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OpenGovIntelligence Project Deliverable D4.1- Pilots and Evaluation Plan V1

Fostering Innovation and Creativity in Europe through Public Administration Modernization towards Supplying and Exploiting Linked Open Statistical Data

Matheus, Ricardo; Janssen, Marijn; Praditya, Dhata

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OpenGovIntelligence

Fostering Innovation and Creativity in Europe through Public Administration Modernization towards Supplying and Exploiting Linked Open Statistical Data

Deliverable 4.1

Pilots and Evaluation Plan — v1

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Editor(s):	Ricardo Matheus (TUDelft)
Contributor(s):	Marijn Janssen (TUDelft) Dhata Praditya (TUDelft) Konstantinos Tarabanis (CERTH) Efthimios Tampouris (CERTH)
Reviewer(s):	Keegan McBride (TUT)
Approved by:	All partners

Abstract:	In this report evaluation methods and measures for the OpenGovIntelligence (OGI) project are presented. The evaluation of OGI innovation ecosystem on public administration is based on four main areas that will be evaluated: 1. Co-Creation Framework. How will this framework enable co-creation? 2. OGI ICT Toolkit (Building blocks and Cubes Design). Are the building blocks suitable for providing the functionality needed? How does the OGI ICT toolkit serve its purpose support application development? 3. Acceptance of OGI Toolkit. Will the users accept and work with the developed applications? 4. Outcomes: what is the result of these use of the applications on elements like administrative burden and transparency?

Keyword List:	Evaluation, adoption, public value, survey, measures, linked open statistical data, open data.

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	Role	*Name*	*Short Name*	*Country*
1.	Coordinator	Centre for Research & Technology – Hellas	CERTH	Greece
2.	R&D partner	Delft University of Technology	TUDelft	Netherlands
3.	R&D partner	National University of Ireland, Galway	NUIG	Ireland
4.	R&D partner	Tallinn University of Technology	TUT	Estonia
5.	R&D partner	ProXML bvba	ProXML	Belgium
6.	R&D partner	Swirrl IT Limited	SWIRRL	United Kingdom
7.	Pilot Partner	Trafford council	TRAF	United Kingdom
8.	Pilot Partner	Flemish Government	VLO	Belgium
9.	Pilot Partner	Ministry of Interior and Administrative Reconstruction	MAREG	Greece
10.	Pilot Partner	Ministry of Economic Affairs and Communication	MKM	Estonia
11.	Pilot Partner	Marine Institute	MI	Ireland
12.	Pilot Partner	Public Institution Enterprise Lithuania	EL	Lithuania

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Executive Summary

The OpenGovIntelligence (OGI) innovation ecosystem provides a framework and an architecture as well as an ICT toolkit for data-driven public service co-creation. Pilots will be executed to validate and prove the usability and effectiveness of OGI ICT toolkit for innovative co-creation ecosystems.

In this report the pilots and evaluation plan are presented. For this literature review has been conducted and various development and evaluation models have been reviewed. Selected evaluation models are presented in the text and thereafter used as the basis for the development of our own OGI-specific evaluation models.

The pilots will be based on agile development with continuous and strong stakeholder participation. There will be a design and an implementation team that will work closely together.

The evaluation plan takes into account multiple stakeholders' perspectives. We will use multiple evaluation methods to deal with the diversity of activities in our project and we opt for customizing the models for the situation in our project.

The various methods that will be employed include surveys, interviews, web metrics and data from social media. The evaluation of OGI innovation ecosystem on public administration is based on four main aspects:

1) **Co-Creation Framework Evaluation**. How will this framework enable co-creation?
2) **OGI ICT Toolkit** (Building blocks and Cubes Design). Are the building blocks suitable for providing the functionality needed? How does the toolkit serve its purpose to support application development?
3) **Acceptance of OGI innovation ecosystem**. WIll the users accept and work with the developed applications?
4) **Outcomes**. What is the result of pilot applications on elements like administrative burden and transparency?

Each of the aspects has its own evaluation methods and measures. The evaluation will demonstrate how the various elements of the project achieve the targeted impact. It is anticipated that in the long term the project outcomes will be important in the area of engagement, participation, transparency, accountability, empowerment and administrative burden of public services.

1 Introduction

The OGI environment provides an ICT toolkit comprising easy-to-use and user centric tools to facilitate realizing Linked Open Statiscal Data (LOSD) innovation ecosystem. Pilots will be executed to validate and prove the usability and effectiveness of OGI ICT toolkit to co-create and innovate ecosystems. This will result in usage of the apps and on long term effects. In order to understand the effect of OGI innovation ecosystem, the evaluation plan which delivered on this D4.1 report.

As defined in Deliverable D1.1 and D2.1, an innovation ecosystem is a compression of two weakly coupled economies, the knowledge economy and the commercial economy, that influence each other (Jackson 2011).

In an ecosystem there are different stakeholders who view the pilots from their own, different perspectives. Developers might want to evaluate the pilots based on meeting the requirements, decision-makers might look at the impact of the requirements in terms of number of users and Return on Investment, policy-makers in terms of societal impact like reducing administrative burden, transparency and contribution to solving societal problems, and end-users for satisfying their needs. Hence, evaluation needs to take into account the multiple stakeholders perspectives.

The evaluation will consider the dimensions of the co-creation framework (co-initiation, co-design, co-implement and co-evaluation), the OGI solution platform (Information and Communication Technologies - ICT - building blocks and cubes design), the User Acceptance of Technology and the theory of Administrative Burden.

The co-creation framework is described in detail in Deliverable D2.1, on the WP 2 Framework Creation. The OGI Solution Platform is also described in detail in another Deliverable D3.1, on the WP 3 ICT tools development. Furthermore, this report is linked to D1.1. OGI Challenges and Needs, on the WP1 Challenges and needs identification. These interconnections and interdependencies are summarised in Figure 1.

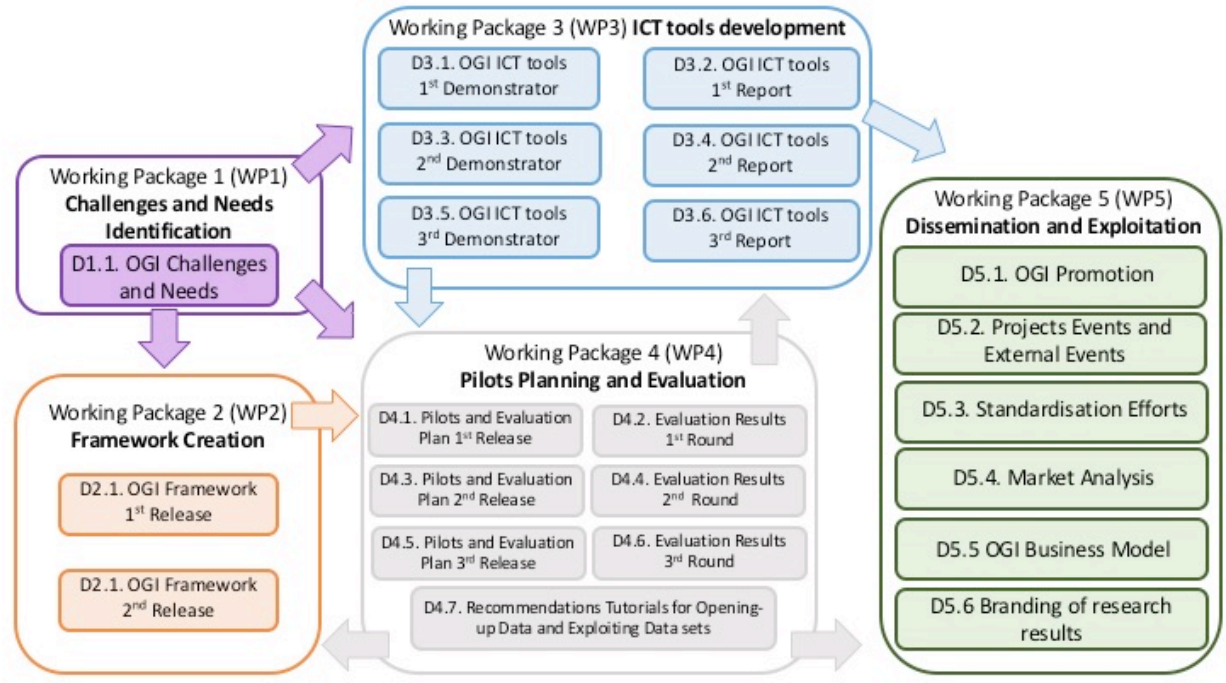


Figure 1 - Interconnections and Interdependencies of OGI Working Packages and Deliverables

The evaluation is based on activities performed, the stakeholders, the outputs and outcomes of activities on the stakeholders identified.

1.1 Scope

The present document is the deliverable 4.1 "D4.1 Pilots and Evaluation plan — First Version" (henceforth referred to as D4.1) of the OGI project. The main objective of D4.1 is to provide:

- Pilots Evaluation Plans.

1.2 Audience

This document is aimed at:

- Pilot partners of OGI consortium (implementers and users); and,
- European Commission (EC).

1.3 Structure

In the next chapter we start by explaining the pilots' implementation plan, as this is the basis for the other activities. The structure of the document is as follows:

- Section 2 provides the Pilots' implementation plan;
- Section 3 describes the Evaluation plan;
- Section 4 presents Conclusions;
- Section 5 presents the Annexes
- Section 6 presents the References.

2 Pilots Implementation Plan

Pilots will deploy the OGI toolkit to implement an application that can be used by others. During a pilot the OGI toolkit will be used and tested and this is guided by the co-creation framework. The use and test on real-life environment demonstrates if OGI toolkit and co-creation framework meets the organisation's requirements. The outcomes and outputs from the results provides us insights for further evaluation and improvement of the OGI toolkit.

OGI project will be evaluated using six pilot projects, that are: The Greek Ministry of Interior (Greece); Lithuanian Ministry of Economy (Lithuania); Trafford Council (England); The Flemish Government (Belgium); The Marine Institute (Ireland); and, The Estonian Ministry of Economics (Estonia). The description of pilots is at D1.1.

The pilot participants (implementers and users) will use the evaluation instrument proposed in this deliverable to provide feedback about how OGI toolkit and co-creation framework are working on each pilot. The feedback will be collected mostly using questionnaire or interviews to measure the user acceptance, the level of participation and the quality of the OGI ICT toolkit and the OGI co-creation framework. The feedback then will be used for further improvement and enable pilots to identify the more appropriate method for supporting implementation of LOSD usage via OGI toolkit and co-creation framework.

This section is structured as follows, in the next section the use of Agile Methods for the Pilots implementation is explained. Then, Pilot Stakeholder analysis is described followed by a list of information needed for each pilot.

2.1 Agile Development in the Pilots

The OGI pilots plan was developed using the agile model proposed by (Beck, Beedle et al. 2001). The Agile method focuses on “agility” and “adaptability” in development. Instead of one time-consuming and rigid development schedule, agile models involve multiple iterative development schedules that seek to improve the output of every iteration. Each iteration will be within a short time frame and contain all the steps of requirement specification, design, implementation, testing, deployment, evaluation. The iterative cycle continues till the final product meets the expectations.

Pilots will be organized in three iterations in which each time the OGI toolkit will be more advanced and further developed. This enables relatively short cycle-time and improvement. Furthermore, functionalities can be evaluated:

1. The first (initial) iteration will use an early version of the evaluation of OGI services and tools. This feedback will be used to further improve the OGI toolkit
2. The second iteration will use a more advanced version. Again, this feedback will be used to further improve the OGI toolkit;
3. The final iteration of pilots will also benefit from the lessons learned in the first two pilot iterations.

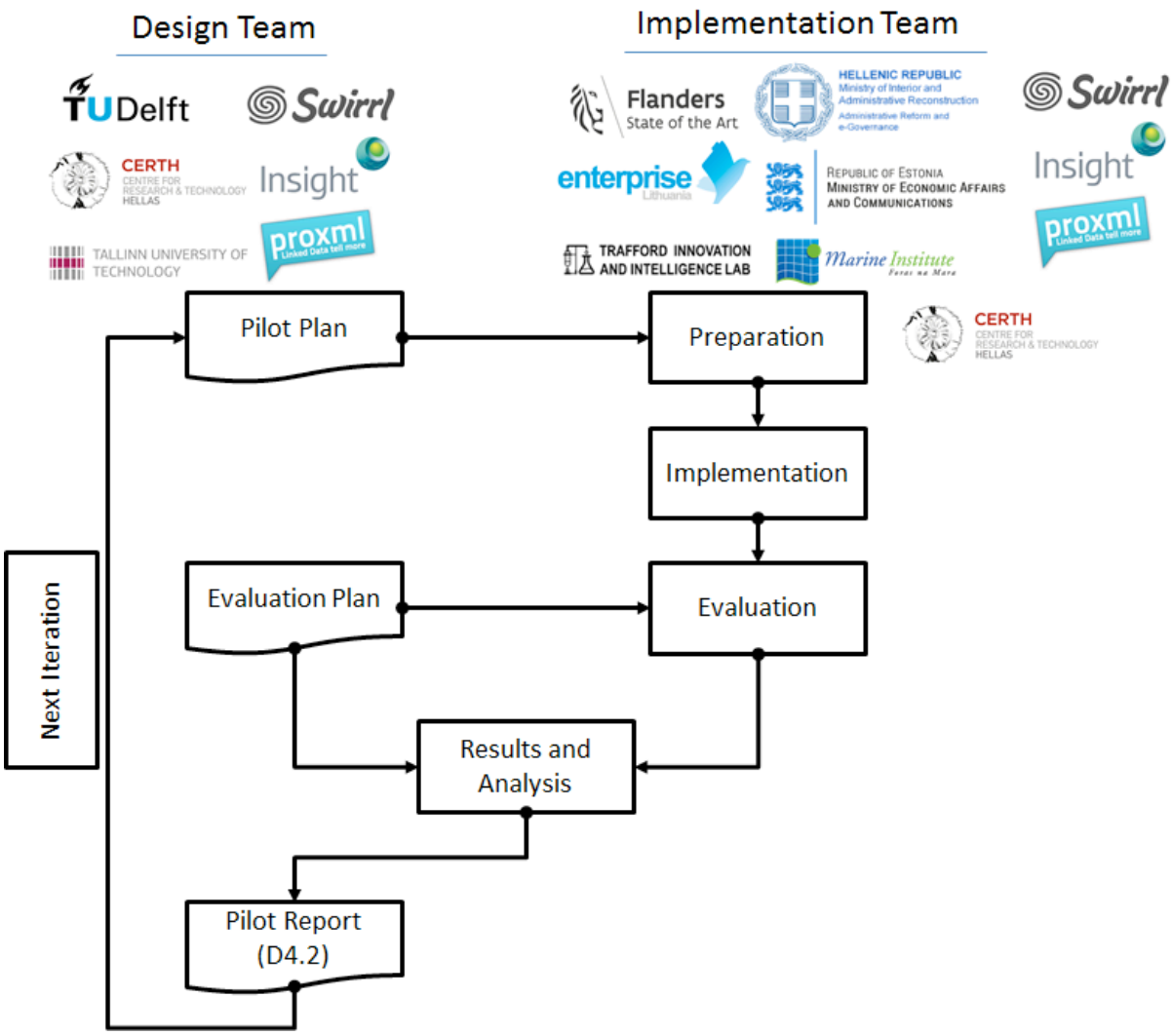


Figure 2 - High Level Processes of Pilot Plan

Figure 2 illustrates the tasks involved in planning for and conducting a pilot and shows the OGI phase during which each of these activities might occur. The timeframe is presented at Section 2.

The pilot design team is responsible to create the pilot and evaluation plan (Deliverables 4.1, 4.3 and 4.5) as well as pilot report (Deliverables 4.2, 4.4 and 4.6). This team consists of the R&D Partners in the OGI consortium. The Pilot implementation team is responsible to execute the pilot projects based on the plan created by pilot design team described on this report D4.1. Pilot implementation will be divided in three main actions:

1. Preparation: the part that deals with collecting needed information from the pilots to fill the implementation template, presented at Section 3;
2. Implementation: the part that executes the implementation of the OGI toolkit and co-creation framework on the pilots by technical partners, presented at Section 3;
3. Evaluation: the part that measures the success of outputs and outcomes after implementation of OGI toolkit and co-creation framework. The evaluation procedures will be presented at Section 3 and created by the OGI consortium.

The findings of the evaluation part of the second step will be analysed by the OGI Consortium. The result of this analysis will be used to create the pilot plan for the next iterative cycle. The objective is to identify challenges and needs to improve the implementation and evaluation of OGI toolkit and OGI innovation ecosystem framework at OGI pilots.

The pilot report will provide the processes of each pilot and evaluation on four evaluation dimensions for each pilot (described at figure X in page 21), and will be the source for the pilot plan of next iteration, for example D4.2 (Evaluation results 1st round) will be the source for D4.3 (Pilot and Evaluation Plan 2nd release), influencing D4.4 (Evaluation results 2nd round) and so on.

2.2 Pilots' Stakeholders Analysis

Stakeholders can play different roles. In accordance with the OGI project approach there are three different roles in the OGI innovation ecosystem on public administration:

1. Data Provider (DP);
2. Public Service Provider (PSP);
3. Public Service Consumer (PSC).

Figure 3 summarises the roles and the flow of public service delivery. The DPs were identified at OGI project proposal. PSP are re-users of data and often aggregate data from various sources and processes the data to make it available for users in easy to use format. The PSPs and PSCs were identified at OGI project proposal and specified on the table 1 of Deliverable D5.1. Dissemination and Exploitation Plan as the targeted groups of dissemination.

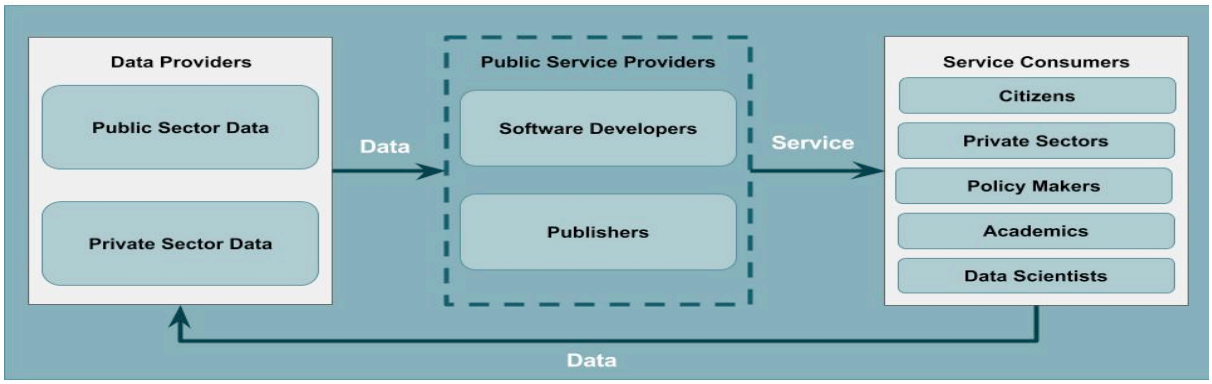


Figure 3 - Overview of main roles at OGI innovation ecosystem on Public Administration

The roles can be performed by different stakeholders and same stakeholders can play multiple roles (Kambil and Short 1994, Kendall 1998). The notion of roles is intuitive; humans think and express themselves in terms of roles (Kristensen 1996). Public authorities, businesses and citizens could provide data (presented on the box "Data Providers" of the Figure 3) that would potentially support the development of public services delivered by any PSP (presented on the box "Public Service Providers of the Figure 3). The consumers have dual roles. They consume services and also might

produce data. The latter is called prosumers. The specifications of them are presented at appendix 2 of Deliverable D6.1. Data Management Plan.

The table summarises the initial identified roles for DP, PSP and SC based on the OGI proposal project.

Table 1 - Roles and Stakeholders matrix of the OGI innovation ecosystem

Stakeholders	Data Provider role	Public Service Provider role	Service Consumer role
Public Administration	Provision of Open Government Data	Design and delivery of public service Provide public services	In policy making and/or internal decision making
Businesses	Business data (private) to be used in services	Co-design and/or co-delivery of public service	In business intelligence, decision making etc.
Citizens/ NGOs	Citizen provided data	Co-design and/or co-delivery of public service	Information provision, transparency etc.

2.3 Pilots' Information Template

In order to compare the pilots and view the similarities and differences a template for describing the pilots has been developed. Information needed to describe the pilots consists of the following main parts: General Information, Stakeholder Overview, Pilot Objectives, Expectations and Benefits, Datasets used, and, Risks.

General information provides a description of organisation and key people on pilots. They will help to conduct the implementation of OGI toolkit, co-creation framework and the evaluation of outputs and outcomes pilots' implementation.

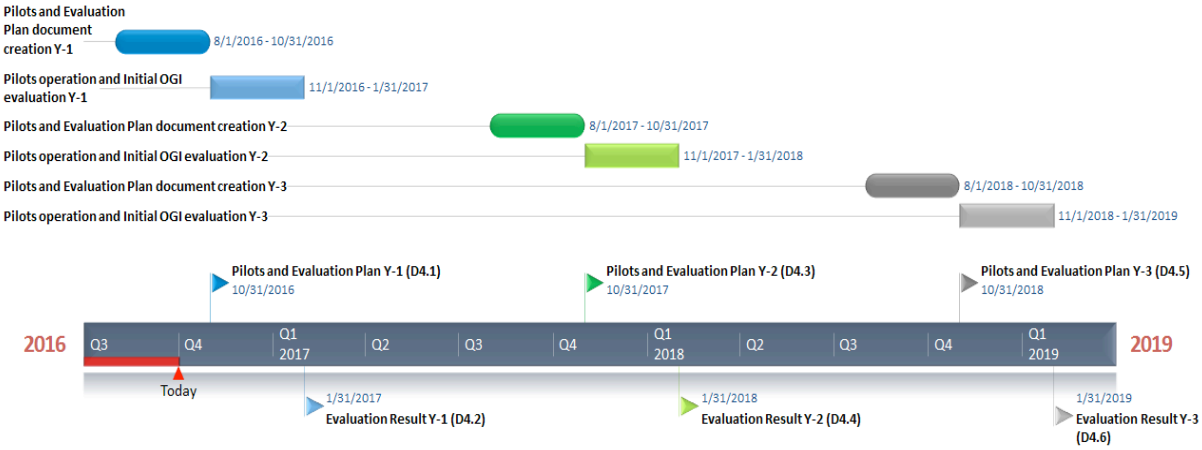
Pilot stakeholder describe the specific pilot's stakeholders and their roles. They will be used as the respondents of interviews, surveys, opinion mining and other evaluation methods described at Section 3 .

Pilot Objectives and Expectations using OGI toolkit and co-creation framework is described to allow comparison of existing usage before and after having used the OGI toolkit and co-creation framework implementation and usage.

Data sets are important part of resources and were selected because their maturity level and characteristics will influence the use of tools, skills needed and strategies to deliver expected pilots' results.

Risks was selected due the need to identify what are the challenges and risks on pilots that can influence on the negative results of outputs and outcomes. This can be used for risk management. The summary is presented at section 5.8. The pilot description already was described at Deliverable D1.1.

2.4 OGI Pilots' Timeline



3 Evaluation Plan

3.1 Introduction

This section aims at presenting a comprehensive model for assessing the operational and usage potential of the OGI solution. There are numerous evaluation models available. Many researchers used these models without any changes, while others adapted them in accordance with their specific objectives and context. We use multiple evaluation methods to deal with the diversity of activities in our project and we opt for customizing the models for the problem at hand in our project. We base our approach at the insight gained from the FP7 Engage (http://www.engagedata.eu/) and OpenCube (http://www.opencube-project.eu/).

In general, the evaluation measures for the OGI toolkit should focus on EU innovation priorities stated in EURO-6-2015:

1. Improving effectiveness and efficiency of Public Administrations; measured by the percentage of OGI solution platform users in the pilots, which agree or disagree the implementation of this solution improve the public service delivery of PAs.
2. Transforming public administrations processes; measured by the percentage of OGI solution platform users in the pilots which agree or disagree the implementation of this solution actually streamline the business process of PAs.
3. Processes and ways in which new cultural and societal challenges are identified in public policies; measured by the use of OGI solution platform increases the participation of citizens and businesses in co-creation (co-initiative, co-design, co-implementation) with PAs in order to address societal problems)
4. Uptake and acceptability of the use of emerging technologies in the public sectors; measured by the intention of use and user satisfaction of the OGI solution platform.
5. Reducing the administrative burden of citizens and businesses; measured by the reduction on administrative burden of citizens and businesses by variables such as cost, time, easiness of procedure dealing with PAs, etc.
6. Offering inclusive public services; measured by the diverse users that use the OGI solution platform.

To reach these objectives, it is necessary to create a framework for the evaluation of the functional and nonfunctional characteristics of the OGI innovation ecosystem, which consists of OGI solution platform and co-creation framework, the ICT toolkit and the targeted users in the pilot projects. The pilot evaluation plan will focus on the specification of an integrated evaluation framework scoping intention to use, quality of the solution platform and framework, and overall impact defined per pilots by setting measurable evaluation criteria and creating an evaluation procedure.

Considering this research is on the middle of applied social science (public administration) and hard science (computing), it is natural to face a “battle” between quantitative *versus* qualitative data and methods. On the one hand, quantitative data is easier to handle and they are more accurate or less subjective in comparison with qualitative data. On the other hand, taking into consideration the objectives and objects that are considered to be studied, qualitative approach will also be necessary.

Due to those aspects we intend to utilise both quantitative and qualitative data for OGI evaluation. Figure 1 shows that objects like ICT toolkits will be evaluated by quantitative methods and objects like people and usage will be evaluated by qualitative methods. Section 3.4.2. has a detailed explanation of methods for gathering data.

This section is structured as follows: the dimensions of evaluation are presented in the next section. Following that, measurable evaluation criteria for each dimension are defined. Then, the approach to collect data for evaluation is described and followed by conclusion.

3.2 Dimensions of Evaluation

The evaluation of OGI innovation ecosystem on public administration is based on four main dimensions:

1. Co-Creation Framework
2. Building Blocks of OGI ICT Toolkit and Cubes Design of OGI ICT Toolkit
3. Acceptance of OGI innovation ecosystem
4. Outcomes

The first dimension "Co-creation Framework" will be evaluated focusing on how pilots and the framework itself can enhance co-creation on the formulation and implementation of the pilots based on the co-initiative, co-design and co-implementation. The evaluation methods and tools are described at Section 3. At Figure 4, this part is represented by the frame colored in green on the right side. The target groups for this evaluation are Public Administrations partners, Citizens and Businesses.

The second dimension "OGI ICT Toolkit" evaluates two mains parts. The first is the "Building blocks of OGI ICT Toolkit". The objective of this evaluation is to identify what influences data quality, System and ICT tools (legacy and new ones) and IT designers, including the implementers from the OGI consortium. The evaluation methods are deep described at Section 3**.** At Figure 4, is represented on the lower frame colored in blue. The target groups for this evaluation are ICT technical partners and the IT department of PAs partners. The second part is the "Cubes Design of OGI Toolkit" prompted an evaluation to the cubes design quality. The objective of this evaluation is to identify what are the factors influencing quality of cubes and which manner data influences system and vice-versa. The evaluation methods and tools are deep described at Section 3. At Figure 4, is represented on the upper frame colored in blue. The target groups for this evaluation are ICT technical partners and the IT department of PAs partners.

The third dimension "Acceptance of OGI innovation ecosystem" contains the evaluation considering the perspective of users. The objective is to understand what are the benefits and challenges that influence the pilot stakeholders presented at Section 3. The evaluation methods and tools are deep described at Section 3. At Figure 4, is represented by frame colored in yellow. The target groups for this evaluation are Public Administrations, Citizens and Businesses.

The fourth dimension "Outcomes" evaluates the challenges and issues that OGI innovation ecosystem (OGI ICT toolkit and co-creation framework) can potentially reduce. The objective is to identify the administrative burdens existing on each pilot and measure the reduction of them. The deep description of evaluation methods and tools are described at Section 3. At Figure 4, is represented by frame colored in yellow. The target groups for this evaluation are Public Administrations, Citizens and Businesses.

The Figure 4 summarises the relationship between the four dimensions.

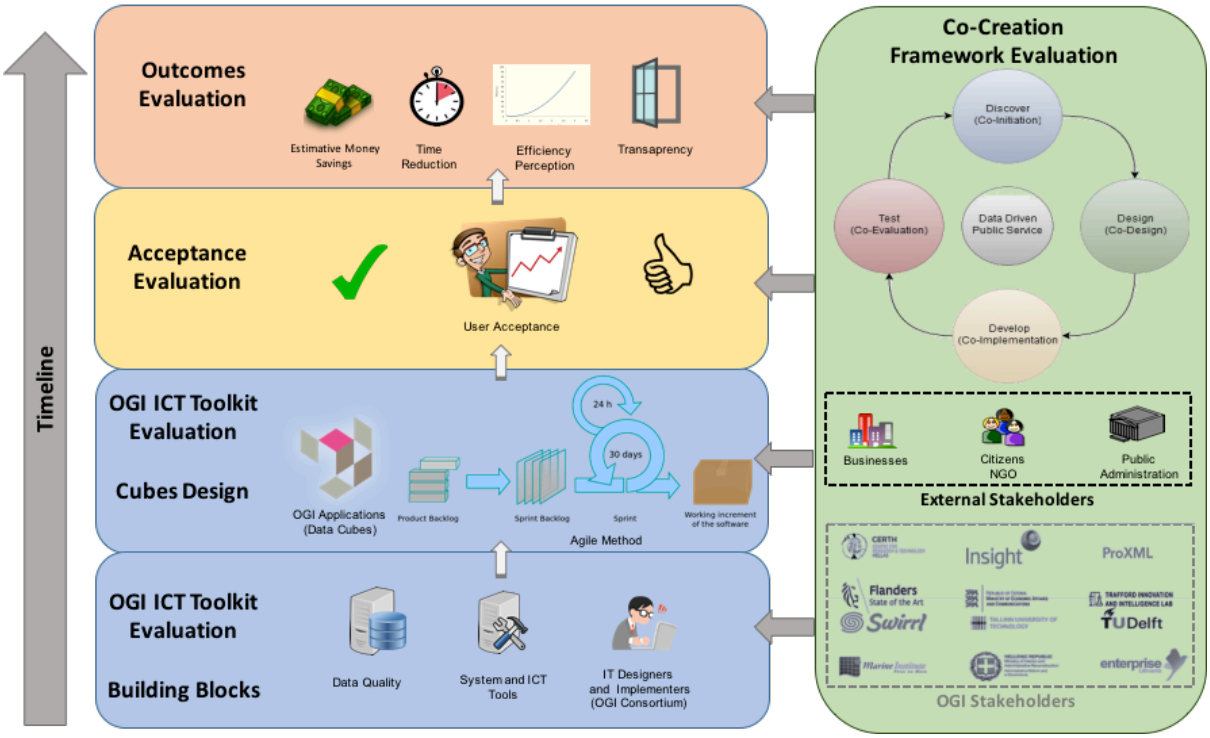


Figure 4 - Stakeholders and dimensions of Evaluation

3.3 Co-Creation Framework Evaluation

Taking in consideration the type of co-creation and participant contribution we could identify methods to collect data and also ICT tools that will treat and analyse the data and feedback of participants. This is explained at D2.1 OGI Framework from WP2 Framework Creation.

The objective of this section is to explain the methods to collect data and ICT tools used to evaluate the feedback, statistics, etc, from the identified types of co-creation and participant contributions. Table 2 summarises the methods to collect data and ICT tools identified as useful to collect and analyse feedback from participant on the four different co-creation stages.

Table 2 - Co-Creation Framework Stages, Methods for Data Collection and Tools for Evaluation

Co-creation type	Target groups	Participant role	Source to collect data	Methods and Tools for evaluation
Co-initiation	Citizens, Businesses and PAs partners	Problem & needs identification	• Social Media	• R statistical analytics • TwitteR • Weka • Other social media analytics
		Idea generation for ways to solve problems (informed by data)	• User workshops • Public meetings • Social Media	
Co-design		Input to service design	• User workshop • Continued participation • Focus groups • User Experience and User Interface testing	• Survey (Questionnaire and interviews)

Co-implementation		Uploading user data	• Web and Phone Statistics (Number of access, download, tc.)	• Web Analytics • Survey (Questionnaire and Interviews) • R statistical analysis • TwitteR • Weka • Other social media analytics
		Suggesting changes to data sets	• Portal's Feedback channels	
		Data creation for a service	• Web and Phone Statistics (Number of access, download, tc.)	
Co-evaluation		Providing feedback to service quality, usefulness, etc.	• Social Media • Portal's Feedback channels	• R statistical analysis • TwitteR • Weka • Other social media analytics
		Reporting data on service operation	• Web and Phone Statistics (Number of access, download, tc.)	

3.3.1 Sources to collect data for OGI Co-Creation Framework

The sections below explain the sources to collect data for OGI Co-creation framework.

3.3.1.1 Social Media

After the widespread use of mobile devices (mobile phones, tablets, etc.) and the access of Internet (3G, wifi, etc.), social media boomed. Facebook, Twitter, Instagram, Youtube, Linkedin and other social media became very popular. Statistics point out that 3 billion users of the 10 biggest social media apps exist.

Part of the usage of this social media apps is related to performance of public services. Collecting these data sets is possible to create opinion mining and check for example the sentiment analysis about any specific subject (against or pro changes, good or bad service delivery, etc.). Problems and needs can be easily identified without high volume of resources (time, people, surveys, etc.). Literature (Sobkowicz, Kaschesky et al. 2012) used opinion mining was done in social media to model, simulate and forecast political opinion.

3.3.1.2 User workshop

A workshop is an activity that aims to introduce something (idea, skill, product, etc) to potential interested people. Workshops range from short workshops (45 minutes or less) to one or more days. A critical aspect of user workshop feedback process is the inclusion of end-users in the creation of the new data driven public services.

The overall structure user workshop planned to be conducted on the pilots is described at Table 3 :

Table 3 - User Workshop for Co-Creation

#	Stage	Description
1	Introduction	This stage has the aim to describe the background to participants and clarify questions. A general objective is given to participants

2	Silent Ideation	In this stage participants brainstorm to produce ideas. They can take notes and be prepared to share the ideas with other people on the workshop.
3	Group discussion	In this this stage there is a group discussion of all the participants, presenting the ideas that they had during the silent ideation. It is allowed to participants give commentaries or insert inputs from other participants ideas presentations (discussion).

The three stages can be repeated as many times and sessions as needed. This way is possible to all individuals provide valuable inputs on the design and structure of the new public service. The user workshop can be used on all the four stage of Co-Creation framework.

The user workshops can produce, as example, the follow outcomes:

- List of issues with the new service;
- List of potential solutions;
- Basic thoughts on the usability and functionality of the service;
- User stories;
- List of user personas of individuals who could use the service, and
- Any other information which may come out of the workshop organically.

After participating on the user workshop, a survey can be conducted to identify the participants' feedback. This survey is described at Table 3 on the Section 5.

3.3.1.3 Continued participation

Sometimes workshops need to happen several times due some reasons (maturity of discussion, lack of resources, time, etc.). Continued participation is the method that monitors how many people participate in future workshops versus those who refused to participate (Joyce and Kraut 2006). This is related to the survey conducted to identify the participants' feedback, described at Table 3 on the Section 5.

3.3.1.4 Public Meetings

Public meetings are important tools for governance. Literature (Lowndes, Pratchett et al. 2001) defines public meetings as "were the most readily identified form of public participation". The data collected on the public meetings will be used as input to generate ideas and solutions for the problems and issues identified previously by government or other stakeholder.

3.3.1.5 Focus group

Literature (Edmunds 2000) defines focus groups as "a form of qualitative research that on a loosely structured way obtains opinions related to a specific topic". It can be on a single group of a collective of groups with homogeneous profiles of participants to no bias the procedure. A moderator participates on the dynamic, reducing the probability of distortions on the group due dominant profiles or loss of focus on the main objective of discussion. The interference of this moderator can be greater or lesser depending on the focus group objective (Wilkinson 1998).

The given example is a discussion about specific movie or book with predetermined questions to be answered. The answers are collected and analysed in accordance with the objective. An example of objective is the identification of theirs acceptance within a specific demographic group. Taking in consideration this features, OGI co-creation framework will use focus group as a tool to collect data to contribute on the design of public service delivery. (King, Feltey et al. 1998) described studies that focus groups were conducted to show how the input from people can be helpful in designing public policies.

Currently, focus group is a widespread and popular method on social science and there is a great number of structured dynamics (Wilkinson 1998). However, OGI consortium decided to use (Edmunds 2000) focus group principles. Edmunds divided his guideline in six dimensions: describing focus groups, the client's roles, the moderator's role, the vendor's role, special situations and focus group evaluation. (Edmunds 2000) suggested four common use for focus groups:

- Testing advertising copy or marketing promotions;
- Positioning products or services;
- Testing new concepts; and,
- Testing usability of a product.

On the other hand, focus groups are not recommended when quantitative results are expected, personal topics are discussed, when decisions or data cannot be validated to be incorporated in the decision-making or you need statistical validity of data collected.

The client role, or at OGI case citizen role, is to give the answer expected by the vendor, or at OGI case the public administration. If the questions are not clear or any bias influence on the answers, this should be solved to collect useful data. Predefining questions and screen all the possible answer avoid surprises during the focus group dynamic. The last guideline for clients (citizens), is to let them closely involved in designing of the discussion guide to ensure that the focus group provides needed data to the vendors (public administration) (Edmunds 2000).

The vendor role (public administration) is based on typical responsibilities, some of them already aforementioned (Edmunds, 2000, pg 3):

- Development of the screening questionnaire(s);
- Recommendation a sampling plan to have a potential list of people to recruit;
- Design the moderator's discussion guide and focus group dynamic;
- Arranging focus group facilities, like place, dynamic material (paper, presentations, TV, computers, etc) and audio recorder or camera recorder;
- Finding ways to give incentives to participants, such as co-op fees or other valuable item/service to participants (chocolate, discounts on products);
- Recruiting focus group participants (generally by telephone, e-mail, in person at street, etc.);
- Vendors can also moderate focus groups if are prepared;
- Debriefing sessions with the clients following each focus group or series of focus groups; and,
- Analysis and presentation of focus group results.

Edmunds (2000, pg 4) explains that sometimes exceptional situations can happen. For example, elderly, children, international groups with different cultures can be the participants. None of them are OGI case, but if yes, we considers the guidelines described by Edmunds (2000).

Finally, evaluation of focus groups. Edmunds (2000, pg 5) suggests that audio and video recorder should be transcripted or carefully listened/watched. During the dynamic, moderator can takes notes or writes responses on boards, aiming summarise the discussion and already identify consensus or dissensus, for example. Connecting this groups with questionnaire and surveys are good strategy to have a qualitative and quantitative data collected at same time.

3.3.1.6 User Experience (UX) and User Interface (UI) testing

Whie User eXperience (UX) is a term that have been used on practice and scientific literature, but hardly deep described or conceptualized (Law, Roto et al. 2009). It happens due some reasons pointed by (Law, Roto et al. 2009) after conducting 275 interviews on the UX area and deep literature review. First because broad range of fuzzy and dynamic concepts, including emotional, affective, experiential, hedonic, and aesthetic variables. Second, because flexibility on analysis since single point to a holistic process. Third due the fragmented and theoretical models involved on UX domain.

Literature conceptualizes UX as "a term associated with a wide variety of meanings ranging from traditional usability to beauty, hedonic, affective or experiential aspects of technology use" (Forlizzi and Battarbee 2004). (Garrett 2010) structures user experience as a project with five dimensions and two product layers (as functionality and as information), from the more abstract to the more concrete: strategy, scope, structure, skeleton and surface. This structured is presented at Figure 5.

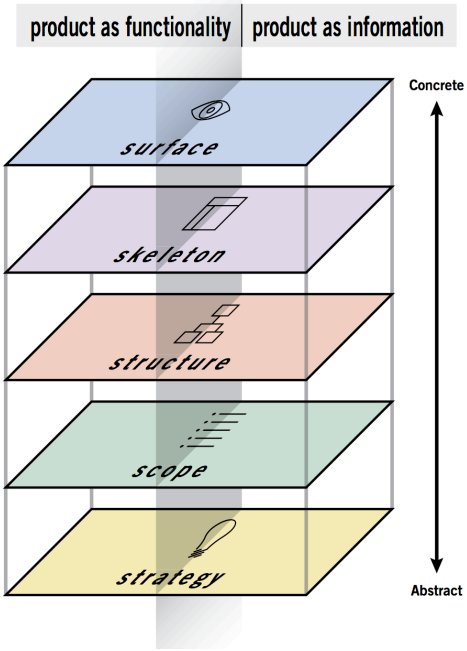


Figure 5 - UX Structure and layers of product and information

Source: (Garrett 2010)

To improve the usability of software and information systems, the paradigm of user-centered design, ISO 13407, Human-centred design processes for interactive systems, is a standard that provides guidance for user-centered design (Jokela, Iivari et al. 2003) .

The ISO 9241-210 substitue the ISO 13407, which aimed to provide guidance on achieving quality in use by incorporating user centred design activities throughout the life cycle of interactive computer-based systems. ISO 9241-210 standard describes 6 key principles that will ensure your design is user centred (Travis, 2011):

- The design is based upon an explicit understanding of users, tasks and environments.
- Users are involved throughout design and development.
- The design is driven and refined by user-centred evaluation.
- The process is iterative.
- The design addresses the whole user experience.
- The design team includes multidisciplinary skills and perspectives.

ISO 9241-210recommends the use of "ripple effect". It means to plan in advance all the possibilities of tools and scenarios of usage before implementing. After implementation, scenario, tools, activities, goals, etc., can change, and influencing on the result. If the plan is well conceptualised, the plan is likely to succeed. The Figure 6 describe an example path taken due changes of plans made during the implementation.

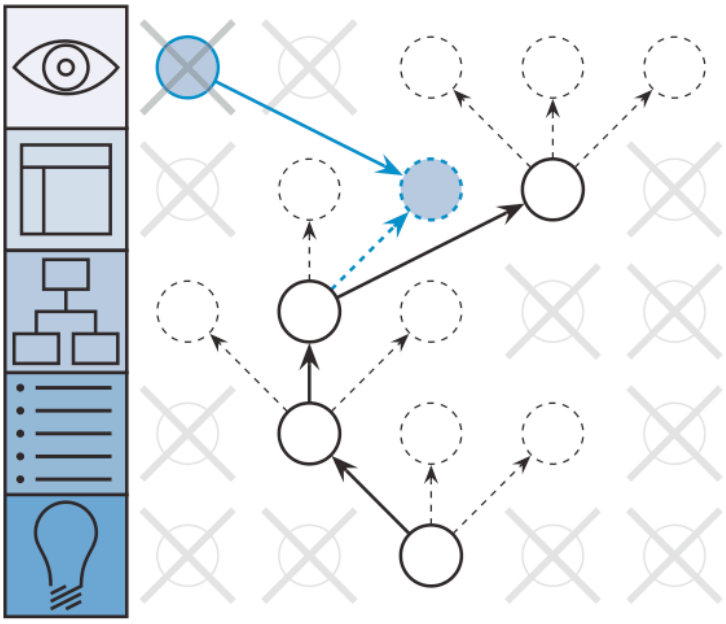


Figure 6 - The ripple effect

Source: (Garrett 2010)

Further the explanations given on ISO 9241-210 (ISO, 2011) and 13407 (ISO, 1999), on both standards, there is no clear guidelines of steps to implement UX. Checking this limitation, Jokela et al (1999) proposed a guideline to fill this blank comparing both standards. The guideline has a 6 steps:

1. Identify need for human-centred design;
2. Understand and specify the context of use;
3. Specify the user and organisational requirements;
4. Produce design solutions;
5. Evaluate design against requirements (loop to step 1 if not reach desired requirement); and,
6. System satisfies specified user and organisational requirements.

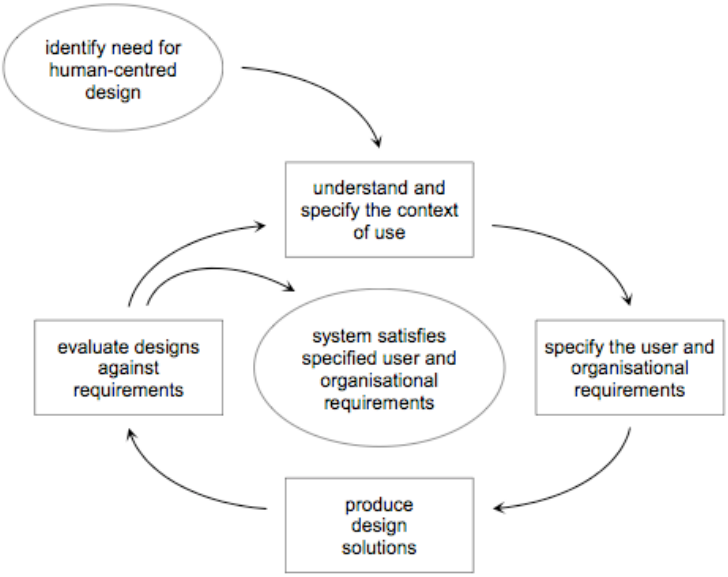


Figure 7 - UX implementation and evaluation steps

Source: (Jokela, Iivari et al. 2003)

Besides the steps to conduct implementation of UX, it was also identified by Jakola et al. (1999) that measures are not created to identify efficiency or any goal that should be reached. For this, we consider to use the ISO/IEC 25010:2011 (20510:2010 2010).

The ISO/IEC 25010:2011 has a parameter called "usability" where 6 measures define if there is or not usability on the system. If consortium identify the need to improve this evaluation, the (Albert and Tullis 2013) evaluation method can be used as auxiliary. We consider that User Interface (UI) is a complementary effect of UX and associated with look, feel and interactivity of system. It is already measured on the UX standards and ISO 25010:2011, in special on the evaluation quality of use.

3.3.1.7 Web and Phone Statistics

Web statistics are becoming more and more important due the massive presence of people and services on Internet. This use of ICT (web sites, Internet, etc.) is normally called as electronic government. Recently a rush to create e-gov solutions. Part of them reduced costs and improve efficiency of service delivery. Other part discovered that e-gov can be expensive, even efficient (Bertot, Jaeger et al. 2010). The web and phone statistics collection aims to evaluate the co-implementation (Data creation for a service) and co-evaluation (Reporting data on service operation) at OGI Co-Creation Framework.

Since 1995 governments have departments and agencies using web statistics collection as method for evaluation. Xue (2004) describes how libraries on the United States started on the begin of Internet to evaluate web site usage. The factors considered for web statistics analysis found at Xue (2004) are:

1. Top pages on the Web site visited and top pages exited (comparison of visitors paths);
2. Length of visits;
3. Visitors and demographics;
4. Date and time of requests;
5. File transfer success;
6. search terms which lead a visitor to the Web site;
7. Sites that refer visitors to the Web site (for example search engines Google, Yahoo, Bing);
8. Most downloaded files; and,
9. Search of phrases (opinion mining / sentiment analysis).

Xue (2004) found that successful web sites are based on detailed classification of subject and annotation for each link, make the best use of homepage and higher ranks pages, list the major subjects to help visitors and develop guides to visitors.

Jana and Chatterjee (2004) considered four dimensions and 19 factors to evaluate the "bibliometrics" and "cybermetrics" of a portal: hits, page views, visits and visitors. Collecting these type of data, it was possible to create to study the content of a specific Web site and quantify its degree of usability through user's' studies. This approach goes further the quantitative analysis of access, downloads, length of visits, etc., seen at Xue (2004). Both can be used for the OGI objective on this stage of Co-creation. The Table 4 reveals the dimensions and factors.

Table 4- Organisational gaps, description and dimensions of evaluation related

Source: (Jana and Chatterjee 2004)

Data Dimension	Data extracted
Hits	1. Entire site (successful) 2. Average per day

	3. Home page
Page views	4. Page views 5. Average per day 6. Average per unique visitor 7. Document views
Visits	8. Visits 9. Average per day 10. Average visit length 11. Median visit length 12. International visits 13. Visits of unknown origin 14. Visits from United States (own country) 15. Visits referred by search engines 16. Visits from spiders
Visitors	17. Unique visitors 18. Visitors who visited once 19. Visitors who visited more than once

3.3.1.8 Portal's Feedback channels

Participation is the fuel to create co-creation. However, without any feedback, the participation can be reduced due to a lack of trust in the process. This section aims to collect data from the feedback of citizens, enterprises, etc. about system and data quality or usefulness, as example. Bailey (2005) analysed how web portals deal with review and feedbacks from people. Currently, people have a *ad infinitum* access of data and it influences on the process of review and feedback. Ubiquitous Internet access also changed the game. Participants want answers with detailed descriptions and argumentations and fast. Opinion leadership by some well-articulated participants also influences on opinion of people. These phenomenons can introduce bias on the data and must be avoided.

Furthermore, the studies of Bailey (2005), Goh et al (2008) used three mechanisms, 13 dimensions and 6 sub-dimensions to create the Knowledge Access, Creation and Transfer (K-ACT) model to extend on existing work in this area by proposing three mechanisms for KM in web portals. The access means the mechanism through which users obtain access to the knowledge in the portal. The creation is understood as the process to acquire knowledge about the user and acquire knowledge from the user. The transfer means the support given user-to-user enabling flow the knowledge. The K-ACT dimensions and factors are summarised at Table 5.

Table 5 **- The K-ACT Model**

Mechanism	Dimension	Sub-Dimension
Access	1. Access to portal	-
	2. Search	Query Results Display
	3. Browse	-
	4. Personalisation	User-driven personalisation System-driven personalisation

	5. Accessibility	-
	6. Information presentation	-
Creation	7. User information acquisition	-
	8. Feedback	-
	9. Domain acquisition	-
Transfer	10. Online collaboration	Organisation to user collaboration User-to-user collaboration
	11. Information alerts	-
	12. User support	-
	13. Resource sharing	-

The scope of the K-ACT model is deliberately focused on features that promote KM practices in portals, it does not attempt to address the universe of KM or software engineering-related concerns or problems. However, design and usability issues are sufficiently addressed in the literature and developers. The recommendation is to use the K-ACT model in conjunction with established usability instruments and guidelines during portal implementation. OGI is combining different types of evaluation from K-CAT, UX, UI and system design to reach the best results and collect the maximum of data from users as possible.

3.3.1.9 Survey Research

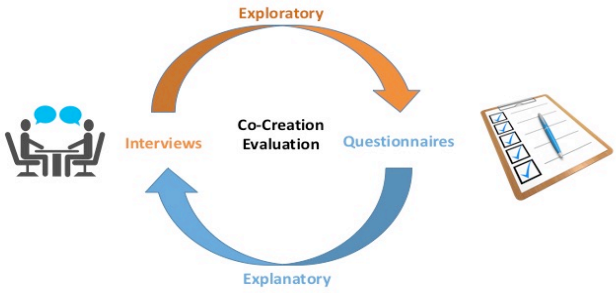


Figure 8 - Exploratory and Explanatory approaches at Co-Creation Evaluation Surveys

A survey is a systematic poll of questions made to some group, or individually, in order to collect answers about some problem, observation, etc. Glasow (2005); it consists of two types of data collection methods: written (questionnaire) and verbal (interviews). Both types will be conducted with different objectives and different periods of co-creation evaluation.

Based on co-creation evaluation, survey research will be used in all of the co-creation types. Interviews will be used to examine the co-initiation and co-evaluation, while questionnaire will be used on the co-design and co-implementation.

Interviews using open-ended questions to seek understanding and interpretation in different situation. In the co-initiation stage, interviews are aimed at identifying problems and to generate ideas for problem solving. In the co-evaluation stage, interviews are aimed at understanding the questionnaire results as well as to seek in-depth information of the several issues found in the questionnaire. Normally, only specific group of stakeholders are called to participate, taking in consideration there is a low degree of statistical validity due its low number and less broader profile of participants. Also there is a higher chance of bias on the answers in comparison of questionnaires. Confidential information can be collected, need of resource, time, etc. are spent and less errors happens on this type of survey.

Questionnaires are using closed-ended questions to gather highly standardised data. It will be conducted so the target respondents can give more generic inputs of design and implementation on the co-creation of public policies processes. Normally questionnaires are given to several people to reach substantial statistical validity of hypothesis, for example already observed on the qualitative approach of survey (interview).

Before conducting the survey (questionnaire or interview), Glasow (2005) suggests to create a model that identifies the expected relationships among the variables (independent and dependent). Variables are used to define the scope of study, however, cannot be explicitly controlled by the researcher. Then is possible to test the model against observations of the phenomena analysing the data collected on interview or questionnaire.

3.3.1.9.1 The survey design

In designing the survey research, Levy and Ellis (2006) suggests two steps that are, sampling strategy and the procedure to obtain the representativeness of the population, including ensure reliability and validity. The nature of this evaluation process is in between exploratory and explanatory; and for this purpose, the mixed method, qualitative and quantitative will be used during whole processes. The sampling strategy should follows these methods. Population for this survey research will be all stakeholders in each pilot, or in general, units of observation will be the Public Administration's employees, citizens and companies' employees which use the OGI innovation ecosystem. Participants of this co-creation survey should represents these units of observation.

The sample techniques will be different for each co-creation type. The co-initiation and co-design will use the non-probability sampling, and the co-implementation and co-evaluation will use the probability sampling. The non-probability sampling is used because in the two first types of co-creation, the respondents will be selected by the ones that actually use the OGI tools and framework to identify the problems and propose the improvement of the public services based on the LOSD from PAs, citizens and companies.

For co-implementation and co-evaluation, survey participants will be selected randomly, in order to reach stronger analysis to justify the use of OGI innovation ecosystem. The challenges of this technique will be to minimise sampling bias and achieve a good representativeness. To deal with these issues, each pilot partner need to really carefully acknowledge the stakeholders of the system, for example number of employee, the demography of users (citizens and businesses), structure of the companies, etc. The list of questions aims to help partners addressing this issue. The summarise co-creation types, sampling techniques and survey techniques are at Table 6.

Table 6 - summarise co-creation types, sampling techniques and survey techniques

Co-Creation Type	Sampling technique	Survey technique

Co-Initiation	Non-Probability	Interviews
Co-Design	Non-Probability	Questionnaire
Co-Implementation	Probability	Questionnaire
Co-Evaluation	Probability	Interviews

3.3.2 Evaluation Methods and tools for OGI Co-Creation Framework

The sections below explain the evaluation methods and tools that will be used on the evaluation of OGI Co-creation Framework.

3.3.2.1 R Statistic Analysis, TwitteR, Weka and other social media analytics

One of the types of analysis is the opinion mining, or popularly described currently as sentiment analysis. Opinion mining grew using data available at opinion-rich resources such as online review sites, personal blogs, microblogs (Twitter) and social network (Facebook, Linkedin, etc.) . Taking in consideration this opportunity, OGI consortium aims to use this type of social data to evaluate the co-initiation, co-implementation and co-evaluation processes on each pilot.

Apparently, the first appearance of "opinion mining" term happened in 2003. Dave et al (2003) described opinion mining as "process a set of search results for a given item, generating a list of product attributes (quality, features, etc.) and aggregating opinions about each of them (poor, mixed, good)". Pang and Lee (2008, pg 1) describes opinion mining as "use information technologies to seek out and understand the opinions of others, identifying opinion, sentiment and subjectivity in texts".

Examples of use in Twitter alerts that data must have follow any lexical organisation, exactly what is being developed with pilot's data sets when linking them in RDF format. Koulompis (2011) believes that part-of-speech features may not be useful for sentiment analysis in the microblogging domain. To overcome this issue, the authors used hashtags (as example, #test), proven more useful as just text mining from social media due the lexical issues aforementioned. This recommendation can influence on the design of research on public administration. Es example, O'Connor et al. (2010) used tweets, from Twitter, to public polls from government (US president Obama approval rating), linking text sentiment to public opinion time series. Close research was made by Pak and Paroubek (2010), describing how useful can be people participation to co-creation of public policies in government.

To conduct the social media analysis of data collected some software were selected. This list is summarised below.

Table 7 - Social Media Libraries and software for data analysis

Tool Name	Description	URL
R Statistics	R is a free software environment for statistical computing and graphics.	https://www.r-project.org/

Rdataviz	Github material repository for data visualisation with R Statistics.	https://github.com/pablobarbera/Rdataviz
Rfacebook – CRAN	Package that provides a series of functions that allow R users to access Facebook's API to get information about users and posts, etc.	https://cran.r-project.org/web/packages/Rfacebook/index.html
TwitteR – CRAN	Package that provides R users to access Twitter API to get information from users, tweets, etc.	https://cran.r-project.org/web/packages/twitteR/index.html
Weka	Weka is a collection of machine learning algorithms for data mining tasks.	http://www.cs.waikato.ac.nz/ml/weka/

To use the software, tutorials were identified. Liu (2011) has a tutorial for opinion mining and sentiment analysis. But further tutorials identified, part of the technical OGI consortium already have knowledge or are students, researchers and give classes on the area, including R analysis, TwitteR CRAN package and Weka, as example.

3.3.2.2 Web Analytics

Web analytics defined as "the measurement, collection, analysis, and reporting of Internet data for the purposes of understanding and optimizing Web usage" (Janssen B, 2009. p.16). According to Janssen, B (2009), there are four stages in the web analytics: 1) Collect the data, then 2) Report and analyse data, using 3) Proven methodologies, metrics or KPIs, and 4) Follow up the results, e.g publications, improvement strategy etc.

Two most popular technical approaches for collecting data of web analytics are logfile analysis and page tagging.

Logfile offer several advantages such as it does not require any changes to the Website or additional software, it provides a freedom to change the Web analytics tools because it creates automatically in the own servers, it does not require any extra bandwidth when loading a page, and it is possible to record both page request successes and failures. However, logfile also has several disadvantages such as the recorded data is limited to only transactions with the Web server, it is only available to those who own their Web servers, it requires additional efforts to record cookies and it cannot record independent data e.g physical location of the visitor (Janssen B, 2009).

The advantages of using page tagging are it provides quick reports, it provides flexibility of recording data without involving requests to web servers, and it is available for any organizations who do not own web servers. The disadvantages of page tagging are it requires extra coding in the website which effect on the additional bandwidth, it has difficulties to modify the analytics tools and it only records page request (Janssen B, 2009).

3.4 Evaluation of OGI ICT toolkits

Evaluation of OGI ICT toolkits is divided in two categories. The first of building blocks and the second for evaluation of cubes design. The summary of data collection and methodology of evaluation is presented at Table 8.

Table 8 - Cube Design and Building blocks data collection and methodology methods of Evaluation

Category	Target groups	Data Collection Approach	Methodology of Evaluation
Product Quality	ICT Partners and IT Department of PAs	Questionnaire and Structured observation of application/website	ISO/IEC 25010
Quality in Use			
System's Data Quality			ISO/IEC 25012

Since the beginning, criteria for evaluation the OGI toolkit needs to be defined. Scientific literature review couldn't provide us an extensive list of standards and requirements organised and structured. ON the other hands, ISO/IEC 25010:2011, the standard for Systems and Software Quality Requirements and Evaluation (20510:2010 2010), presents a structured list of requirements for building blocks and systems, which we considered for cubes design.

ISO 25010 is adopted as the evaluation method for OGI ICT toolkit. ISO 25010 is organised in 8 parameters which are divided into 30 measurement variables presented at Table 9.

Table 9 **- OGI Toolkit Requirements for Evaluation**

No	Parameter	Description	Measured by	Description
1	Functionality	the degree to which the OGI solution platform provides functions that meet stated and implied needs when used under specified conditions	Functional completeness	the set of functions covers all the specified tasks and user objectives
			Functional correctness	the correct results with the needed degree of precision
			Functional appropriateness	the accomplishment of specified tasks and objectives
2	Performance	the degree to which the OGI solution platform performs relative to the amount of resources used under stated conditions	Time behaviour	the response and processing times and throughput rates of a product or system, when performing its functions, meet requirements.
			Resource Utilization	the amounts and types of resources used by a product or system, when performing its functions, meet requirements.
			Capacity	the maximum limits of a product or system parameter meet requirements.
3	Compatibility	the degree to which the OGI solution platform can exchange information with other products, systems or components, and/or perform its required functions, while sharing the same hardware or software environment.	Coexistence	perform its required functions efficiently while sharing a common environment and resources with other products, without detrimental impact on any other product.
			Interoperability	exchange information and use the information that has been exchanged.
4	Usability	the degree to which the OGI solution platform can be used by specified users to achieve	Appropriateness recognizability	users can recognize whether a product or system is appropriate for their needs.

		specified goals with effectiveness, efficiency and satisfaction in a specified context of use	Learnability	can be used by specified users to achieve specified goals of learning to use the product or system with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use.
			Operability	has attributes that make it easy to operate and control.
			User error protection	protects users against making errors.
			User interface Aesthetics	user interface enables pleasing and satisfying interaction for the user.
			Accessability	can be used by people with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use.
5	Reliability	The degree to which the OGI solution platform performs specified functions under specified conditions for a specified period of time.	Maturity	meets needs for reliability under normal operation.
			Availability	operational and accessible when required for use.
			Fault tolerance	operates as intended despite the presence of hardware or software faults.
			Recoverability	recover the data directly affected and re-establish the desired state of the system.
6	Security	the degree to which the OGI solution platform protects information and data so that persons or other products or systems have the degree of data access appropriate to their types and levels of authorization	Confidentiality	ensures that data are accessible only to those authorized to have access
			Integrity	prevents unauthorized access to, or modification of, computer programs or data
			Non-repudiation	proven to have taken place, so that the events or actions cannot be repudiated later
			Accountability	actions of an entity can be traced uniquely to the entity
			Authenticity	identity of a subject or resource can be proved to be the one claimed
7	Maintainability	the degree to which the OGI solution platform can be modified to improve it, correct it or adapt it to changes in environment, and in requirements	Modularity	composed of discrete components such that a change to one component has minimal impact on other components
			Reusability	an asset can be used in more than one system, or in building other assets
			Analysability	possible to assess the impact on a product or system of an intended change to one or more of its parts,

				or to diagnose a product for deficiencies or causes of failures, or to identify parts to be modified
			Modifiability	effectively and efficiently modified without introducing defects or degrading existing product quality
8	Portability	the degree to which the OGI solution platform can be transferred from one hardware, software or other operational or usage environment to another	Adaptability	can effectively and efficiently be adapted for different or evolving hardware, software or other operational or usage environments
			Installability	can be successfully installed and/or uninstalled in a specified environment
			Replaceability	can replace another specified software product for the same purpose in the same environment

The quality in use relates to the impact or outcome of the product when used in particular context and consists of 5 parameters which are divided into 11 measurement variables as shown in Table 10.

Table 10 **- Criteria for Evaluation of Quality in Use** (ISO/IEC 25010, 2011)

No	Parameter	Description	Measured by	Description
1	Effectiveness	accuracy and completeness with which users achieve specified goals	-	-
2	Efficiency	resources expended in relation to the accuracy and completeness with which users achieve goals	-	-
3	Satisfaction	the degree to which the user needs are satisfied when using the OGI solution platform in a specific context of use	Usefulness	degree to which a user is satisfied with their perceived achievement of pragmatic goals, including the results of use and the consequences of use
			Trust	degree to which a user or other stakeholder has confidence that a product or system will behave as intended
			Pleasure	degree to which a user obtains pleasure from fulfilling their personal needs
			Comfort	degree to which the user is satisfied with physical comfort
4	Freedom from Risk	the degree to which the OGI solution platform mitigates the potential risk of the usage	Economic Risk Mitigation	the potential risk to financial status, efficient operation, commercial property, reputation or other resources in the intended contexts of use
			Health and Safety Risk	the potential risk to people in the intended contexts of use

			Mitigation	
			Environmental Risk Mitigation	the potential risk to property or the environment in the intended contexts of use
5	Context coverage	the degree to which the OGI solution platform can be used with effectiveness, efficiency, freedom from risk and satisfaction in both specified contexts of use and in contexts beyond those initially explicitly identified	Context Completeness	can be used with effectiveness, efficiency, freedom from risk and satisfaction in all the specified contexts of use
			Flexibility	can be used with effectiveness, efficiency, freedom from risk and satisfaction in contexts beyond those initially specified in the requirements

During the evaluation, each measurement variable will be assessed from the user perspective, such as public administration offices, citizens and businesses. Their input then will be used to improve the OGI solution platform by the consortium and the revision will be evaluated again during the next stage of pilot.

3.5 Acceptance Evaluation of OGI ICT toolkit

The acceptance evaluation is aimed at evaluating the gap between perceived delivered services and expected services. This evaluation aims to identified level of user satisfaction and the intention of use from the users' perspective. Target groups in this particular evaluation are PAs, citizens and businesses.

To derive an evaluation plan, theories and concepts of IT adoption from existing literature that are relevant in the context of the OGI Project were reviewed. In addition, related works on evaluation criteria, as well as methodical concepts for performing project evaluations were examined. These theories were later adapted in accordance with the objectives of the OGI project. From these theories, we collected the factors influencing the intention to use the OGI solution platform including the user satisfaction. The models also provide the mechanism or relation between each factor, the positive or negative impact or the direction of the relation.

3.5.1 IT Adoption Models from Literature

From several IT adoption models available from literature, the focus of this evaluation plan is on models that fit for individual use and in the variables should be in accordance with Delivery 1.1 - Needs and Challenges for Data Infrastructures.

3.5.1.1 Technology Acceptance Model (TAM), TAM2 and TAM3

TAM was developed by {Davis, 1989 #448} to explain two important factors influencing user decision in accepting technology, i.e., *perceived usefulness* and *perceived ease of use*. Partala & Saar (2015) explain that the original version of TAM, which is developed based on the theory of reasoned action by Ajzen & Fishbein (1975), emphasizes how the degree of personal impressions affect the adoption of a particular technology. One of the limitations of original version of TAM is the exclusion of *subjective norm* as the direct determinant in influencing individual behavior whereas the perceived norm might affect the degree of compliance in a particular system (Bagozzi, Davis, & Warshaw, 1989). Moreover, this model pays more focus on initial adoption instead of continuous usage of a technology (Bhattacherjee & Premkumar, 2008). In addition to that, TAM is mostly dealt with the voluntary adoption (Hossain & Quaddus, 2011) and does not take into account the qualitative, emotional, and cultural components as the influence factors of actual behavior (Ward, 2013).

The original version of TAM was expanded by Davis & Venkatesh (2000) by investigating *the external factors* in explaining the technology adoption decision. The new model (TAM 2) explains that the social influence processes and the cognitive instrumental processes produce significant impacts in technology adoption decision (Davis & Venkatesh, 2000). Furthermore, TAM 2 was enhanced by Bala & Venkatesh (2008) in order to provide more comprehensive factors in explaining individual acceptance of technology. They explain *the importance of the intervention*, i.e., pre-implementation and post-implementation intervention, in IT adoption process in the company. This new model (TAM3) has the main focus on how the intervention by the organization can help employees to make a better decision on technology adoption (Bala & Venkatesh, 2008). The proper application of TAM3 is believed to be able to reduce the risk of implementation failure in a company (Bala & Venkatesh, 2008).

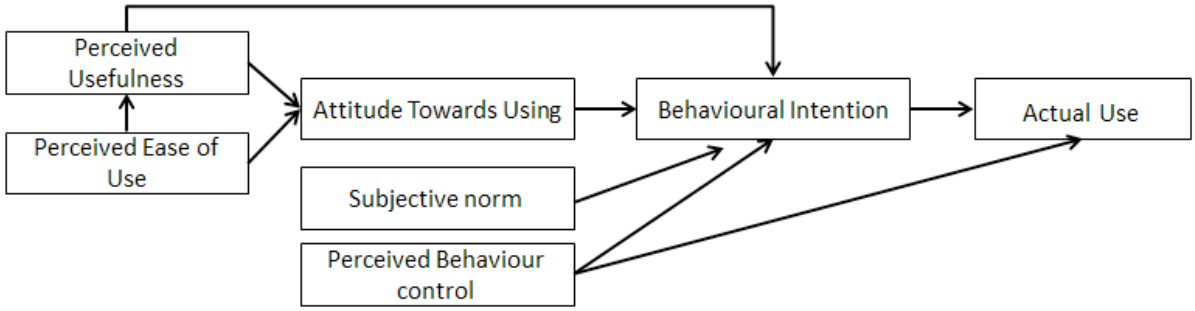


Figure 9 **The Framework of original TAM** (Davis, 1989)

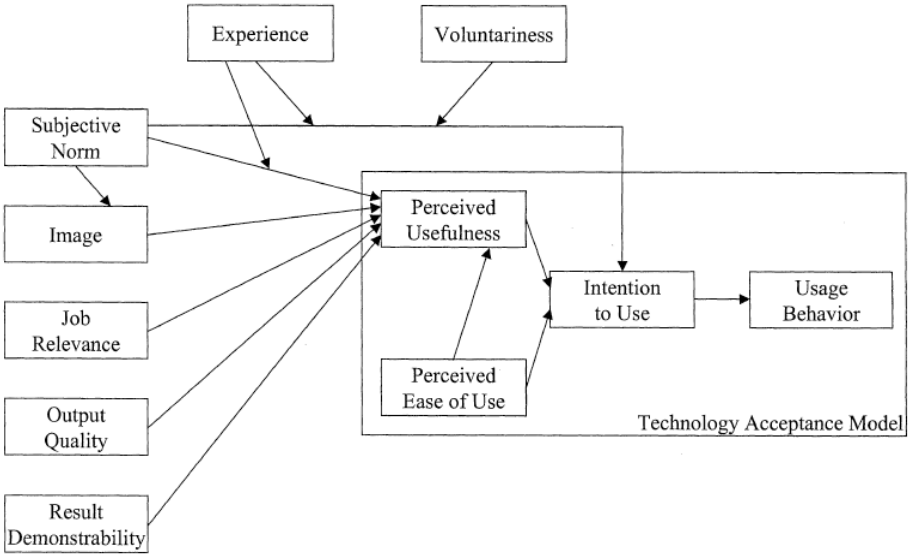


Figure 10 **The Framework of TAM2** (Davis & Venkatesh, 2000)

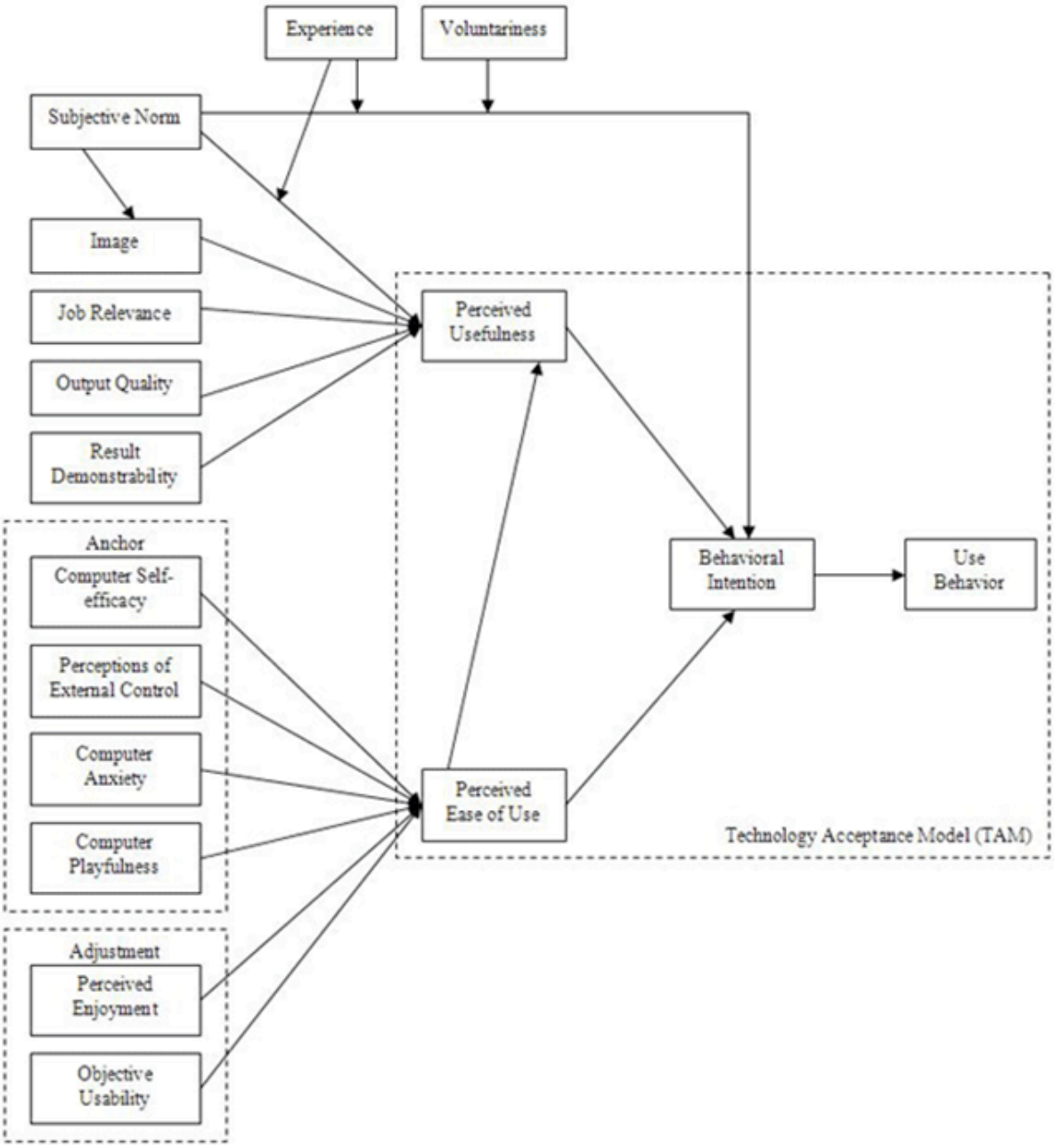


Figure 11 **The Framework of** TAM3 (Bala and Venkatesh, 2008)

3.5.1.2 Unified Theory of Acceptance and Use of Technology (UTAUT)

Venkatesh et al. (2003) developed a unified model, called the unified Theory of Acceptance and Use of Technology (UTAUT). UTAUT has four core determinants (i.e., performance expectancy, effort expectancy, social influence, and facilitating conditions) of intention and usage and up to four moderators (i.e., age, gender, experience, and voluntariness of use) of key relationships. The theory was developed through the review and integration of eight dominant theories and models (Venkatesh et al., 2003) presented at below.

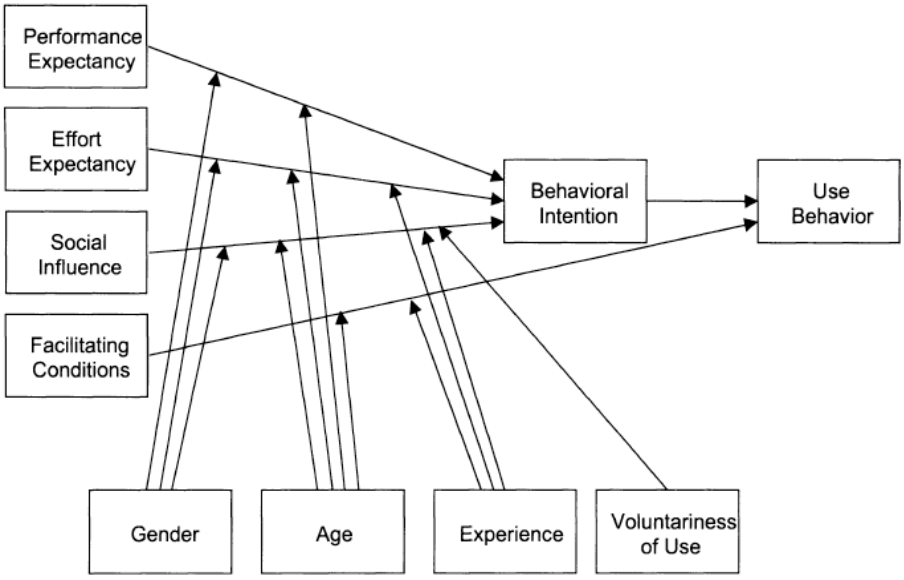


Figure 12**The UTAUT** Framework (Venkatesh et al., 2003)

3.5.1.3 DeLone and Mclean IS Success Model

The DeLone and McLean IS success theoretical model firstly introduced in 1992 to provide a general and comprehensive evaluation of IS success from different perspectives. This model proposes seven IS success measurements, and structured in three layers: 'information quality', 'system quality' and 'service quality' (at the first layer), which affect 'user satisfaction' and also the 'actual use' of the IS (at the second level). Then 'user satisfaction' and 'actual use' influence the 'individual impact' and the 'organizational impact' of the IS.

The 2003 model proposed a new specification, 'intention of use', at the second layer and combined 'individual and organizational impacts' into 'net benefit'

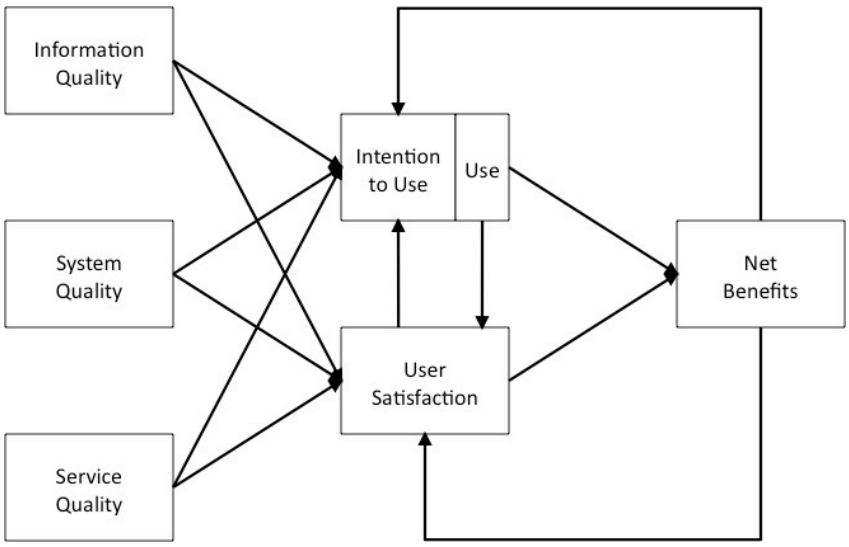


Figure 13 **The IS Success** Framework (DeLone and McLean, 2003)

3.5.2 Acceptance Evaluation Framework for OGI

A combination of aforementioned theories above will be employed to create an evaluation of user acceptance and intention of use for OGI. Table X below presents variables and (general) measured items for the pilots evaluation. However, as each pilot has their own characteristics, e.g. objectives, target audiences, etc. the questionnaire created for the evaluation may be different to each pilot.

Table 11 - User Acceptance Evaluation for OGI

Variable	*Measured Items*	*Source*
Job Relevance (JR)	OGI toolkit makes mine and my colleagues job tasks easier to be accomplished. In my job, usage of the system is important. In my job, usage of the system is relevant	(Davis & Venkatesh, 2000)
Output Quality (OQ)	The quality of the output I get from the OGI toolkit is higher compare to previous system. I have no problem with the quality of the OGI toolkit's output.	(Davis & Venkatesh, 2000)
Result Demonstrability (RD)	I have no difficulty telling others about the results of using the OGI toolkit. I believe I could communicate to others the consequences of using the OGI toolkit. The results of using the OGI toolkit are apparent to me. I would have difficulty explaining why using the OGI toolkit may or may not be beneficial.	(Davis & Venkatesh, 2000)
Perceived Ease of Use (PEU)	My interaction with OGI toolkit is clear and understandable; OGI toolkit usage does not require a lot of skills; I find it easy to get the OGI toolkit to do what I want it to do. I find the OGI toolkit to be easy to use.	(Davis, 1989)
Perceived Usefulness (PU)	Using OGI toolkit improves my performance in my job tasks; Using OGI toolkit enhances my effectiveness in my job tasks; Using OGI toolkit in my job increases my productivity. I find the OGI toolkit to be useful in my job.	(Davis, 1989)
Intention to Use (IU)	If I have access, I would use OGI toolkit.	(Davis, 1989)

3.6 Outcomes Evaluation

This section describes the methods selected to evaluate the long term outcomes of OGI. The use of the apps by user should result in the outcomes engagement, participation, transparency, accountability, empowerment and administrative burden.

3.6.1 Transparency

Transparency has been used as a magic concept by government and public managers {Ward, 2014 #658}. Your usage include as synonymous with accountability {Bovens, 2007 #445}, openness {Coglianese, 2009 #23}, open government data {Frank, 2015 #801} as example. Due no clear definition and largely used by academics, this project take in consideration transparency as a concept of an unilateral process of disclosure of data, information, actions that an organisation has been conducting {Peixoto, 2013 #378}.

Transparency is a phenomenon that can lead to accountability, but does not guarantee any concrete result of justice or mobilisation, just public exposure to scrutiny {Fox, 2007 #71} . In addition to the discussion of what is and what is not transparency, there are only a few models try to explain and evaluate transparency. {Matheus, 2013 #213@@author-year} proposed an evaluation model for

transparency initiatives considering transparency as a multidimensional object based on many factors influencing two main dimensions: interpretation and accessibility. Facilitating conditions were added considering background and profile of users influencing transparency.

The OGI project will test if factors and facilitating conditions influence positively or negatively transparency dimensions. These factors designed as propositions with signs toward the dimensions shows that those factors are assumed, but not yet know.

3.6.1.1 Dimensions of Interpretation

Literature points issues for data Interpretation due natural problems of human cognition (Evans, 1972, Venkatesh et al., 2003, Jamenson, 2009). Interpretation requires information about how data was collected and what might be concluded from it (data context). As such on formal research methods (Silverman, 2011), regular people have same actions that scientists perform doing research. It means it is a natural process of human curiosity to discover and combine data and information on patterns. From this point of view, it was identified several proposition that can influence positively and/or negatively on interpretation of data. To this case, we consider data to perform the public service delivery using OGI innovation ecosystem. This will depends on the pilot public policy service delivery and users (inside public sector, or citizens, businesses, etc.).

- ***Proposition 1 (P1): Easier interpretation of data results in higher transparency.***

Without easier interpretation or even an information or data, how citizens are used to consume, such as mass media for example, can result, if not distorted, in higher transparency (Balkin, 1999, Mahlke, 2002).

- ***Proposition 2 (P2): The presence of examples on the website has significant positive influence on interpretation.***

Probably at the first moment websites can be confusing and lower the attention of citizens, however, if examples can be easily demonstrated by videos, images or tutorials, it could has a positive influence on transparency for citizens because they become more familiar with data and how to use the transparency tool (Ciborra, 1999).

- ***Proposition 3 (P3): Simple language has significant positive influence on interpretation.***

If the idea is to produce transparency for everyone, data and information must be on language accessible to majority of people, facing problems as lack of time, access to education and advanced technological equipment, and other typical problems of developing countries (Mendonça et al., 2007).

- ***Proposition 4 (P4): Higher information quality has a significant influence on interpretation.***

No matter for what or which, literature have been pointing out that data quality is an important subject for several managerial aspects, for example for disasters response (Bharosa et al., 2009), orchestrating information (Bharosa et al., 2008) or for transparency of budget, public services, etc. (Peixoto, 2013, Zuiderwijk, 2012, Matheus et al., 2012). On the other hand, ISO/IEC 25012 treats about data quality from a technical perspective (ISO/IEC 25012, 2008). The next three propositions (a, b and c) are related to information quality influencing transparency.

- ***Proposition 4a: updatedness of information has a significant influence on data quality.***

Updating data is an important aspect for transparency. Latency of update can influence positively or negatively the usage of data. The more updated is the information, likely to be more useful it is for any stakeholder on any role that they are performing (ISO/IEC 25012, 2008, Bharosa et al., 2008). If possible, data sets should be disclosed on different format of periods and aggregation. As example, regular data is monthly aggregated but can be disclosed daily disaggregated, because is collected every day. The same for time, aggregated in day or disaggregated in hours.

- ***Proposition 4b: higher data completeness has a significant influence on data quality.***

Completeness can vary from stakeholders, role performed and objectives (Matheus and Janssen, 2015). On this way, Linked Data solutions combined with Big and Open Linked Data can solve issues related to completeness due its flexibility on visualising and accessing data sets (Peixoto, 2013, Zuiderwijk, 2012). If "a lot of data" (data overload - proposition 5b) is disclosed to stakeholders, can influence transparency because can lead to confusion and misunderstanding.

- ***Proposition 4c: higher data accuracy has a significant influence on data quality.***

A basic principle of data is accuracy. Doesn't make any sense to have a database with wrong data sets. Spreadsheet errors due to misinterpretation when being compiled or misunderstanding while usage can compromise quality of transparency and the results of usage for public policies formulation, implementation and evaluation (Bharosa et al., 2008, Zuiderwijk, 2012, Matheus et al., 2012).

3.6.1.2 Dimension of Accessibility

Accessibility was identified as a dimension that can influence positively and negatively on interpretation of data and websites (Jamenson, 2009, Venkatesh et al., 2003).

- ***Proposition 5: higher accessibility has a significant positive influence on transparency.***

There is no relationship between accessible the website and higher investments (Lazar, 2003). From this perspective, is possible to suppose that the accessibility has a positive influence on transparency for citizens as websites' users (Perdue, 2001). The next four propositions (a, b, c and d) are related to accessibility influencing transparency.

- ***Proposition 5a: Simple language has significant positive influence on accessibility.***

Citizens, businesses and civil servants are at same time similar and differents, depending on which perspective we classify them. To create transparency to everyone of these stakeholders, data and information must be on a language accessible to majority of people. Simple and direct language can contribute positively on transparency (Mendonça et al., 2007).

- ***Proposition 5b: data overload has a significant negative influence on accessibility.***

Sometimes data can be distributed on an overloaded format. More data than the necessary to be used or in any kind of format can obligate users to (advanced) search or do new actions far from user normality. On the case of advanced search and new actions require specific knowledge to perform simple objectives. Data overload can discourage people to continue on the website or using information wrongly (Mahlke, 2002, Loiacono et al., 2002).

- ***Proposition 5c: Adhesion to standards has a significant positive influence on accessibility.***

Not only a big range of stakeholders and objectives. New devices have been developed (tablets, smartphones, smart watches, etc.) and standards are necessary to be followed. Linked Data and Open Government Data are approaches to reduce lack of standards on data, as example (Zuiderwijk, 2012). Audience is influenced on how much websites are accessible and minimum technology requirement to use. Further that, there is international recognized patterns and guidelines on the area for websites, including people with disabilities, elderly, etc. (Kuzma, 2010).

- ***Proposition 5d: Unified use of technology has positive influence on accessibility.***

While majority of users are migrant to determined web browser or technology, developers can still coding for not update or popular software. This can influence on audience usage and accessibility (Petre et al., 2006). Unified use of technologies can lead to higher number of people using instead of not mature (state-of-art) technologies (Helbig et al., 2009).

3.6.1.3 Facilitating conditions

In the UTAUT model age, experience and voluntariness of use (Venkatesh et al., 2003). For transparency, literature indicates that experience might be an important variable. Education level and income were included as conditions that influence positively or negatively on user experience.

1. **Experience**

Interpretation is likely be dependent on the past experience of the persons with these type of data. An experienced users might need less time to understand what can be done with the data (Venkatesh, 2003; Davis, 2000, Mahlke, 2002).

- ***Proposition 6a: the influence of interpretation on transparency will be moderated by experience.***
- ***Proposition 6b: the influence of accessibility on transparency will be moderated by experience.***

2. **Age**

Literature (Livingstone, 2007, Holt et al., 2013) have been pointing out that age is an important condition, being on whether in childhood, adolescence, adulthood and elderly. Depending on which age you are working, you have to construct websites focusing that group and perceiving what are the group peculiarities.

- ***Proposition 7a: the influence of interpretation on transparency will be moderated by age.***

3. **Level of education**

According to literature (Benest, 2011), the competencies required by 21st century workers at all levels within the global workforce include being digitally literate, possessing hard skills and soft skills, and having accessibility. It is known that level of education is highly related to level of education. Eurostat household statistics suggests that percentage of Internet access and experience (time of usage) of Internet and computers on high income households is higher than low income (Vicente and Lópes, 2011). Considering this, level of education influences positively or negatively transparency on both interpretation and accessibility dimensions.

- ***Proposition 8a: the influence of interpretation on transparency will be moderated by the level of education.***
- ***Proposition 8b: the influence of accessibility on transparency will be moderated by the level of education.***

Table 12 - Adapted Transparency Evaluation Method

Source Matheus and Janssen (2013)

Dimension	*Factor*	*P. #*	*Proposition*
Interpretation	*Ibid*	P1	Easier interpretation of data results in higher transparency
	Examples of usage	P2	presence of examples of the website product, the higher has a positive influence on interpretation.
	Simple Language used	P3	Simple language has significant positive influence on transparency
	Data Quality	P4	higher information quality has a significant influence on interpretation
	Updatedness of Information	P4a	higher updated information has a significant influence on data quality.
	Completeness	P4b	higher data completeness has a significant influence on data quality
	Accuracy	P4c	higher data accuracy has a significant influence on data quality
Accessibility	*ibid*	P5	higher accessibility has a significant positive influence on

			transparency
	Simple Language	P5a	Simple language has significant positive influence on transparency
	Data Overload	P5b	data overload has a significant negative influence on accessibility
	Adhesion to Standards	P5c	Adhesion to standards has a significant positive influence on accessibility
	Unified Technology	P5d	Unified use of technology has positive influence on accessibility
Facilitating Conditions	Experience	6a	the influence of interpretation on transparency will be moderated by experience
		6b	*the influence of accessibility on transparency will be moderated by experience*
	Age	7a	the influence of interpretation on transparency will be moderated by age
	Level of Education	8a	the influence of interpretation on transparency will be moderated by the level of education
		8b	the influence of accessibility on transparency will be moderated by the level of education

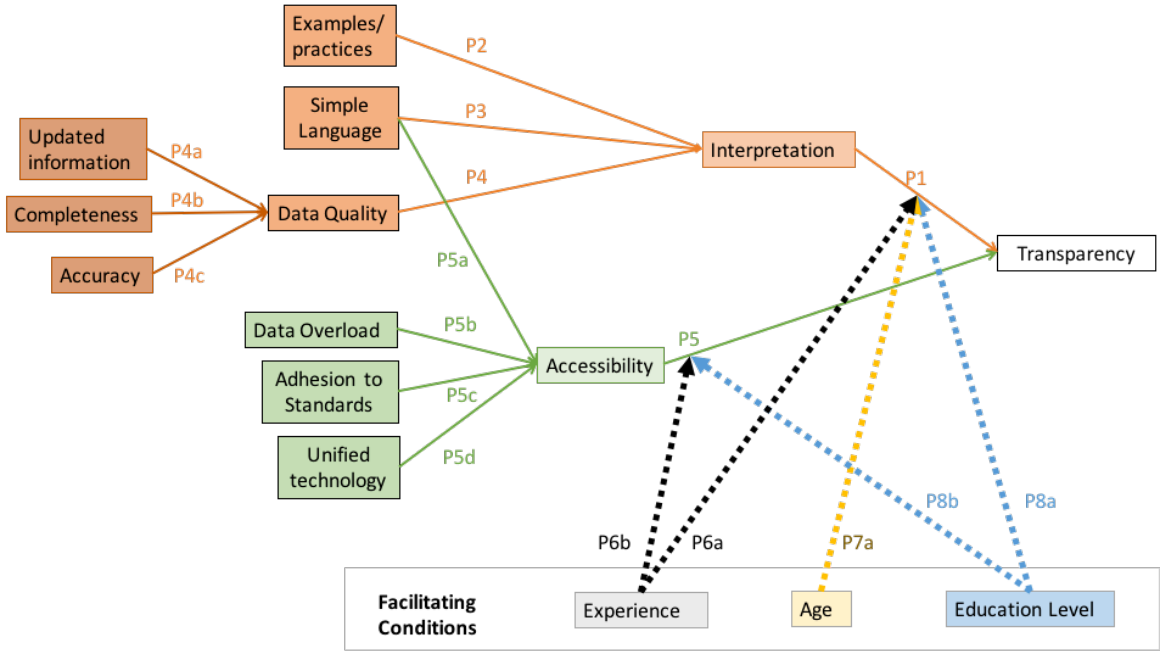


Figure 14 - Adapted Transparency Evaluation Method

Source Matheus and Janssen (2013)

3.6.2 Administrative Burden

Governments are facing issues to delivery more public services with less financial resources, time and people. Due these reasons, OGI will evaluate how OGI innovation ecosystem influences on reducing administrative burden. The evaluation methods are based on the Cost Benefit Assessment (CBA) approach, following the Study on eGovernment and the Reduction of Administrative Burden - SMART 2012/0061 {Gallo, 2014 #732}, a taxonomy of costs and benefits has been adapted.

The dimension considered for both Public Sector and Users was Benefits, divided in two categories: direct and indirect benefits. The reason to focus only on Benefits is because OGI consortium is interested on the benefits that OGI innovation ecosystem can provides. It means that this section is focusing on the outcomes. Indeed the description of the pilots already describe a situation of losses and increasing cost without a conformable increase of efficiency on public service delivery. It means that any evolution, re-engineering of public service delivery will improve the current situation. If the OGI innovation ecosystem is not working properly, this will be evaluated on the OGI ICT toolkit, OGI co-creation framework and mainly at acceptance evaluation.

The figure below summarises the focal point between public sector and users outcomes.

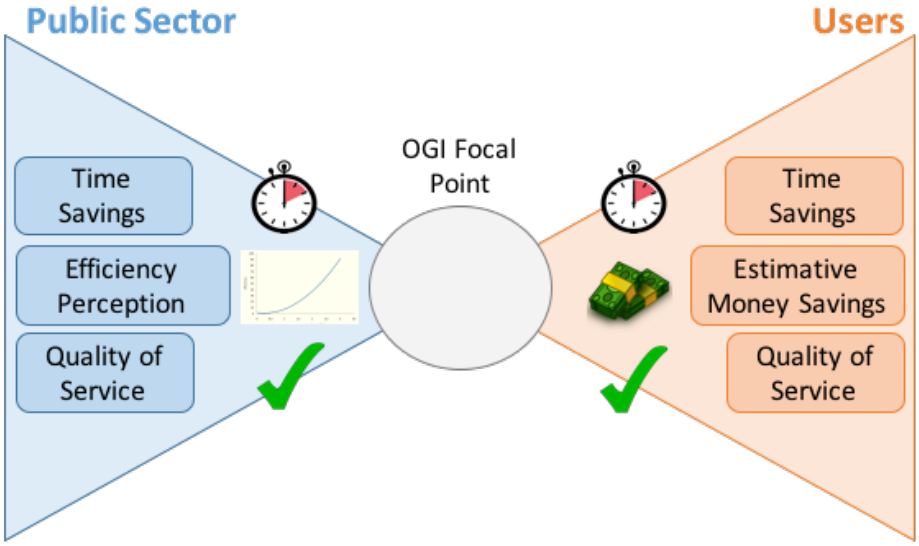


Figure 15- OGI Focal Point

The table below summarises the adapted taxonomy for Costs and Benefits of OGI innovation ecosystem for stakeholders. The questionnaire created for public sector and users are provided at Section 5.

Table 13 - Taxonomy for Benefits for OGI innovation ecosystem stakeholders

Adapted from {Gallo, 2014 #732}

Dimension	Categories	Sub-Categories	Description
Benefits for Public Sector	Direct Benefits	Time Savings	Includes all monetizable benefits arising from improvements on public service delivery, including time savings before/after OGI innovative ecosystem implementation.
	Indirect Benefits	Efficiency perception	Encompass non monetizable benefits related to a better service delivery and the enhancement of the decision-making process.
		Quality of service	
Benefits to Users (citizens, businesses)	Direct Benefits	Time Saving	Includes all monetizable benefits arising from improvements on public service delivery, including time savings before/after OGI innovative ecosystem implementation.
	Indirect Benefits	Estimative Money Saving	
		Quality of service	Encompass non monetizable benefits related to a better service delivery and the enhancement of the decision-making process.

3.6.2.1 Benefits for Public Sector and Users

There was two ways to understand "benefits for Public Sector". First as organisation, and second as people involved on the processes. Taking in consideration the OGI innovation ecosystem, we decided to take approaches depending on pilots. Some pilots have clear definition of Public Sector (organisation and people - civil servants, policy makers, etc.) and users (citizens, businesses, etc.). However, other pilots don't have a clear definition between Public Sector and users, because the users are on the Public Sector (civil servants, policy makers, etc.).

The approach designed below is a guideline that can be changed taking in consideration pilot singularity. The summary of data collection methods is presented at Table 14 and the planned questions of questionnaires and interviews are at section 5.

1. **Time savings**

Time savings considers two potential scenarios. If the public service already existed, it is possible to measure how much time in days or hours a civil servant or citizen/business person perform the task or receive the public service delivery. The measure can be collected with log observation of delivery, researcher observation of process (presential) or via survey (questionnaire and/or interview).

If the public service doesn't exist and a new one will be created, we will take in consideration the measures comparing similar processes or collect data from users (civil servants, citizens, business person, etc.) from a perception or expectation perspective. Then a Likert scale based on level of satisfaction with time spent on public service (1- very dissatisfied to 5-very satisfied).

2. **Efficiency Perception**

Efficiency perception considers public sector data from people that uses the OGI innovation ecosystem. It means no quantitative data from performance, for example, before OGI 10 minutes, after OGI 5 minutes, 50% of improvements. The objective is to identify if public sector users (civil servants, public managers, etc.) has the (subjective) perception that improved efficiency or not. To measure efficiency perception, a questionnaire will be conducted on public sectors. Questionnaire uses Likert scale for level of agreement (1 strongly disagree to 5- strongly agree) to identify efficiency perception.

3. **Estimative Money Savings**

Avoided expenses cannot be 100% sure about a model for all the users. Taking this in consideration, the approach used a perception or expectation perspective for expenses that he used before/after implementation of OGI innovation ecosystem. A questionnaire will collect data based on a Likert scale of agreement (1 strongly disagree to 5- strongly agree) and open question asking to provide how much expenses were avoided, for example 10 euros. Further, can be asked what type of services, products, etc. were avoided to expense, for example, consultancy, ticket for public transportation, gasoline, etc.

4. **Quality of Service**

Quality of service considers two potential scenarios. If the public service already existed, it is possible to measure the level of quality using Likert scale (1-poor to 5- excellent) and comparison between past and current product/service (1- much worse to 5- much better). If

any issue was identified on this questionnaire, further interviews will be conducted looking for identify and measure the issues.

If the public service doesn't exist and a new one will be created, we will take in consideration the measures comparing similar processes or collect data from users (civil servants, citizens, business person, etc.) from a perception or expectation perspective. Then a Likert scale based on level of satisfaction with quality of public service (1- very dissatisfied to 5-very satisfied).

Table 14 - Summary of Data Collection and Analysis methods

Stakeholder	Categories	Sub-Categories	Data Collection Method
Public Sector (Civil servant, policy-makers)	Direct Benefits	Time Savings	Web Statistics; Questionnaire; Interview.
	Indirect Benefits	Efficiency perception	Questionnaire; Interview.
		Quality of service	
Users (Citizens, businesses)	Direct Benefits	Time Savings	Web Statistics; Questionnaire; Interview.
	Indirect Benefits	Estimative Money Savings	Questionnaire; Interview.
		Quality of Service	

4 Conclusions

The OpenGovIntelligence (OGI) innovation ecosystem provides a framework and an architecture as well as an ICT toolkit for data-driven public service co-creation. Based on agile development with continuous and strong stakeholder participation, pilots will be implemented. There will be a design and an implementation team that will work closely together. The evaluation plan takes into account multiple stakeholders' perspectives. We will use multiple evaluation methods to deal with the diversity of activities in our project and we opt for customizing the models for the situation in our project.

The various methods that will be employed include surveys, interviews, web metrics and data from social media. The evaluation of OGI innovation ecosystem on public administration is based on four main aspects:

1) **Co-Creation Framework Evaluation**. How will this framework enable co-creation?
2) **OGI ICT Toolkit** (Building blocks and Cubes Design). Are the building blocks suitable for providing the functionality needed? How does the toolkit serve its purpose to support application development?
3) **Acceptance of OGI innovation ecosystem**. WIll the users accept and work with the developed applications?
4) **Outcomes**. What is the result of pilot applications on elements like administrative burden and transparency?

Each of the aspects has its own evaluation methods and measures. The evaluation will demonstrate how the various elements of the project achieve the targeted impact. It is anticipated that in the long term the project outcomes will be important in the area of engagement, participation, transparency, accountability, empowerment and administrative burden of public services.

The table

Table 15 summarises the methods for data collection and evaluation.

Table 15 - Overview of dimensions, methods to collect data and methods to Evaluate

Dimension	*Method to Collect Data*	*Method to Evaluate*
Co-Creation Framework Evaluation	• Social Media; • User Workshop; • Continued Participation; • Public Meetings; • Focus Groups; • User Experience and User Interface; • Web and Phone Statistics; • Portal's Feedback Channels • Surveys (Questionnaires and Interviews).	R Statistic Analysis (TwitteR, Weka and Others); Web Analytics based on (Xu, 2004; Jana and Chatterjee, 2004; Goh et al., 2008).
OGI ICT Toolkit Evaluation (Building Blocks and Cubes Design)	Survey (Questionnaires).	ISO/IEC 25010; ISO/IEC 25012.
Acceptance Evaluation	Survey (Questionnaires).	Combination of TAM, TAM2, TAM3, UTAUT, Delone and McLean.
Outcomes Evaluation	Survey (Questionnaires and interviews); Web Statistics.	Transparency Model adapted from UTAUT (Matheus and Janssen, 2013) Administrative Burden model adapted from Gallo et al. (2014)

5 Annexes

5.1 Answer of Delft Meeting Questionnaire of objectives and expected outputs and outcomes for Pilots

This section presents the answers of a questionnaire made during the Delft Meeting in June 2016. The questionnaire aimed to collect objectives, expected outputs and outcomes from the pilots.

Table 16 **- Pilot 1 The Greek Ministry of Interior (MAREG) answers**

Questions	**Answers**
What are the objectives of the Pilot?	The main objective of Greek Pilot is to reduce costs improving: 1. Car's management; 2. Paper usage; 3. Avoid misuse of public assets (cars, drivers and fuel).
How to enable the objective?	Electronic and automated management reports and will be created with OGI toolkit. Potentially real-time dashboards can be created.
The system will be used internally or externally?	Internal usage.
What do you want to evaluate?	1. Car usage taking in consideration different dimensions (ministry, department, purpose, driver, age, brand, consumption etc.); 2. Reduction of paper usage; 3. Misuse of cars, drivers and fuel.
How do you determine if your pilot was a success?	Is it possible to share the solution for other success? Toolkit is relevant to the job on the department? Other departments also think OGI toolkit is useful? Quality of public service delivery is higher than before (quantitative analysis)
Which types of evaluation methods do you prefer?	In depth Interview with very specific people (management level). Identification of hierarchy and process flow Quantitative analysis of improvements (Before-After OGI)

Table 17 **- Pilot 2 : Enterprise Lithuania (Ministry of Economy - Lithuania)**

Questions	**Answers**
What are the objectives of the Pilot?	Create an interactive dashboard for people to give transparency of business data and allow co-creation, innovation for business people.
How to enable the objective?	Create a web-based dashboard with interactive functionalities to business people create analysis and data-driven decision-making.
The system will be used internally or externally?	Externally, for people, especially business people.
What do you want to evaluate?	If there is growth of users, numbers of new business and its distribution. Measure if analytics functionalities are proper to generate new business.
How do you determine if your pilot was a success?	1. Growth of users of dashboard (data); 2. Growth of numbers and well distributed of new business; 3. If analytics are proper to business people.
Which types of evaluation methods do you prefer?	Workshops (Focus group) with civil society (business people) to identify in-depth if functionalities are proper and how data sets have been used or wanted to be used; Survey to identify more generic sense if functionalities are proper and how data sets have been used or wanted to be used; Interview with specific people to identify co-creation and innovation using LOSD.

Table 18 **- Pilot 3: Trafford Council (England)**

Questions	**Answers**
What are the objectives of the Pilot?	Change bureaucracy internal process flow for public service delivery and civil servants behavior to reduce skill technology dependency for data-driven decision-making of technical group.
How to enable the objective?	OGI tool kit usage to reduce skill technology dependency for data-driven decision-making of civil servants and enable change on bureaucracy flow for public service delivery.
The system will be used internally or externally?	Internally for process flow changes and reduction of skill dependency of civil servants.
What do you want to evaluate?	Identify if civil servants are using properly the tool kit and changes on the process flow of public service delivery.
How do you determine if your pilot was a success?	1. Number OGI tool kit user's (civil servants); 2. Level of technology acceptance (functionalities usage); 3. Level of dependency of technical group; 4. Changes on the process flow of public service delivery.
Which types of evaluation methods do you prefer?	• Survey and questionnaire for generic subjects; • Interviews with internal civil servants for in depth discoveries; • Comparison of process flow before/after OGI tool kit usage; • List of opened data sets and services created.

Table **- Pilot 4 The Flemish government**

Questions	**Answers**
What are the objectives of the Pilot?	Creating a rank of environmental statistics (pollution) based on integrated, automated and interactive web based dashboard for governmental data-driven decision-making and civil society accountability.
How to enable the objective?	Creating an integrated, automated and interactive web based dashboard to identify official data presented by enterprises and real data measured on certain regions.
The system will be used internally or externally?	Both.
What do you want to evaluate?	To compare the official and real pollution data on certain regions.
How do you determine if your pilot was a success?	1. Civil servants user acceptance, user experience, in-depth level of usage and number of usage; 2. Comparison between old and new flow of public service delivery and inspections; 3. Comparison between
Which types of evaluation methods do you prefer?	• Interview • Survey and questionnaires • Comparison of old and current inspect processes flows, reports and statistics of pollution.

Table 19 **- The Marine Institute**

Questions	**Answers**
What are the objectives of the Pilot?	Create a web based dashboard wit OGI tool kit that enables decision-making based on statistical data-driven on innovative way based on co-creation by different owners of data and responsible for public service delivery.
How to enable the objective?	Linking and opening-up statistical data from the organisation and creating a web based dashboard with interactive functionalities like heat maps, predictions of scenarios and other automated functions.
The system will be used internally or externally?	Internally by civil servants of the organisation. Externally by specific community of users (sailors)
What do you want to evaluate?	1. Reduction of costs to deliver public services; 2. User acceptance of functionalities; 3. Innovation and co-creation for public service delivery.
How do you determine if your pilot was a success?	• If OGI tool kit and dashboard can reduce costs (time, people, funds) to delivery certain public services; • If OGI tool kit and dashboard have the proper and most accepted functionalities for users; • If OGI tool kit and dashboard improve the innovation and co-creation of public service delivery.
Which types of evaluation methods do you prefer?	Workshops (Focus group) and webinars with civil society (business people) to identify in-depth if functionalities are proper and how data sets have been used or wanted to be used; Survey to identify more generic sense if functionalities are proper and how data sets have been used or wanted to be used; Interview with specific people to identify co-creation and innovation using LOSD.

Table 20 **The Estonian Ministry of Economics**

Questions	**Answers**
What are the objectives of the Pilot?	Opening-up and linking statistical real estate data for people and civil servants to enable co-creative and innovative decision-making through transparency of data sets.
How to enable the objective?	Creating a web based portal with LOSD of real estate with tool kit features that help transparency for better decision-making, co-creation and innovation.
The system will be used internally or externally?	People.
What do you want to evaluate?	• Portal and tool kit functionalities acceptance of users; • Frequency of visitors; • How much th
How do you determine if your pilot was a success?	1. Technical opinion about portal and functionalities; 2. Number of access, downloads and visualisations.
Which types of evaluation methods do you prefer?	• Survey for generic questions from portal and functionalities acceptance of users; • Interview to capture in depth specific questions • Statistics of portal access, download of data sets and visualisations.

5.2 Survey User Workshop Evaluation (Feedback)

Table 21 - Survey User Workshop Satisfaction (Feedback)

#	Question	Answer (Measure)
1	How satisfied were you with the user workshop?	1- Very Dissatisfied 2- Dissatisfied 3- Unsure 4-Satisfied 5- Very much
2	The user workshop was well organised?	1- Strongly Disagree 2- Disagree 3- Neither agree or disagree 4- Agree 5- Strongly Agree
3	How relevant was the content of this workshop to your current position?	1- Very irrelevant 2- Irrelevant 3- Neutral 4- Relevant 5- Very relevant
4	How was the moderation of the workshop?	1- Poor 2- Fair 3- Good 4- Very Good 5- Excellent
5	Do you believe that the workshop had an ideal range of participants?	1- Strongly Disagree 2- Disagree 3- Neither agree or disagree 4- Agree 5- Strongly Agree
6	What were your key take aways from this user workshop?	Open question
7	How satisfied were you with the session content? (Both presented and pre-read material)	1- Poor 2- Fair 3- Good 4- Very Good 5- Excellent
8	Any additional comments regarding the sessions or overall agenda?	Open question
9	Any overall feedback for the event?	Open question
10	What organisation do you represent?	Open question
11	Would you be willing to participate in future workshops?	YES / NO
12	Name	Optional (anonymous is possible)

5.3 ICT Tools for OGI Toolkit

A survey was conducted in June with the technical partners of OGI Consortium. The survey aimed to identify which ICT tools could be used for OGI toolkit. The list is presented at Table 22.

Table 22 - List of ICT tools for OGI Toolkit

#	ICT Tool	Description	URL
1	**OpenCube Compatibility Explorer**	The OpenCube Compatibility Explorer is part of Data Expanding LOSD data lifecycle. It identifies compatible cubes and establishes links between then to facilitate discovery.	http://opencube-toolkit.eu/opencube-compatibility-explorer/
2	**OpenCube Aggregator**	The OpenCube Aggregator is part of "Data Expanding" LOSD data lifecycle. The Aggregator component can be easily initialized by creating a widget.	http://opencube-toolkit.eu/opencube-aggregator/
3	**OpenCube Expander**	The OpenCube Expander is part of "Data Expanding" LOSD data lifecycle. It supports the identification of compatible cubes stored either at the native triple store or at remote SPARQL end-points. The expander can be started via widget on OpenCube Aggregator.	http://opencube-toolkit.eu/opencube-expander/
4	**OpenCube OLAP Browser**	The OpenCube OLAP Browser is part of the "Data Exploring" LOSD data lifecycle. It supports browsing of cubes that are stored either at the native triple store or at remote SPARQL end-points. The browser can be initialized by creating a widget.	http://opencube-toolkit.eu/opencube-map-view/
5	**OpenCube MapView**	The OpenCube MapView is part of Data Exploring" LOSD data lifecycle. It supports visualization of cubes containing a geospatial dimension. The visualization maps are created using OpenStreetMap.	http://opencube-toolkit.eu/opencube-map-view/
6	**R Statistical Module**	This component aims at giving the users the ability to apply statistical analysis methods to data represented as RDF data cubes	http://opencube-toolkit.eu/r-statistical-analysis-module/
7	**JSON-stat2qb**	The JSON-stat2qb extension for data cubes component enables generation of the RDF graph from a JSON-stat data source. User needs to provide base URI of the generated cube and the source of the data.	http://opencube-toolkit.eu/json-stat2qb-extension-for-data-cubes/
8	**TARQL**	TARQL Extension for data cubes is a tool for converting CSV files to RDF accordingly to SPARQL 1.1 syntax. The data cubes are generated based on the provided, easy to modify, query templates. TARQL extension can be stacked with other data components for instance the output RDF can be visualised with i.e. the OpenCube Map View.	http://opencube-toolkit.eu/tarql-extension-for-data-cubes/

5.4 Interviews for Transparency Evaluation

This interview will be conducted on users of transparency portals (open data portals, etc.) and potential systems that will be created to delivery service to people, businesses and civil servants. The Table 23 contains questions and the literature source from where questions emerged.

Table 23 - Interview for Transparency Evaluation

Questions for Users	Literature Source
1- Name, role (public sector, citizen, business person, etc.), age and level of education.	-
2- Do you use transparency portal (Pilot OGI toolkit)? Explain your answer.	-
3- Do you think that the simpler is the language used, the more you could use transparency portals?	Mendonça et al., 2007
4- Do you think that the higher is the quantity of information, the better can be your interpretation or data overload is an issue?	Mahlke, 2002, Loiacono et al., 2002
5- Do You think that updated information can provide to you better interpretation?	ISO/IEC 25012, 2008, Bharosa et al., 2008
6- Do You think data completeness is an important aspect for transparency (Pilot OGI toolkit)?	Matheus and Janssen, 2015, Peixoto, 2013, Zuiderwijk, 2012
7- Do you think data accuracy can influence on your understanding of data?	Bharosa et al., 2008, Zuiderwijk, 2012, Matheus et al., 2012
8- Do You think that your experience can help your interpretation of data and the website?	
9- Do you think that your experience can overcome any problem of accessibility of transparency websites?	
10- Do You think that your age can influence on interpretation? Why? Cite reasons.	
11- Do You think that your age can influence on accessibility of the website? Why? Cite reasons.	Kuzma, 2010
12- Do You think that your level of education can influence on interpretation? Why? Cite reasons.	
13- Do You think that your level of education can influence on accessibility of website? Why? Cite reasons.	

5.5 Questionnaires for Administrative Burden Evaluation

Table 24 - Questionnaire for Administrative Burden Evaluation - Public Sector

Measure	Questions for Public Sector	Answer
Personal information	1- What is your name?	Name (option for anonymous if asked)
	2- What is your role, position working with OGI innovation ecosystem?	Role or position at Public Sector
Frequency of Use	3- Which is your frequency of use	1- Never 2- Almost never 3- Sometimes 4- Almost every time 5- Every time
	4- For the next years, what is the probability to use?	1- Not probable 2- Somewhat improbable 3- Neutral 4- Somewhat probable 5- Very Probable
Time savings	5- Are You satisfied with time spent on this specific public service delivery?	1- Very dissatisfied 2- Dissatisfied 3- Unsure 4- Satisfied 5- Very satisfied
	6- If yes, how much of time are you saving now?	1- Reduction of 25% 2- Reduction of more than 50% 3- Reduction of more than 75% 4- Reduction of more than 100% (percentage can be substituted by time, for example 1 minute, to more than 5 minutes)
	7- If yes, how much of time are you spending more now?	1- More 25% 2- More than 50% 3- More than 75% 4- More than 100%
Efficiency Perception	8- Do you agree that OGI innovation ecosystem helps to improve efficiency?	1- Strongly Disagree 2- Disagree 3- Somewhat disagree 4- Neither agree or disagree 5- Somewhat agree 6- Agree 7- Strongly agree
	9-How do you classify the quality of service provided with OGI innovation ecosystem (or name of public service delivery) now?	1- Poor 2- Fair 3- Good 4- Very Good 5- Excellent
Quality of use	10- Comparing the OGI innovation ecosystem with past public service delivery, your feel about OGI is?	1- Much worse 2- Somewhat worse 3- About the same 4- Somewhat better

		5- Much better
	11- Why do You feel OGI is better/worse?	Open question.

Table 25 - Questionnaire for Administrative Burden Evaluation - Users

Measure	Questions for Public Sector	Answer
Personal information	1- What is your name?	Name (option for anonymous if asked)
	2- Are You user of OGI innovation ecosystem?	Yes or no (filter question)
Frequency of Use	3- Which is your frequency of use	1- Never 2- Almost never 3- Sometimes 4- Almost every time 5- Every time
	4- For the next years, what is the probability to use?	1- Not probable 2- Somewhat improbable 3- Neutral 4- Somewhat probable 5- Very Probable
Time savings	5- Are You satisfied with time spent on this specific public service delivery?	1- Very dissatisfied 2- Dissatisfied 3- Unsure 4- Satisfied 5- Very satisfied
	6- If yes, how much of time are you saving now?	1- Reduction of 25% 2- Reduction of more than 50% 3- Reduction of more than 75% 4- Reduction of more than 100% (percentage can be substituted by time, for example 1 minute, to more than 5 minutes)
	7- If no, how much of time are you spending more now?	1- More 25% 2- More than 50% 3- More than 75% 4- More than 100%
Estimative Money Savings	8- Did You save any monetized (money, service, product, etc.) using OGI innovation ecosystem?	Yes or No (filter question)
	9- if yes, can you classify how much of money (etc.) are you saving now?	1- Reduction of 25% 2- Reduction of more than 50% 3- Reduction of more than 75% 4- Reduction of more than 100% (percentage can be substituted by money, for example 10 euros, to more than 5o euros)
	10- If no, how much of money (etc.) are you spending more now?	1- More 25% 2- More than 50% 3- More than 75%

		4- More than 100%
Quality of use	11- How do you classify the quality of service provided with OGI innovation ecosystem (or name of public service delivery) now?	1- Poor 2- Fair 3- Good 4- Very Good 5- Excellent
	10- Comparing the OGI innovation ecosystem with past public service delivery, your feel about OGI is?	1- Much worse 2- Somewhat worse 3- About the same 4- Somewhat better 5- Much better
	11- Why do You feel OGI is better/worse?	Open question.

5.6 Questionnaire for Acceptance Evaluation

Table 26 - Questionnaire for Acceptance evaluation

Variable	*Statement*	*Answers*
Job Relevance (JR)	OGI toolkit makes mine and my colleagues job tasks easier to be accomplished. In my job, usage of the system is important. In my job, usage of the system is relevant	5-Likert Scale: 1 = Very Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Very Agree
Output Quality (OQ)	The quality of the output I get from the OGI toolkit is higher compare to previous system. I have no problem with the quality of the OGI toolkit's output.	
Result Demonstrability (RD)	I have no difficulty telling others about the results of using the OGI toolkit. I believe I could communicate to others the consequences of using the OGI toolkit. The results of using the OGI toolkit are apparent to me. I would have difficulty explaining why using the OGI toolkit may or may not be beneficial.	
Perceived Ease of Use (PEU)	My interaction with OGI toolkit is clear and understandable; OGI toolkit usage does not require a lot of skills; I find it easy to get the OGI toolkit to do what I want it to do. I find the OGI toolkit to be easy to use.	
Perceived Usefulness (PU)	Using OGI toolkit improves my performance in my job tasks; Using OGI toolkit enhances my effectiveness in my job tasks; Using OGI toolkit in my job increases my productivity.	

	I find the OGI toolkit to be useful in my job.	
Intention to Use (IU)	If I have access, I would use OGI toolkit.	1- Not probable 2- Somewhat improbable 3- Neutral 4- Somewhat probable 5- Very Probable

5.7 Questionnaire for OGI ICT toolkit

No	Parameter	Measured by	Statements/Questions	Answers
1	Functionality	Functional completeness	To what extend do you agree or disagree that the OGI toolkit provides all required functionalities? To what extend do you agree or disagree that all functions in the OGI toolkit work properly?	5-Likert Scale: 1 = Very Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Very Agree
		Functional correctness	To what extend do you agree or disagree that all functions in the OGI toolkit provide correct results?	
		Functional appropriateness	To what extend do you agree or disagree that all functions in the OGI toolkit help you analyze the statistical data?	
2	Performance	Time behaviour	To what extend do you agree or disagree that the response and processing times of OGI toolkit when performing its functions, meet requirements?	
		Resource Utilization	To what extend do you agree or disagree that the amounts and types of resources used by the OGI toolkit when performing its functions, meet requirements?	
		Capacity	the maximum limits of a product or system parameter meet requirements.	
3	Compatibility	Coexistence	To what extend do you agree or disagree that OGI toolkit perform its required functions efficiently while sharing a common environment and resources with other products, without detrimental impact on any other product?	
		Interoperability	To what extend do you agree or disagree that OGI toolkit can be used with your existing network?	
4	Usability	Appropriateness recognizability	To what extend do you agree or disagree that OGI toolkit is appropriate for your work?	
		Learnability	To what extend do you agree or disagree that OGI toolkit can enable the user to learn how to use it?	
		Operability	To what extend do you agree or disagree that OGI toolkit has attributes that make it easy to operate and control.	
		User error protection	To what extend do you agree or disagree that OGI toolkit protects the users against making errors?	
		User interface Aesthetics	To what extend do you agree or disagree that OGI toolkit's user interface enables pleasing and satisfying interaction for the user?	

		Accessability	To what extend do you agree or disagree that OGI toolkit can be used by wide range of users?	
5	Reliability	Maturity	To what extend do you agree or disagree that OGI toolkit is reliable under normal operation.	
		Availability	To what extend do you agree or disagree that OGI toolkit is accessible when required for use?	
		Fault tolerance	To what extend do you agree or disagree that OGI toolkit still operates as intended despite the presence of hardware or software faults?	
		Recoverability	To what extend do you agree or disagree that OGI toolkit can be restored quickly from a system failure and recovered to the point at which a failure occurred?	
6	Security	Confidentiality	To what extend do you agree or disagree that OGI toolkit ensures that data are accessible only to those authorized to have access?	
		Integrity	To what extend do you agree or disagree that OGI toolkit prevents unauthorized access to, or modification of, computer programs or data?	
		Non-repudiation	To what extend do you agree or disagree that OGI toolkit proven to have taken place, so that the events or actions cannot be repudiated later	
		Accountability	To what extend do you agree or disagree that OGI toolkit ensures that actions of an entity can be traced uniquely to the entity?	
		Authenticity	To what extend do you agree or disagree that OGI toolkit provides identity of a subject or resource so it can be proved to be the one claimed?	
7	Maintainability	Modularity	To what extend do you agree or disagree that OGI toolkit composed of discrete components so a change to one component has minimal impact on other components?	
		Reusability	To what extend do you agree or disagree that data from OGI toolkit can be used in other systems, or in building other data?	
		Analysability	To what extend do you agree or disagree that it is possible to assess the impact on OGI toolkit of an intended change to one or more of its parts, or to diagnose for deficiencies or causes of failures, or to identify parts to be modified?	
		Modifiability	To what extend do you agree or disagree that OGI toolkit can effectively and efficiently modified without introducing defects or degrading existing product quality?	
8	Portability	Adaptability	To what extend do you agree or disagree that OGI toolkit can effectively and efficiently be adapted for different or evolving hardware, software or other operational or usage environments?	
		Installability	To what extend do you agree or disagree that OGI toolkit can be successfully installed and/or uninstalled in a specified environment?	
		Replaceability	To what extend do you agree or disagree that OGI toolkit can replace another specified software product for the same purpose in the same environment?	

No	Parameter	Measured by	Questions	
1	Effectiveness	Effectiveness	Within 1 to 5, how do you rate the OGI toolkit in term of accuracy and completeness to achieve your goals?	
2	Efficiency	Efficiency	Within 1 to 5, how do you rate the OGI toolkit in term of the use of resource to achieve your goals?	
3	Satisfaction	Usefulness	Within 1 to 5, how do you rate your satisfaction in using OGI toolkit to achieve your goals?	
		Trust	Within 1 to 5, how do you rate the OGI toolkit in term of it will behave as intended?	
		Pleasure	Within 1 to 5, how do you rate the OGI toolkit in term of obtains pleasure from fulfilling your personal needs?	
		Comfort	Within 1 to 5, how do you rate the OGI toolkit in term of the OGI toolkit design?	Level of Quality: 1 - Poor 2 - Fair 3 - Good 4 - Very Good 5 - Excellent
4	Freedom from Risk	Economic Risk Mitigation	Within 1 to 5, how do you rate the OGI toolkit in term of the potential risk to financial status, efficient operation, commercial property, reputation or other resources in the intended contexts of use?	
		Health and Safety Risk Mitigation	Within 1 to 5, how do you rate the OGI toolkit in term of the potential risk to people in the intended contexts of use?	
		Environmental Risk Mitigation	Within 1 to 5, how do you rate the OGI toolkit in term of the potential risk to property or the environment in the intended contexts of use?	
5	Context coverage	Context Completeness	Within 1 to 5, how do you rate the OGI toolkit in term of it can be used with effectiveness, efficiency, freedom from risk and satisfaction in all the specified contexts of use?	
		Flexibility	Within 1 to 5, how do you rate the OGI toolkit in term of it can be used with effectiveness, efficiency, freedom from risk and satisfaction in contexts beyond those initially specified in the requirements?	

5.8 Questionnaire for Pilots Description

1) General pilot information

a. Pilot Name;
b. Name of organization leading the pilot (responsible organization);
c. Contact Info;
d. Physical Address (address, place, zipcode);
e. Online Address (email address);
f. Telephone;
g. Useful links; (URL of organisations)
h. Key People in charge (as evaluation's respondents);
    i. Name;
    ii. Position;

iii. Email;
iv. Phone number.

2) **Pilot Stakeholders (data providers, public service providers, service consumer);**
   a. Name;
   b. Short description of the role in the pilot;
   c. Email and phone number;
   d. Organisation;
   e. Position/role (Civil servant / Citizen / Enterprises).
   f. Detail information about Human Resource:
   g. Experience using data analytics (methods, tools) and LOSD;
   h. Existing tools;
   i. Capacity Building Organisational support for people capability for the pilot.
3) **Pilot Objectives Expectations using OGI toolkit and framework**
   a. Main objective of the pilots;
   b. Expected benefits of the pilot;
   c. Objectives / Final products (D1.1);
   d. Expected outputs and outcomes;
4) Description of the Current business processes of target improvement (high-level description in BPMN);
   a. Data sets
      i. Number of different data sets
      ii. Current LOSD lifecycle (based on D1.1 Figure 9 table 10);
      iii. Current identified/perceived issues and causes;
      iv. LOSD Maturity Level (based on D1.1 Table 5);
      v. Current publish and usage of data;
      vi. Data Quality (based on section 5 of D1.1);
      vii. Existing usage statistics (e.g. number of data, access, and download);
      viii. Data-driven co-produced services/products (based on section 3 D1.1 and D2.1).
      ix. Data sets available (D6.1):
   b. Identified Risks
      i. Organisational
      ii. Participation of stakeholders
      iii. Pilot planning
      iv. Required people skills
      v. Pilot support
      vi. Lack of existing usage data
      vii. Data
      viii. Lack of data sets
      ix. Data Quality

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