resources needed to make the business model possible;
6. The key activities necessary to implement the business model;
7. The key partners and their motivations to participate in the business model;
8. The revenue streams generated by the business model (constituting the revenue model);

³² https://en.wikipedia.org/wiki/Business_Model_Canvas

9. The cost structure resulting from the business model.

5.2.1.1 Open data business model canvas

Open Data Enterprise³³ developed one version of the Business model canvas, adapted to open data.



The Center for Open Data Enterprise is an independent nonprofit organization, based in Washington DC that develops smarter open data strategies for government, businesses, and other nonprofits by focusing on data users.

The Open Data for Business Canvas is based on the original Business Model Canvas (www.businessmodelgeneration.com)

Figure 10: Open data business model canvas

5.2.2 Idea evaluation criteria

This section is based on a former work realised during the project Innoserv (FEDER) to identify and discuss the available knowledge on the idea evaluation process through a systematic review of the management literature.

Here are presented the publications identified as relevant to the context of BE-GOOD.

(2012) BOCKEN, N.M.P., ALLWOOD, J.M., WILLEY, A.R., KING, J.M.H.

The authors propose a tool, based on Stage-Gate[®] by Cooper (2008), which aims to screen a range of ideas for their greenhouse gas reduction potential, and implementation difficulty, before starting more in-depth technical and market research.

They propose gain (described by low, medium or high) and pain (described by three dimensions: the extended supply chain, the technology and the product concept) indicators for new product launches. The total of the pain indicators leads to a score for the difficulty of implementation which is compared to the gains to create four possible situations for an idea evaluation: Difficult to justify, low-hanging fruits, long term option, and high potential.

³³ <http://opendataenterprise.org>

(2011) MATHEWS, Scott

The contents of this paper were based on a study at Boeing. A preliminary phase involves an ideation event, leading to various concepts, which will then enter the innovation portfolio:

Phase 0: Qualitative attributes

- Concept description
- Value proposition
- Industry/market/competitor trends
- Related technology/product trends
- Major uncertainties

Phase 1: Quantitative information at the level of rough order-of-magnitude (ROM) estimates for each of the attributes. The author proposes the Technology Readiness Levels (Mankin 1995):

- TRL 1 Basic principles observed and reported
- TRL 2 Technology concept and/or application formulated
- TRL 3 Analytical and experimental critical function and/or characteristic proof-of-concept
- TRL 4 Component and/or breadboard validation in laboratory environment
- TRL 5 Component and/or breadboard validation in relevant environment
- TRL 6 System/subsystem model or prototype demonstration in a relevant environment (ground or space)
- TRL 7 System prototype demonstration in a space environment
- TRL 8 Actual system completed and “flight qualified” through test and demonstration (ground or space)
- TRL 9 Actual system “flight proven” through successful mission operations

Phase 2: More details in the form of three scenarios

- Pessimistic scenario
- Most likely scenario
- Optimistic scenario

Phase 3: Estimating annualized cash flows (Net present value or option pricing) for all scenarios, forming the initial elements for the concept's business case.

(2011) COOPER, Robert

The author proposes a scorecard approach for evaluating new ideas:

I. Strategic fit & importance

- Strategic alignment – fits our strategy, centred on a key strategic arena
- Strategic importance & impact – very important to strategy, huge impact if successful

II. Market opportunity

- Size of market (existing or potential)
- Growth rate of market (existing or potential)
- Competitive intensity – no/few competitors, open territory

III. Feasibility

- Technical – it can be done, we can develop & produce (or can acquire skills & capability)
- Marketing – it can be sold, we have what it takes to market the solution (or can acquire)

IV. Competitive advantage

- Solution will be unique, differentiated
- Will offer customer or users a compelling value proposition – meets a large need at the right price

V. Reward

- Potential for profit – we can make good profits here
- Payback period is acceptable
- Risk level is acceptable

To counter the tendency to propose improvement projects that are less risky and less innovative, the author provides a detailed description of five vectors that are drivers of bold innovations:

- Have a product innovation strategy that focuses your development efforts on opportunity-rich strategic arenas
- Foster the right climate and culture for innovation, driven by senior executives
- Set up a proactive idea generation, capture, and handling system
- Have a robust idea-to-launch stage-gate process designed to handle large, complex, and bold development initiatives
- Do the necessary up-front due diligence and making the right fact-based investment decisions in these riskier projects (portfolio management)

The article also lists an idea-to-launch process of five phases, based on Cooper (2008).

Finally it also proposes a “Strat-Map” to categorize ideas based on two dimensions:

- their ability to leverage existing competencies, strengths and assets
- their attractiveness: size, growth, need, margins, potential for new products

This “Strat map” leads to four situations: High risk bets, good bets, conservative bets, and no bets.

(2010) FERIOLI, Marcelo, DEKONINCK, Elies, CULLEY, Steve, ROUSSEL, Benoit, RENAUD, Jean

The authors propose to create idea cards, a one page format of all the essential elements in your idea (difficult to read in the online article). This will be evaluated by an expert panel using three simple criteria (Yes, Maybe, No).

The research team analysed the argumentations of these experts and found the following groups of criteria to analyse an idea in more detail:

- Objective Criteria (Measureable criteria and logical argumentation):
 - **Novelty:** Sufficiently novel or innovative
 - **Feasibility:** Technically impossible, technically (not) interesting, financially (not) interesting
 - **Strategy:** Different from the company strategy, (not) in the field of work of the company, (not) in the field of work of the department

- **Subjective Criteria** (Less measurable criteria at this early stage, no evidence or logic based on knowledge, an estimation):
 - **Social acceptability:** Tractability, usefulness, public acceptance
 - **Comprehensibility:** Hard to understand the idea, quality of the idea card
 - **Instant reject:** Quick decision
 - **Feeling assessment:** “This I like the most”, “I like it”.

The authors propose to have the following decision tree for the evaluation of an idea:

- 1st stage: Objective criteria (If OK, next phase)
- 2nd stage: Subjective criteria + feeling assessment (If OK, next phase)
- Idea accepted

(2009) VON AHSEN, Anette, HEESSEN, Marcel

The article provides a possible innovation process for innovation projects in SMEs and various integrated scoring models into this process.

- Phase 1: Change recognition (i.e. Opportunity to innovate)
- Phase 2: Idea generation
- Phase 3: Concept development
- Phase 4: Development
- Phase 5: Test
- Phase 6: Check of readiness for marketing
- Phase 7: Market introduction

The checklist for Phase 1:

- Does the innovation fit with the strategy?
 - Yes/No
 - What potential conflicts exist?
- What competences are affected?
- Target customers identified?
 - Yes/No
 - Which?
- Do customers already exist?
 - Yes/No
 - Which?
- Customer’s importance?
- Origin of innovation?
- Is the staff sufficiently qualified to use this innovation?
 - Yes/No
 - Possibilities for improvement of qualification?
- Sufficient human resources for the development?
 - Yes/No
 - Possibilities to get more manpower?
- New feature or will existing components be replaced?
 - Existing/New
 - What will be replaced?

- Is the market new or familiar?
 - Familiar/New

There are three scoring models for the second gate in the process:

- Market attractiveness:
 - Market volume
 - Market growth
 - Competitive environment
 - Key forces
 - Customer relevance
 - Benefit gain customer
 - Cost advantage customer
- Technology attractiveness:
 - Strategy conformity
 - Product differentiation
 - Learning effects
 - New markets
 - Relevance in the market
 - Patent position
 - Potential for follow-up projects
- Risk Assessment:
 - Expected useful life
 - Likelihood of realisation
 - Comparison of development time and time-to-market
 - Required investment
 - Development of similar innovations by competitors
 - Customer development of similar innovations (backwards integration)
 - Knowledge of market
 - Usability of know-how
 - Degree of novelty

Each scoring model's sub elements must be evaluated qualitatively on a scale from 1 to 3. Each level of the scale has a dedicated description in order to facilitate the determination of the appropriate level.

Furthermore the authors propose a quantitative approach to determine the interdependencies (i.e. technological interdependencies, synergetic use of resources, market interdependencies) between projects are determine the priority of each innovation project.

(2009) KERKA, Friedrich, KRIEGESMANN, Bernd, SCHWERING, Marcus

The authors propose a model (three stage approach) for evaluating innovation ideas (difficult to read the details in the digital article).

Additionally they propose two dimensions to evaluate ideas:

- Implementation costs (Internal dimension):
 - Inputs required (material, etc.)

- Sources/Suppliers
- Development personnel and know-how required
- Technical equipment for development
- Production material/manufacturing capacity required
- Manufacturing organisation
- Production personnel and know-how required
- Delivery robustness/logistics required
- Sales personnel and know-how required
- Sales organisation
- Success potential (External dimension):
 - Competitiveness/Marketability
 - Market size/number of potential customers
 - Demand volume
 - Current price level in the target market
 - Market growth
 - Competitor intensity (provider market force)
 - Exclusivity
 - Sustainability
 - Influence on company products
 - Future potential (leverage effect)

Each dimension has a scale from 1 to 5 and each criterion must be weighted. Each point of the scale has a description per criterion, helping the correct evaluation. The result is a global score for each dimension, which can be compared to the other, in order to find ideas that should be implemented immediately, rejected immediately or carefully considered.

(2007) DAY, George

First of all a risk matrix for evaluating the probability of failure for new ideas. Each element of the two groups of criteria must be evaluated on a scale between 0 and 5, by using predefined descriptions of the corresponding situation.

The two groups of criteria and elements are:

- **Product/Technology** (score 0 – 35)
 1. Our current development capability ...
 2. Our technology competency ...
 3. Our intellectual property protection ...
 4. Our manufacturing and service delivery system...
 5. The required knowledge and science bases...
 6. The necessary product and service functions...
 7. The expected quality standards ...
- **Intended market** (score 0 – 30)

1. Customers' behaviour and decision-making processes will ...
2. Our distribution and sales activities will ...
3. The competitive set (incumbents or potential entrants) will ...
4. Our brand promise is ...
5. Our current customer relationships are ...
6. Our knowledge of competitors' behaviour and intentions is...

Secondly the author proposes the following questions to stimulate the debate during the evaluation of an idea (complementary to the previous risk analysis). Each question has a sublevel with more detailed questions:

- Is the market real?
- Is the product real?
- Can the product be competitive?
- Can our company be competitive?
- Will the product be profitable at an acceptable risk?
- Does launching the product make strategic sense?

The author proposes several, ready to use scorecards.

(2004) KARNI, Reuven, SHALEV, Semadar

This article provides many details on the organization of an ideation event. The actors, their role, search strategy etc. The following elements are proposed to define the ideation event:

- Issue: the problem to be solved and its characteristics
- Ideation mechanism: the technique or techniques to be used to enhance creativity
- Subjects or "creators": the group chosen to provide creative ideas
- Decision makers or "judges": the group chosen to evaluate the ideas suggested
- Innovativeness: the characteristics of an idea by which its quality is to be evaluated
- Measures: the parameters for determining the worth of the ideation event (process and solution)

The authors further provide a classification of possible problems to be solved, linked to an idea. The possible types are determined by their need (existing or new), product (existing or new) or feature (existing or new). There are four types:

- Improvement
- Invention
- Application
- Specialization

The innovativeness of an idea can be measured through a 5 point scale (ranging from no relevance to very relevant) by looking at:

- Appropriateness: the extent to which the idea addresses the issue
- Implementation: the ease with which the idea can be realized
- Application: the ease with which the idea can be operationalized
- Economy: the extent to which the idea is financially worthwhile to implement and apply

(2003) HART, Susan, HULTINK, Erik Jan, TZOKAS, Nikolaos, COMMANDEUR, Harry

The authors propose the following phases for the evaluation of new products:

- Idea screening
- Concept screening
- Business analysis
- Product testing
- Test market
- Post launch short term
- Post launch long term

Furthermore there are 20 evaluation criteria that were explored in each of the evaluations stages. For the idea screening, the following criteria were found to be used often:

- Technical feasibility
- Intuition
- Product uniqueness
- Market potential

5.2.3 Business success metrics

5.2.3.1 Dimensions of Business Viability

The Dimensions of Business Viability Model is a generic framework that assists the entrepreneur in identifying individual tasks (decisions) in validating the Business Concept. The dimensions of business viability model is a decision weighting model that provides a benchmark framework for measuring the Business Concept's viability. It validates the business concept by the core dimensions of:

- Market Viability
- Technical Viability
- Business model viability
- Management model viability
- Economic and financial model viability, and
- Exit strategy viability.

The business feasibility study findings are assessed by potential investors and stakeholders regarding their credibility and depth of argument. At the core of the business feasibility study decision making process is a business viability model assessment which provides the necessary commercial decision making data.

Each dimension of the business viability model contains components which evaluate individual characteristics of the enterprises business venture's viability, Here is an example of such components:

MARKET VIABILITY

- Market Environment e.g. size, sustainability, potential market, target market, potential value
- Competitors
- Similar Products
- Pricing
- Packaging
- Distribution to markets
- Promotion/Advertising

MANAGEMENT MODEL VIABILITY

- Application of knowledge & skills
- Training
- Employee management and recruitment
- Management of intellectual property
- Management of risk
- Ability to delegate to staff
- Suitable organisational structure
- Suitability of management and quality protocols
- Ability to measure business process

TECHNICAL VIABILITY

- Capacity
- Availability and quality of resources, inclusive of raw materials, labour and professional expertise
- Supply chain implications
- Manufacturing process
- Ability to apply IP

ECONOMIC AND FINANCIAL VIABILITY

- Start up costs
- Working capital
- Operating costs
- Raw material costs
- Overall return on investment
- Overall profitability
- Break even point
- Sustainability of market versus projected revenue
- Ability to generate economic value

BUSINESS MODEL VIABILITY

- Uniqueness of model in terms of competitive advantage
- Ability of competitor to duplicate
- Ability to create value through priority knowledge & process i.e. IP
- Ability to create wealth
- Ability to duplicate and delegate i.e. documentation of tacit & explicit knowledge

EXIT STRATEGY VIABILITY

- Ability to create wealth from exit strategy
- Ability to define exit strategy
- Ability to relate exit strategy to industry model
- Ability to identify potential buyers and/or strategies
- Ability to create capital assets i.e. IP
- Ability to schedule exit strategy

Figure 11: Examples of viability dimensions

6 PROCUREMENT

In order to create innovative applications and innovative ecosystems, most of current reflexions focus on cooperation mechanisms between the public and private sectors and seek to implement innovative forms of PPPs³⁴.

Procurement state-of-the-art will be addressed in the deliverable “T1.3.1 - Operational BE-GOOD framework and templates”.

³⁴ <https://www.datainnovation.org/2016/08/three-types-of-public-private-partnerships-that-enable-data-innovation/>

7 OPEN DATA INCUBATORS

This section focusses on two European open data incubators, funded by the EU commission to promote the uptake of open data reuse and value generation.

7.1 FINODEX - FUTURE INTERNET OPEN DATA EXPANSION

FINODEX^{35 36} is a European virtual accelerator that selects, funds and provides support services to SMEs & Web Entrepreneurs building their products and services making use of FIWARE technologies and re-using Open Data. The main objective is to launch ready-to-market ICT products and services fostering the European ICT ecosystem.

FIWARE technology provides a simple set of public and royalty free powerful APIs (Application Programming Interfaces) which are the building blocks of the ICT applications and services. An open source reference of the FIWARE components is available so that creating and implementing ICT modules relying in FIWARE is fast and cost-effective, decreasing the development cycles of ICT products and services.

Open Data is data that can be freely used, re-used and redistributed by anyone - subject only, at most, to the requirement to attribute and share-alike. Open data has a clear potential to unlock a significant economic value becoming an instrument for innovation and business generation. FINODEX promotes the re-utilization of open data with a clear business focus across Europe.

7.1.1 Offered services

The services offered by FINODEX cover the whole spectrum of needs for the entrepreneurs. They range from technical support with FIWARE and Open Data technologies, to Business Mentoring to refine the business model of their product/service or a remote channel for business coaching.

Offering 5 free professional services to the selected projects via open call:

<i>teach</i>		Technical and business training
<i>support</i>		Technical support and mentoring
<i>connect</i>		Connecting with other FI-PPP initiatives
<i>fund</i>		Funding (up to €170,000 per project)
<i>invest</i>		Linkage with private investors

Figure 12: Finodex services

FINODEX has directly injected €480,000 in a total of 48 projects. By the end of the acceleration process a total of €4.64 million will be distributed among the +100 beneficiaries.

³⁵ Finodex is co-funded by the European Union under Grant agreement number 632838 and is part of the FIWARE Accelerate programme.

³⁶ <http://www.finodex-project.eu>

7.1.2 Approach

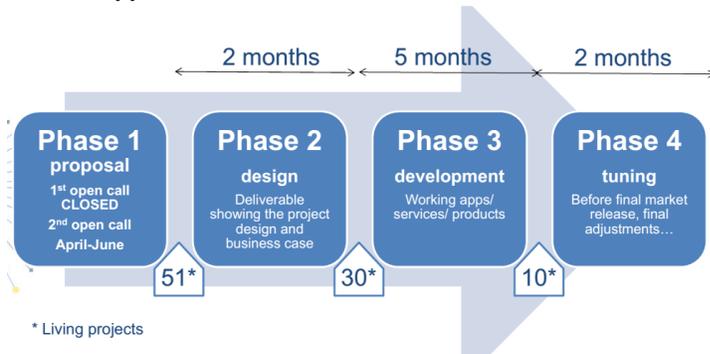


Figure 13: Finodex evaluation phases

7.1.3 Evaluation criteria

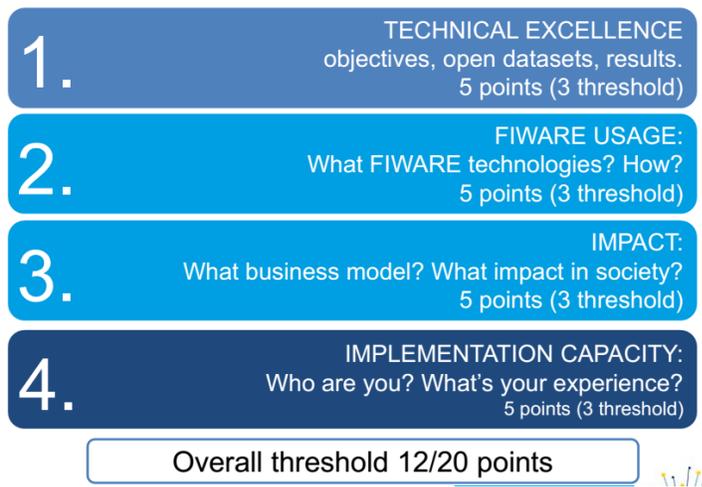


Figure 14: Finodex evaluation criteria

Following the two open calls 493 proposals were received (respectively 197 and 296). 101 were selected to enter in the acceleration process.

7.1.4 Developed solutions

- 3D Meteo - Meteo for Energy - Meteorology Applied for Energy Efficiency
- CANARD - Aims to revolutionize how airports check that their security systems are fully operational by replacing the current calibration units with a CANARD UAV.
- CropDiagnosis - A mobile application that revolutionises the way farmers deal with their cultivation issues.
- DADAFI - Develops a platform to radically improve decision support and consulting services in dairy farming.
- eViti (renaming to eVineyard) - Helps viticulturists to learn more about their vineyards through powerful analytics, and helps them spray smarter.
- Firerisk - Real time perception of the wildfire risk for a specific area
- Fruitwatcher - Monitoring fruit transport conditions from stores until distribution facilities in order to assess whole lifecycle control and detect possible usual undesirable events
- Genesis (Xpressomics) - Google-like search engine for genetic data analysing thousands of scientific experiments and giving a ranked list of the most relevant treatments that have most effect on a gene.

- GeoSpatiumLab - Pesticide Finder helps agricultural companies and individual farmers choosing the most suitable pesticides for their crops avoiding potential risks to human health and environment
- Infinbox - Smart Hospital provides a secure open platform for integrating private cloud services, facilitating and improving medical information management.
- KISSMYBIKE - A new advanced anti-theft system designed specifically for bicycles.
- Linknovate - Linknovate is a search engine that helps manufacturing and R&D teams in corporations find technologies and partners.
- OpenMove - Openmove, the first open platform for mobile ticketing
- Sensape GmbH - Developing cutting edge and visionary computer algorithms to design smarter real world product presentations.
- SmartPlatformCity - The Open-Data Smart-City Apps show and map information to the citizen in real time providing value information for citizens, improving their quality of life.
- Talkycar - TalkyCar connects your vehicle with your smartphone to track all your trips scoring your driving style to detect fuel efficiency, providing advices or calling the medical services in case of accident.
- WiseTown - Collects information from different streams to identify the issues that affects the town in several areas: urban renewal, garbage collection, public safety, transportation, social services and environmental problems.
- ZEUS - A service for monitoring, automating operations and analysing information that provides added value functionalities to partially or fully automate business or manufacturing processes by using IT technologies

7.2 ODINE - OPEN DATA INCUBATOR FOR EUROPE

The Open Data Incubator for Europe (ODINE^{37 38}) is a 6-month incubator for open data entrepreneurs across Europe. The programme is funded with a €7.8m grant from the EU's Horizon 2020 programme.

ODINE aims to establish an industry-focused ecosystem of open data start-ups and SMEs in Europe.

³⁷ ODINE has received funding from the European Union's Horizon 2020 Research and Innovation Programme under the Grant Agreement 644683.

³⁸ <http://www.opendataincubator.eu>

7.2.1 Approach

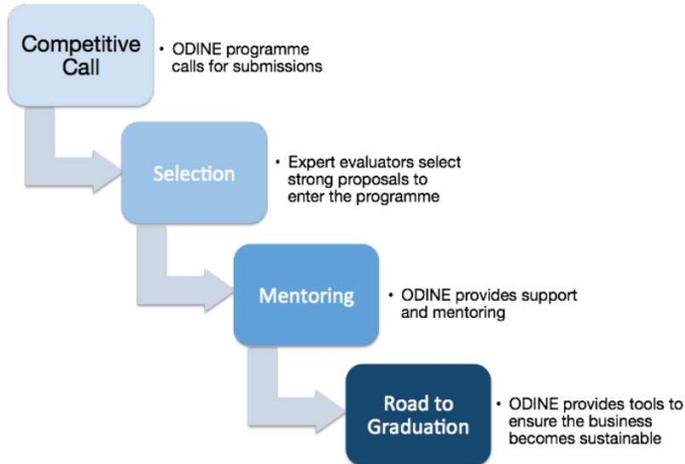


Figure 15: ODINE evaluation process

7.2.2 Offered services

If accepted for funding by the ODINE call an open data business will receive:

- Initial investment up to €100 000
- Coaching from business mentors and business schools
- Peer-networking and support via meetups in major European cities
- Business pitching opportunities at major open data events such as the ODI Summit
- Technology and data sets, as well as training materials and webinars by ODINE open data experts
- High-quality coverage in The Guardian datablog, at events such as OKCon, OKFest, ODI Summit, and European Data Forum, and via the Open Data Institute and OKF networks
- Brokering introductions to business angels and investors

Services



Figure 16: ODINE services

7.2.3 Evaluation criteria

- Criterion 1: Idea
 - Strength or novelty of the idea
 - Usage or creation of open data
 - "Open by default"
- Criterion 2: Impact
 - Value proposition and potential scale
 - Market opportunity and timing
 - Triple bottom line impact (social, environmental, economic)
- Criterion 3: Team and budget
 - Knowledge and skills of the team
 - Capacity to realise the idea
 - Appropriateness of the budget to realize the idea

7.2.4 ODINE auto-evaluation

ODINE was presented by Walter Palmetshofer during the Int. Open Data conference IODC'16 in Madrid. Here are the main lessons learnt from the project experience:

7.2.4.1 *What worked well*

- Agile services and processes
- Open by default, for running the incubator (tools, info, etc.)
- Assigned ODINE advisor as first point of contact
- Bespoke support to individual needs
- Human interaction
- Good balance of commitment VS freedom

7.2.4.2 *Opportunities for improvement and challenges for the call itself*

- No awareness using open data
- Not applying because "afraid" of EU - projects paperwork
- Variety of quality from the proposals

7.2.4.3 *Opportunities for improvement*

- Format to track progress was admin-intensive
- Keep track of progress remotely felt impersonal
- Spotting gaps in companies' technical knowledge was hard; Brought in mentors to do technology 'health checks'

7.2.4.4 *Challenges*

- Run virtual incubation rather than in-house
- Optimise the fixed acceleration length
- Support scalability in a short timeframe
- Access to qualitative data
- Accommodate very diverse needs (verticals, stages,)

8 OPEN DATA INITIATIVES

As part of the review of experiences with PSI initiatives, we identified interesting cases in Singapore, Finland, Mexico and Spain.

8.1 SINGAPORE - CALL-FOR-CONTRIBUTION

One interesting example to encourage the creation of valuable services from public data, as far as we know, is the Call-for-Collaboration (CFC) model set up in Singapore (Chan, 2013).

In terms of incentives for reuse, Singapore has put in place a dual strategy: like many public institutions (States, regions, etc.), Singapore organized hackathons that allowed to develop applications then referenced on its platform of open data. This can be seen as the first step in an open data reuse policy, for which many initiatives are currently standing. In the hackathons, there are often very general themes on which the stakeholders are called to create and develop their solutions. Aware of the limits imposed by the hackathon model, in particular the fact that one does not master the reuse made of the data, which corresponds to the original definition of the open data, Singapore has therefore used the CFC approach.

The CFC methodology was not conceived specifically for the open data context but has been combined with the open data principles. It implies a wide variety of subjects and actors. The ecosystem of service developers is not innovative enough according to the government, and given the small size of the population which can deter investments,

Scope of CFC

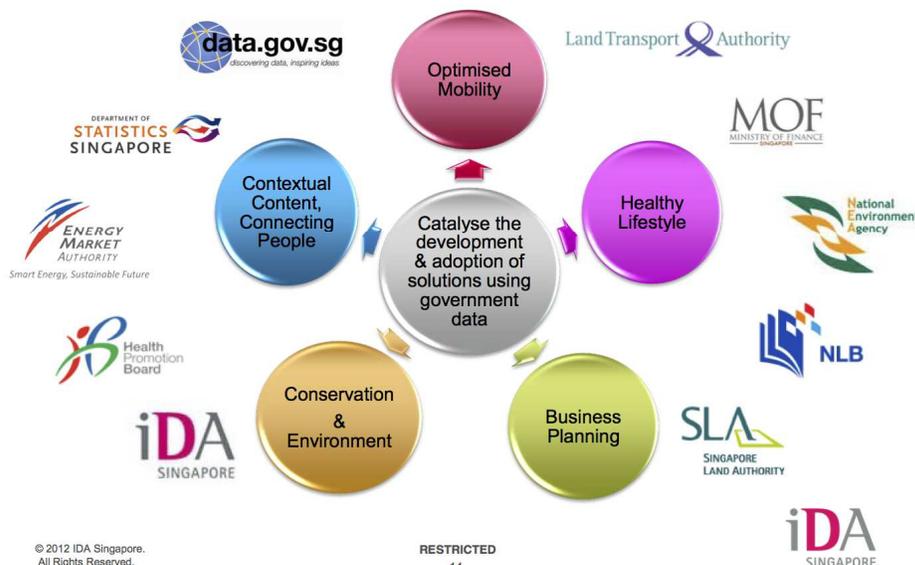


Figure 17: Scope of CFC in Singapore

This is a kind of public procurement focused on innovative products or services. In the frame of the CFC, even if it does not reach the degree of accuracy of a specification, the operator details the functionalities of the products. We could not find any element concerning the natures of dialogue relationships between service providers and data providers, which are so important in the field of open data, which could bring the CFC closer to the European model of competitive dialogue.

It fits well with Singapore's development model, where the State intends to play a strategic role in the development pathway of the economy, which requires a much higher level of funding but allows to indicate precisely the type of service the institution wishes to generate. This must be put in a broader context of Singapore's constant adaptation to the new economic contexts. (Chua, 2011)³⁹ lists building public-private partnerships among the levers that have allowed Singapore to take advantage of successive waves of innovation and to be among the most successful economies.

Before the reform of 2016, the Infocomm Development Authority of Singapore (IDA) was a public agency in charge of the « Intelligent Nation 2015 » program, whose goal was to stimulate the growth of IT sector in Singapore. One of the sub-programs concerned the theme of e-government.

Besides the provision of new products and services, one objective of the kind of PPP that is the CFC is clearly to build an ecosystem through the release of datasets, the local firms and people (start-ups), to strengthen the skills of the people, the readiness of the business.

The goal is also to use the CFC as a mean to capacity building⁴⁰: to helps the companies to develop new business models, to provide them some expertise in participating the procurement process, to give their employees the opportunity to develop new skills.

Strategy

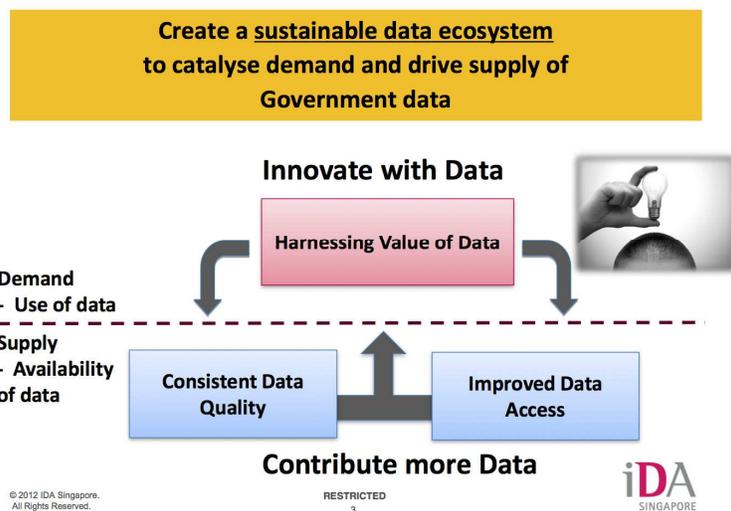


Figure 18: Data-driven innovation strategy in Singapore

We think the idea of an initial push rather consistent with the projects of the BE-GOOD challenges.

It was not possible to find a specific legal framework for the Singapore CFC. Can it be said that this is an innovative, ad hoc approach, which would undoubtedly respect the general legal framework but would not be subject to specific legislative provisions?

³⁹ <http://www.melodiesproject.eu/content/open-data-innovation-and-public-private-partnerships>

⁴⁰ “Government intervention was mainly used to create the initial supply push in terms of creating the opportunities and providing conducive working partnerships.” -> the e-transformation journey of Singapore

We have little information about the number of projects submitted under this call for tenders. This is one of the variables on which the organizer has only indirect levers and depends on the maturity of other components of the ecosystem. In all cases, it seems to have been rather small in Singapore, we have only recorded 4.

We believe important to emphasize the originality (for 2013) of a methodology combining open data with public intervention in economic development. It might seem self-evident for people accustomed with strong public intervention, but it deviates at least in part from several principles supported by some of the first open data evangelists, who thought that the role of public administration could stop after the provision of data.

One example of CFC is Example multi-modal journey planner for Singapore, launched in 2015 under the auspices the Land Transport Authority agency⁴¹. The call for collaboration lists in a very broad way the main features of the service and gives some minimal constraints, for example language settings, kinds of alerts available for final users.... Proposals must use at least one government dataset from any of these areas: business planning, conservation and environment, contextual content, connecting people; optimised mobility and healthy lifestyle. The guidelines document draws the evaluation criteria very broadly too and even with some vagueness. Innovativeness is mentioned, but without explaining what the organizer meant there, or what aspects will be retained for evaluation. The submission date, two months after the publication of the call here, which seems rather few.

“Call-for-Collaboration⁴² aims to **invite industry players to express interests in collaborating** with LTA to **jointly deploy and co-market** their multi-modal journey planner for use in Singapore.

- The objective of this CFC is to harness the value of government data to:
 - Empower the general public with information and the ability for informed decision making
 - Enable business enterprises to improve productivity, enhance planning and create new value.
- This CFC invites organisations (ICT companies, end-user business enterprises, trade associations, Institutes of Higher Learning, non-profit organisations and more) to propose solutions using government data in the following areas:
 - Applications that can be used by the people and/or private sectors
 - Data Services to create derived datasets, and for sharing via suitable platforms
- Proposals submitted for this CFC must make use of at least one government dataset from any of the following focus areas: Business Planning, Conservation and Environment, Contextual Content, Connecting People; Optimised Mobility and Healthy Lifestyle.
- The Government data sources include the data.gov.sg (<http://www.data.gov.sg>) and OneMap (<http://onemap.sg>) portals.”

⁴¹ <https://www.lta.gov.sg/content/ltaweb/en/e-services/call-for-collaboration--multi-modal-journey-planner-for-singapor.html>

⁴² <https://www.lta.gov.sg/content/ltaweb/en/e-services/call-for-collaboration--multi-modal-journey-planner-for-singapor.html>

CALL FOR COLLABORATION - MULTI-MODAL JOURNEY PLANNER FOR SINGAPORE

BACKGROUND

The Land Transport Authority of Singapore (LTA) is issuing a Call-for-Collaboration (CFC) with industry players to co-create a multi-modal journey planner mobile app for Singapore commuters.

PURPOSE

This Call-for-Collaboration aims to invite industry players to express interests in collaborating with LTA to jointly deploy and co-market their multi-modal journey planner for use in Singapore.

No.	Features & Functionalities	Examples
1	Enables commuter to do pre-trip and on-trip journey planning	<ul style="list-style-type: none"> • Trip Setup • Start a trip
2	Guides commuter to get from point A to B, according to commuters' preferences	<ul style="list-style-type: none"> • Fastest routes • Least transfers • Least walking • Covered walkways • Least cost
3	Enables commuter to search for origin or destination locations	<ul style="list-style-type: none"> • Postal code • Landmarks • Point of interests
4	Enables commuter to configure preferred departure and arrival time of travel	<ul style="list-style-type: none"> • Start Date/time • Arrival Date/time
5	Enables configuring and saving of "favourites" or default choices	<ul style="list-style-type: none"> • Profiles • Favourites
6	Calculates the best overall journeys between origin and destination for the commuter to choose their preferred options	<ul style="list-style-type: none"> • Bus • Train • Taxi • Cycling • Walking • Combination of modes
7	Provides contextual information	<ul style="list-style-type: none"> • Estimated duration of travel • Estimated travel fare • Weather conditions at destination • Calories burnt for walking • Cycling travel modes • MRT station exits to destination, etc.
8	Incorporates real-time information along with planned time-table	<ul style="list-style-type: none"> • Real-time bus arrival timing and • Scheduled train arrival timing
9	Advises commuters in real-time to adapt to changes	<ul style="list-style-type: none"> • Train delay or disruptions
		disruption notification, etc.
11	Enables re-planning of recommended routes to avoid disrupted train stations	<ul style="list-style-type: none"> • Prompts for changes
12	Provides Multi-lingual Options	<ul style="list-style-type: none"> • English • Other languages



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SCOPE OF COLLABORATION

Party	Scope of Partnership
LTA	<p>Provide access to land transport open data and APIs on DataMall@MyTransport.SG.</p> <p>Publicise and promote use of the multi-modal journey planners undertaken in this Call for Collaboration.</p>
Industry Players	<p>Co-create multi-modal journey planner that meets the needs of Singapore commuters, and develop Active Mobility features such as walking & cycling.</p> <p>Make multi-modal journey planner available for use on popular mobile devices and platforms (e.g., iOS and Android).</p>

PROPOSAL SUBMISSION

Interested industry players in this CFC should submit information about their multi-modal journey planner to LTA with the following content for consideration:

Email: LTA_CFC@lta.gov.sg

- Current feature and functionality of multi-modal journey planner
- Planned enhancement roadmap of multi-modal journey planner
- Differentiation from other multi-modal journey planner

EVALUATION CRITERIA

Finalists will be shortlisted for presentation to LTA's Selection Committee. Evaluation criteria are based on:

1. Comprehensiveness of proposed Journey Planner
2. Alignment to LTA's Mission of Connecting people and places, enhancing travel experience
3. Innovativeness
4. Focus on Public Transport
5. Focus on Sustainable Mobility (Active Mobility)

CALL FOR COLLABORATION TIMELINE

No.	Activity	Date
1	Publish Call for Collaboration	Oct 2015
2	Proposal Submission and Clarifications (Submit presentation slide and link to company website)	Extended to 14 Dec 2015
3	Presentation by Shortlisted Industry Players	Feb 2016 (Updated)
4	Award of Call for Collaboration	Mar 2016 (Updated)

CONTACT INFORMATION

Land Transport Authority of Singapore

Figure 19: Example of CFC

There are also projects on a more international scale than truly transnational. In 2013, China and Singapore announced their willingness to share common projects on smart cities. To reach this purpose, it was decided

to adopt the methodology of the CFC developed in Singapore⁴³. However, we could not find more detailed information about the process involved by an internationalization of this methodology.

One question concerns the impulses necessary to reach homeostasis in the ecosystem. This could be the role of incubators and open data platforms, but it seems rather far away. One of the questions to which our examples provides few answers is sustainability. Other CFCs in other contexts have undoubtedly contributed to the emergence of a self-sustaining ecosystem. But here we still lack information on the long term consequences. In other words, we ignore if the initial pulse can be enough to set up a sustainable ecosystem or if further impulses are needed.

8.2 FINLAND

Several experiences can be of interest in Finland, as there is not a centralized national strategy, as stated by OECD, but several kinds of methods put in place to drive the reuse of open data. Here are highlighted the main initiatives:

8.2.1 Innovative Cities Programme

Tampere participated in a programme funded by a European grant: Innovative Cities Programme (INKA), for the Smart City and Renewable Industry parts. The main focus of the programme, which lasted from 2014 to 2017, was on the companies. It aimed to help local businesses to elaborate/test some solutions in real urban environment to solve challenges. This stage should help them to confront their solutions to international competition⁴⁴. Similarly to the Singapore CFC, it can be considered as a capacity building method since the objective is to stimulate the private sector to make it more innovative by increasing its skills.

8.2.2 Six City strategy

The 6-Cities Programme addresses the need to build skills of the community of public actors in order to foster the spread of an open innovation policy. It is based on the implementation of three consistent approaches:

- Open data of the cities to feed all the products/services
- Open innovation platforms, with the aim to create new products and services through new kinds of procurement processes.
- Open participation, co-creation.

The selection implies various processes:

1. "themed calls for proposals for the different focus areas of the Six City Strategy;
2. focused calls for proposals, such as for educational institutions;
3. negotiation procedure between partners, which can be used to carry out a continuous application process."

The strategy foresees to set up a range of common tools and services, especially in these fields:

- To ease the cooperation between the cities, experiences and learning are stored into an open knowledge bank, also used to analyse the challenges of the projects.
- Training courses & peer learning
- Work together to develop data catalogues with compatible metadata

⁴³ <http://www.opengovasia.com/articles/smart-city-collaboration-between-singapore-and-china> ;
<https://www.imda.gov.sg/infocomm-and-media-news/buzz-central/2013/11/opening-up-new-smart-city-opportunities-for-ict-firms>

⁴⁴ <https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/support-measure/manner-suomi/inka-%E2%80%93-innovative-cities-programme>

- In select parts, standardise open programming interface in the city's system for utilisation by the ecosystem.
- Harmonise the structure of the data to be as compatible and comparable as possible.
- The cities evaluate and score the projects based on selection criteria specific to the six city strategy

8.2.3 TEKES Smart Procurement Program;

TEKES is the Finnish National Funding Agency for Technology and Innovation. It coordinated a programme of Smart Procurement⁴⁵, leading to the launch of ten projects based on innovative procurement methodology with a budget of EUR 60 M⁴⁶. The aim was to speed up the introduction of innovation and to improve access for products and services developed by SMEs.

8.3 MEXICO - RETOS PÚBLICOS

The Mexican open data initiative has intentionally been conceived to give birth to an ecosystem⁴⁷ through new forms of Public-Private Partnerships (Truswell, 2016)⁴⁸. It has been assessed by the OECD (OECD, 2016, p. 120)⁴⁹ which praises Mexico's efforts to promote the creation of services through the constitution of public-private partnerships within the framework of *Retos públicos*, which means "Public challenges". It stresses that the success of the initiative is due in part to the platform that centralizes the proposals. This platform indicates the stage of each challenge, provides a list of key points that provides the main characteristics of the expected service, but also what already exists in the field. After the challenge, the finalists and then the winner are announced there⁵⁰.

In March 2015, MEPP⁵¹ produced a "Diagnosis of Legal-Regulatory Framework for the Acquisition of Digital Services in Mexico." The report includes a description of public procurement frameworks, international best practices on similar challenge-based competitions, Mexico's legal framework, barriers on Mexican public ICT procurement, the evaluation process used during Retos Públicos pilot stage, and recommendations to improve it.

One of the objectives of the program, by the kind of procurement process chosen, was to involve companies, especially SMEs, which are not accustomed to participate and submit proposals to public tenders.

This competition model allowed to create 15 applications from 75 prototypes, and involved about 1,500 participants.

However, since the challenges are driven by different ministries, there is almost one assessment framework per challenge.

The documents presenting the challenges indicate to the potential participants the basic criteria used for the evaluation of their proposals. The relative weight of the criteria in the evaluation is even specified. Some criteria are very generic for this type of project: answers given to the basic problems, respect of technical aspects, design, ergonomics, and previous achievements. Criteria also include clarity of formulation,

⁴⁵ <http://www.tekes.fi/en/programmes-and-services/tekes-programmes/smart-procurement/>

⁴⁶ <https://www.tekes.fi/en/programmes-and-services/tekes-programmes/smart-procurement/>

⁴⁷ (Escobar & Montiel, 2015): <https://www.youtube.com/watch?v=e3YmpryrzFk>

⁴⁸ <http://www.melodiesproject.eu/content/open-data-innovation-and-public-private-partnerships>

⁴⁹ <http://www.oecd.org/gov/digital-government/open-government-data-review-of-mexico-9789264259270-en.htm>

⁵⁰ <http://retos.datos.gob.mx/>

⁵¹ <https://propem.org/wp-content/uploads/2016/02/MEPP-QR4-Annual-FY-2015-Oct-2015.pdf>

understanding of project issues, attempts to meet needs and trying to go beyond basic demand. They try to estimate the economic viability of the development of the applications. The evaluation also includes the use of public data open by the application and, interestingly, the production of new open data. This can be related to the concept of infomediary contented by Pollock.

The first evaluation is ensured by the team of the National strategy of open data, assisted by *Codeando Mexico*, an organization promoting the dissemination of civic tech. The first jury includes technicians, researchers, civil society representatives, etc. The proposals are evaluated and the top ten selected for the next stage.

Five finalists are then selected and their projects are guaranteed to be published on the platform. Each finalist receives 10,000 dollars if they meet the requirements of the challenge.

From the ground of this model, a more general and challenging program, Retos Mexico⁵², has been designed aiming to build an open innovation ecosystem, with a platform opened to both public and private challenges. This is an interesting development of open data, although difficult to analyse since the platform is still in an embryonic stage.

8.4 BARCELONA

Analysing the case of Barcelona seems relevant since this city is at the forefront in the search for innovative solutions for smart cities⁵³. The Barcelona Growth program⁵⁴ was launched before the transposition of the 2014 European directive on public procurement. We believe that the case remains relevant since the choices of the organizers and the problems faced are similar in the new legal framework.

The program was designed as a tool to foster innovation as the country was afflicted by the economic crisis. One of the purposes was to remove the entries barriers and to foster the involvement of new participants in public procurement processes.

Barcelona chose to adopt a problem solving oriented methodology, which had been already experimented in Boston (USA) and Paris. Six main themes were given from reducing bicycle thefts to automatic detection and alerts of damaged road surfaces.

They also address the problem of metrics to assess each challenge and faced this question: how to reconcile the need to have a substantial and common approach with the need to adapt as much as possible to the diversity of situations.

Key challenges were culture change in the public agencies and problem statement preparation. The point with problem statement was to design them so that they will not tend to return to the traditional solution prescription model. The consultancy company which worked with Barcelona helped to write the statements so it would be understood by companies which do not have wide tradition of participation in procurement.

The challenges were globally provided around 1.000.000€: 6.000€ at least and 250.000€ at most per company selected for the further steps.

Beside the classic evaluation criteria and those designed specifically for each challenge, they also evaluated the fact that the competitors are new in the field of public procurement, that the solutions submitted are new or drifted from existing ones and that they comply with.

⁵² <https://retomexico.org>

⁵³ <https://www.juniperresearch.com/press/press-releases/barcelona-named-global-smart-city-2015>

⁵⁴ <https://barcelona.numa.co/>

They tried to limit the size of the documents describing the challenges. The procurement consisted in two phases: First there was an open ideas competition, allowing to choose five finalists. Then a negotiated procedure following the legal European framework, which has been reformed since then. In this kind of procurement, the specifications are written both between government and the finalists. The stakeholders estimate that the Competitive Dialogue procedure would be more useful.

To engage users not familiar with public procurement, the consultancy company contacted 200 companies per challenge to present the themes of the challenges and the procedure intended to facilitate their access to public markets.

Among the lessons learnt, the stakeholders remind the importance to determine the procurement process since almost the beginning of the project. Also, the organizers identified from this experience the need to provide some trainings to the different stakeholders, both on the technical aspects and on the organization of the competitions.

9 ANNEX 01 – SHARE-PSI BEST PRACTICES

9.1.1 Policies and Legislation [#policy](#)

Legal requirements, licenses etc. licensing of information, data and metadata

- [Provide PSI at zero charge](#)
- [Develop and Implement a Cross Agency Strategy](#)
- [Encourage crowdsourcing around PSI](#)
- [Enable feedback channels for improving the quality of existing government data](#)
- [High Level Support](#)
- [Holistic Metrics](#)
- [Develop an Open Data Publication Plan](#)
- [Open Up Public Transport Data](#)
- [Open Up Research Data](#)
- [Support Open Data Start Ups](#)

9.1.2 Platforms [#platforms](#)

Open data platform(s), publication and deployment of information, data and metadata

- [Encourage crowdsourcing around PSI](#)
- [Establish an Open Data Ecosystem](#)
- [\(Re\)use federated tools](#)
- [Enable feedback channels for improving the quality of existing government data](#)
- [Standards for Geospatial Data](#)
- [Provide metadata](#)
- [Provide descriptive metadata](#)
- [Establish Open Government Portal for data sharing](#)
- [Provide Complementary Presentations](#)
- [Provide Feedback to the Original Publisher](#)

9.1.3 Dataset criteria [#criteria](#)

Dataset criteria, priorities, value and scope

- [Dataset Criteria](#)
- [Establish an Open Data Ecosystem](#)

9.1.4 Charging [#charging](#)

Charging issues and proposals

- [Open Data Business Models & Value Disciplines](#)
- [Provide PSI at zero charge](#)
- [Establish an Open Data Ecosystem](#)
- [Holistic Metrics](#)

9.1.5 Techniques [#techniques](#)

Techniques for opening data, technical requirements and tools.

- [Provide bulk download](#)
- [Use content negotiation for serving data available in multiple formats](#)
- [Make data available through an API](#)
- [Provide complete documentation for your API](#)
- [Avoid Breaking Changes to Your API](#)
- [Enrich data by generating new metadata](#)
- [\(Re\)use federated tools](#)
- [Make feedback available](#)
- [Choose the right formalization level](#)
- [Standards for Geospatial Data](#)
- [Use Web Standards as the foundation of APIs](#)
- [Provide metadata](#)
- [Provide descriptive metadata](#)
- [Provide locale parameters metadata](#)
- [Provide structural metadata](#)
- [Preserve identifiers](#)
- [Establish Open Government Portal for data sharing](#)
- [Use persistent URIs as identifiers of datasets](#)
- [Use persistent URIs as identifiers within datasets](#)
- [Provide Complementary Presentations](#)
- [Publish Statistical Data In Linked Data Format](#)
- [Provide Subsets for Large Datasets](#)
- [Provide data up to date](#)
- [Assign URIs to dataset versions and series](#)
- [Provide version history](#)
- [Provide a version indicator](#)
- [Reuse vocabularies, preferably standardized ones](#)

9.1.6 Organisation [#organisation](#)

How to organise PSI sharing, necessary functions and communications

- [Open Data Business Models & Value Disciplines](#)
- [Establish an Open Data Ecosystem](#)
- [\(Re\)use federated tools](#)
- [High Level Support](#)

9.1.7 Formats [#formats](#)

Dataset structures, formats, APIs

- [Provide bulk download](#)
- [\(Re\)use federated tools](#)
- [Provide data in multiple formats](#)
- [Use machine-readable standardized data formats](#)
- [Standards for Geospatial Data](#)
- [Use persistent URIs as identifiers of datasets](#)
- [Use persistent URIs as identifiers within datasets](#)

9.1.8 Reuse [#reuse](#)

Encouraging (commercial) re-use

- [Open Data Business Models & Value Disciplines](#)
- [Cite the Original Publication](#)
- [Make data available through an API](#)
- [Establish an Open Data Ecosystem](#)
- [\(Re\)use federated tools](#)
- [Standards for Geospatial Data](#)
- [Provide data license information](#)
- [Follow Licensing Terms](#)
- [Provide locale parameters metadata](#)
- [Provide structural metadata](#)
- [Use persistent URIs as identifiers of datasets](#)
- [Use persistent URIs as identifiers within datasets](#)
- [Provide Complementary Presentations](#)
- [Provide data provenance information](#)
- [Provide real-time access](#)
- [Support Open Data Start Ups](#)
- [Provide Subsets for Large Datasets](#)
- [Provide version history](#)
- [Provide a version indicator](#)

9.1.9 Persistence [#persistence](#)

Persistence and maintenance of data and metadata

- [Assess dataset coverage](#)
- [\(Re\)use federated tools](#)
- [Preserve identifiers](#)
- [Use persistent URIs as identifiers of datasets](#)
- [Use persistent URIs as identifiers within datasets](#)
- [Assign URIs to dataset versions and series](#)
- [Provide version history](#)

9.1.10 Quality [#quality](#)

Data quality issues and solutions, quality assurance, feedback channels and evaluation.

- [Establish an Open Data Ecosystem](#)
- [Enrich data by generating new metadata](#)
- [Gather feedback from data consumers](#)
- [Make feedback available](#)
- [Provide data quality information](#)
- [Preserve identifiers](#)
- [Use persistent URIs as identifiers of datasets](#)
- [Use persistent URIs as identifiers within datasets](#)
- [Provide Complementary Presentations](#)
- [Provide Feedback to the Original Publisher](#)
- [Provide data provenance information](#)

- [Enable quality assessment of open data](#)
- [Assign URIs to dataset versions and series](#)
- [Provide version history](#)
- [Provide a version indicator](#)

9.1.11 Documentation [#documentation](#)

Documentation of information/data, creation of metadata.

- [Assess dataset coverage](#)
- [Provide complete documentation for your API](#)
- [Avoid Breaking Changes to Your API](#)
- [Provide an explanation for data that is not available](#)
- [\(Re\)use federated tools](#)
- [Provide data provenance information](#)

9.1.12 Selection [#selection](#)

Selection of information/data to be published according to various criteria.

- [Categorise openness of data](#)
- [Establish an Open Data Ecosystem](#)
- [Gather feedback from data consumers](#)
- [Identify what you already publish](#)
- [Publish overview of managed data](#)
- [Provide Feedback to the Original Publisher](#)
- [Provide real-time access](#)

9.1.13 Discoverability [#discoverability](#)

Data discoverability.

- [Assess dataset coverage](#)
- [Establish an Open Data Ecosystem](#)
- [Provide an explanation for data that is not available](#)
- [Standards for Geospatial Data](#)
- [Provide metadata](#)
- [Provide descriptive metadata](#)
- [Provide locale parameters metadata](#)
- [Establish Open Government Portal for data sharing](#)
- [Use persistent URIs as identifiers of datasets](#)
- [Use persistent URIs as identifiers within datasets](#)
- [Assign URIs to dataset versions and series](#)