



*"Linked Open Apps Ecosystem to open up innovation in smart cities"*

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### **Summary**

This deliverable aims to analyse and answer the three questions posed in D6.1 *Evaluation methodology of the project*. To do so, the deliverable is organised in 4 sections. Section 2 will shortly explain the methodology proposed, and the changes in this methodology due to the inner development of the pilots during the project time. Section 3 will present the results of the analysis by each of the dimensions that were proposed in D6.1 and will give a first evaluative result on the questions posed in this introduction. Section 4 will discuss challenges faced by the project and Section 5 potentialities learnt from the pilots for the future of iCity. Section 6 will present the main conclusions of the evaluation.

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## ABBREVIATIONS AND ACRONYMS

Acronym	Description
App	Application
DoW	Document of Work
SMEs	Small and Medium Enterprises
API	Application Programming Interface

## 1 Introduction

The aim of the sociological evaluation of the iCity Pilots as stated in D6.1 *Evaluation methodology of the project*. There were three questions to answer:

- Do the user-driven open innovation ecosystems produce a meaningful and useful platform for those involved in the co-creation of services of public interest —that is, governments, citizens, developers, business, research centres, etc.?
- Does it create new forms of ICT-mediated governance?
- Do the platform and their new applications tackle efficiently the delivery of services of public interest and contribute to solve social problems in the city?

The first question focuses on the process of engagement of the several stakeholders which will get involved in the iCity project, the stage of co-creation of applications and the final results of these processes. All this, in order to assess the whole co-creation methodology described in D2.4: “iCity Methodology”.

The second question is about the generation of new forms of e-governance. From this dimension we will evaluate, on the one hand, the internal governance of the iCity project pilots and, on the other hand, how these innovations affect urban governance processes. In particular, this will be done focusing on the improvements in the efficiency of the services delivered.

Finally, the third question deals with delivery of public services and services of public interest: this dimension focuses on the analysis of impacts and results of the project in achieving the delivery of new services. To do so, it will collect the opinion of end users, administrations and companies involved. In particular it will centre on analyzing the delivered services in order to assess the impact of the pilots in societal change.

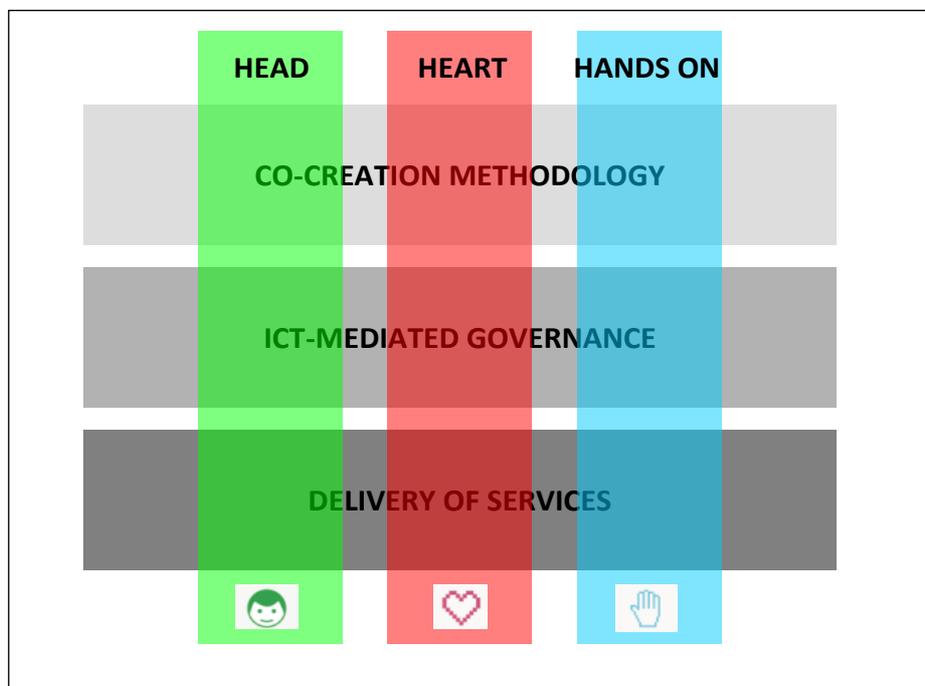
This deliverable aim to analyse and answer the three questions posed in D6.1 *Evaluation methodology of the project*. To do so, the deliverable is organised in 4 sections. Section 2 will shortly explain the methodology proposed, and the changes in this methodology due to the inner development of the pilots during the project time. Section 3 will present the results of the analysis by each of the dimensions that were proposed in D6.1 and will give a first evaluative result on the questions posed in this introduction. Section 4 will discuss challenges faced by the project and Section 5 potentialities learnt from the pilots for the future of iCity. Section 6 will present the main conclusions of the evaluation.

## 2 The methodology

In D6.1 Evaluation methodology of the project there were planned three different stages to generate three groups of evaluation indicators for each question and three temporal sequences (figure 1):

- Axes:
  - Co-creation methodology (engagement, process and results).
  - ICT-mediated governance (internal and external).
  - Delivery of public services or services of public interest.
- Time stages:
  - Head activity aims to identify/map the actors of cities innovation ecosystems and to provide protocols and tools to collect and understand which are their interests, needs and barriers in order to participate in the iCity project.
  - The Heart activities are those linked to the consolidation of relationships that are necessary to establish trust and commitment between public and private stakeholders. Its goal is to encourage stakeholders to overcome their barriers and to explore together common interest possibilities.
  - Hands on deals with the submission of app proposals ideas, as well as developed Apps. It provides different events to foster the development of Apps in each territory following a coordinated strategy.

**Fig. 1: Evaluative general scheme**



Source: own elaboration

Table 1. Results expected in first DOW amendment

Indicator	Method of measurement	Expected result
Downloads from iCity Apps store	Enumeration of downloads by using logs	40,000
Applications utilized by users	Enumeration of evidence of use by using platforms logs	200
Users involved in testing and use of applications	Number of users (from logs of the platforms)	43,000
Social Media visibility	Enumeration of users awareness (by logs)	10,000
Applications released	Enumeration of applications	300
Additional interested cities	Enumeration of additional municipalities	10

Source: 1<sup>st</sup> amendment of the DOW and D6.1

For that purposes, a clear methodology was designed based on the recollection of different indicators in each stage. However, the methodology envisioned in D6.1 Evaluation methodology of the project was based on the generation of data and results as expected at that time (see table 1). Since then, the deployment of the pilots, the co-creation process and the production of results were re-defined due to the actual progress of the project and a reassessment of the objectives of the project that was approved in the third DOW amendment (see table 2). The scope and ambition of the project was scaled down in regards to the co-creation process, and given the actual developments, many of the indicators envisioned contained not enough data to support a quantitative analysis of the project (table 2). In addition, and as it will be discussed in Section 4, the deployment of pilots brought unexpected uses of the platform and new avenues to exploit iCity that were difficult to measure in quantitative terms. Thus, it was decided to analyse the quantitative data when available and significant, and carry out a complementary analysis based on participant observation, interviews with partners, participants and stakeholders. On the one hand, the evaluation team has done observant participation in events in the three cities (Barcelona, Bologna and Genoa), which involved as well talks with participants and regular interviews with iCity partners in the meetings of the consortium. On the other hand, the evaluation team has had exchange information with the people in charge of WP5 in each city.

Table 1. Results achieved M41, target M45 (third amendment)

Related obj.	Indicator	Measurement method	Current (M41)	Target (M45)
<b>Attraction of stakeholders and developers</b>				
<b>Obj-3</b>	Open innovation stakeholders identified and contacted	Enumeration of organizations (by SIG registration and iCity Portal registration)	622	300
<b>Obj-4</b>	Open innovation stakeholders identified developing applications	Enumeration of organizations (by iCity Portal registration)	363	250
<b>Obj-3</b>	Developers	Enumeration of all developers (by iCity Portal registration)	367	600
<b>Obj-3</b>	Youth Engagement in development of Apps	Enumeration of students and young developers (by iCity Portal registration)	92-176	400
<b>Outreach to stakeholders and society</b>				
<b>Obj-6</b>	Social Media visibility	$\sum_{M=Jan}^{Dec} (A_M + B_M + C_M + D_M + E_M + F_M)$	203.879	95.000
<b>Apps</b>				
<b>Obj-3</b>	Requests for proposal of Apps	Number of requests for proposal Apps, (this is the same number of #tokens)	227	750
<b>Obj-4</b>	Applications released	Enumeration of applications (by iCity Portal status)	8	60
<b>Obj-5</b>	Apps success	Percentage of Apps with activity (by iCity Platform logs) (week average)	50%	60%

Source: D5.7

## 3 Co-creation, governance and results evaluation

### 3.1 Introduction

In this section we present the findings of the evaluation of co-creation processes, tangible results of the pilots and its governance.

### 3.2 Co-creation evaluation

The evaluation question behind this part of the analysis is:

Do the user-driven open innovation ecosystems produce a meaningful and useful platform for those involved in the co-creation of services of public interest —that is, governments, citizens, developers, business, research centres, etc.?

In other words, what we are looking at it is the success of local ecosystems in producing *processes of co-creation* of services of public interest by using the iCity platform. To answer this question we will first mapping the key actors in the different activities hold during the pilots. We will focus on the main events of engagement and complement the analysis with the late events, which were following a different methodology of engagement. Then we will make a stakeholder analysis. Finally, we will discuss participants' perception of the engagement and co-creation events. In doing so, we will take into account two important considerations. On the one hand, what we will show are the **perceptions** of the participants in the co-creation events. That is their view, which it is based on their own understanding of the project, and therefore, it does not necessarily describe how the project actually was designed or evolved. On the other hand, the processes of co-creation are still in progress. Due to the accumulated delays in the project – which have been justified elsewhere – but namely, the lagging schedule in realising the platform and infrastructure connection plus a longer development processes than expected in defining, creating and finishing Apps has made that many of the co-creation processes are still on-going.

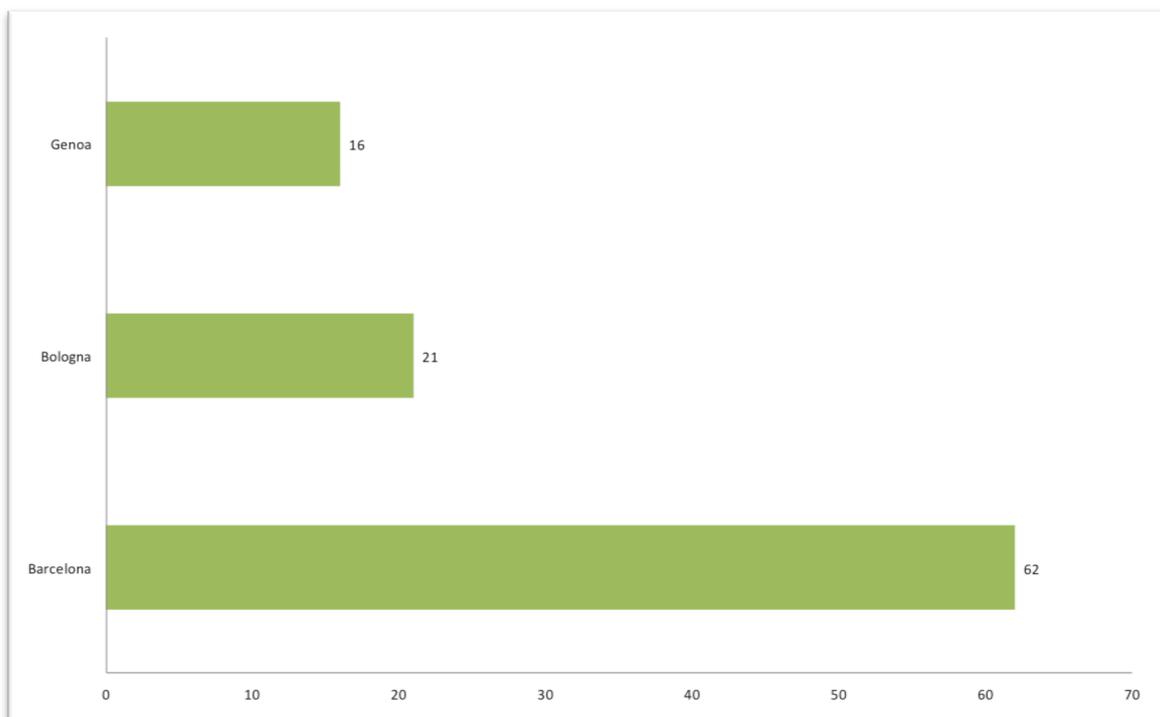
#### 3.2.1 Mapping

According to D5.7 Pilot's development report-final, the consortium has identified and contacted 622 stakeholders, of whom 363 were developing Apps and 367 developers (table 2). This is a clear mark that cities in the consortium have made a great effort to disseminate the project amongst local ecosystem stakeholders as the record of social media visibility corroborates (table 2, though as well using non digital channels). However, this do not necessarily translates in actual processes of developing Apps, nor in engaging with a process of co-creation with other stakeholders. Indeed, one think that has been recurrent in many stakeholders and developers from the private sector has been the willingness of creating themselves the Apps – that is, without co-creation taking place. Thus, we have focus on the participants that have shown willingness for participating in processes of co-creation through the Pilots activities.

In this regard, we have profiled the 158 participants in the regular iteration meetings held in Barcelona, Genoa and Bologna (including the iCity Campus). This is a representative sample of the people who have shown interest in the project and have actively participated in activities of co-creation. Thus, by mapping them, we can have information about the potential stakeholders in the project aiming at co-creation.

Several activities have been deployed to attract key actors to the iCity platform with the final objective to stimulate the development of new Apps. However, the participation in the three cities involved has been uneven (figure 2). These activities include six iteration meetings (with ninety-nine people participating in these engagement activities), the *iCity Camp* meeting and a complementary *hackathon* organised in the city of Barcelona (attending 49). Attendance to these meetings has been quite heterogeneous, being those in Barcelona the ones with greater attendance. Thus, to begin with, the first outcome of these events has been to create a database of potential participant stakeholders and individuals in each city.

Figure 2. Participation in iteration meetings



Besides the number of attendees in these events, it is also critical to know the type of stakeholders mapped in the system. Profiling these 158 potential stakeholders, we observe a low balanced distribution among citizens, developers and members of academia (Figure 3, 4, & 5). The presence of university members is manifestly prevailing (46.7%). This dominance was even higher in the iCity Camp activities (53.1%). Despite this disproportion, the configuration of these interest groups is tolerably heterogeneous and also seems appropriate to the aim of the project, as far as:

- The dominant area of expertise among all participants in the iteration meetings is technology and development of Apps (81.8%).
- One fifth of participants in the engagement activities are potential users of the platform services.

Figure 3. **Distribution of potential stakeholders in all engagement activities**

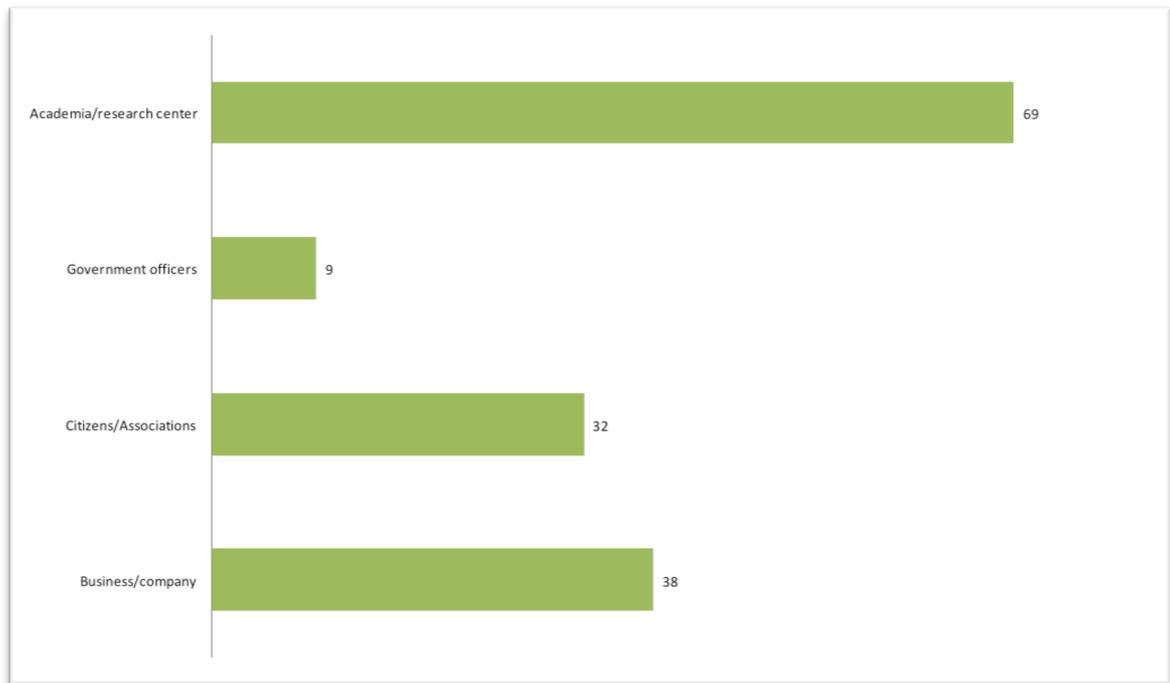


Figure 4. **Distribution of potential stakeholders in iteration meetings**

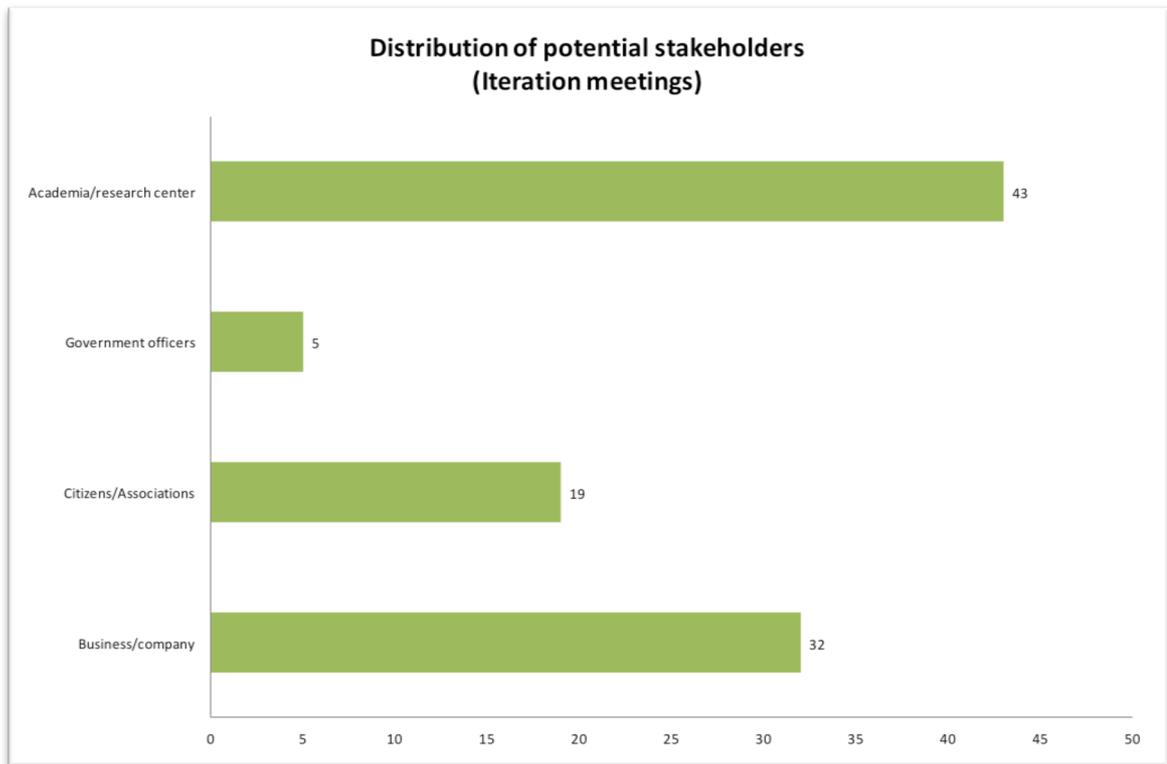
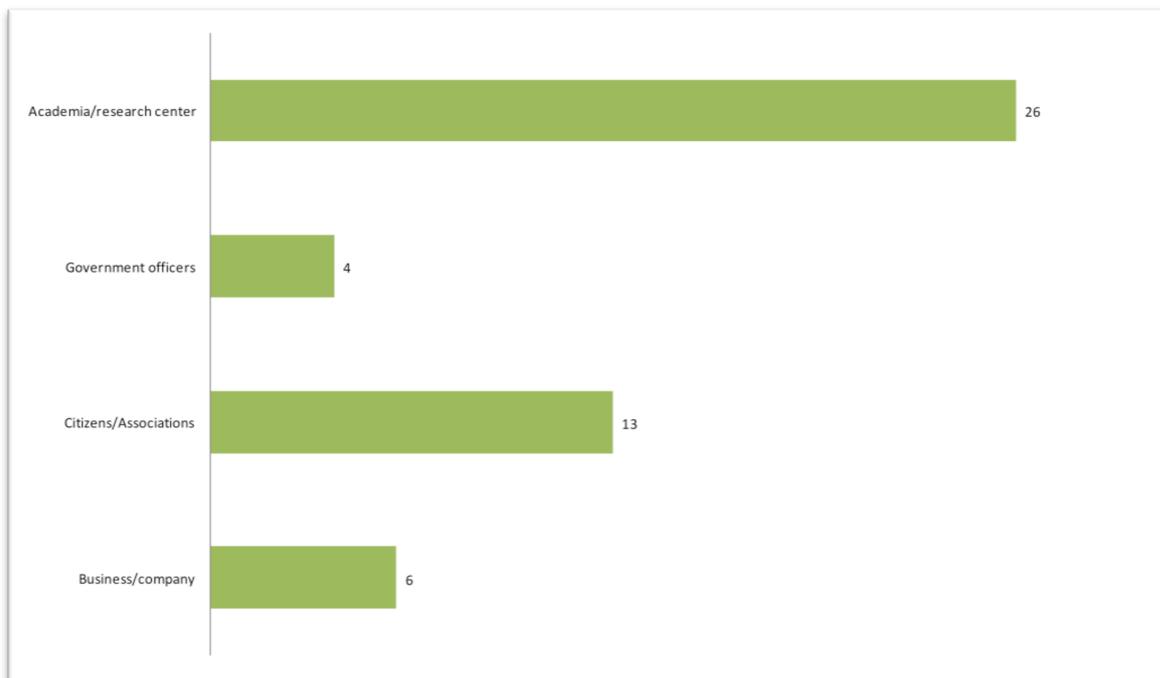


Figure 5. Distribution of potential stakeholders in iCity Camp



### 3.2.2 Stakeholders' enrolment

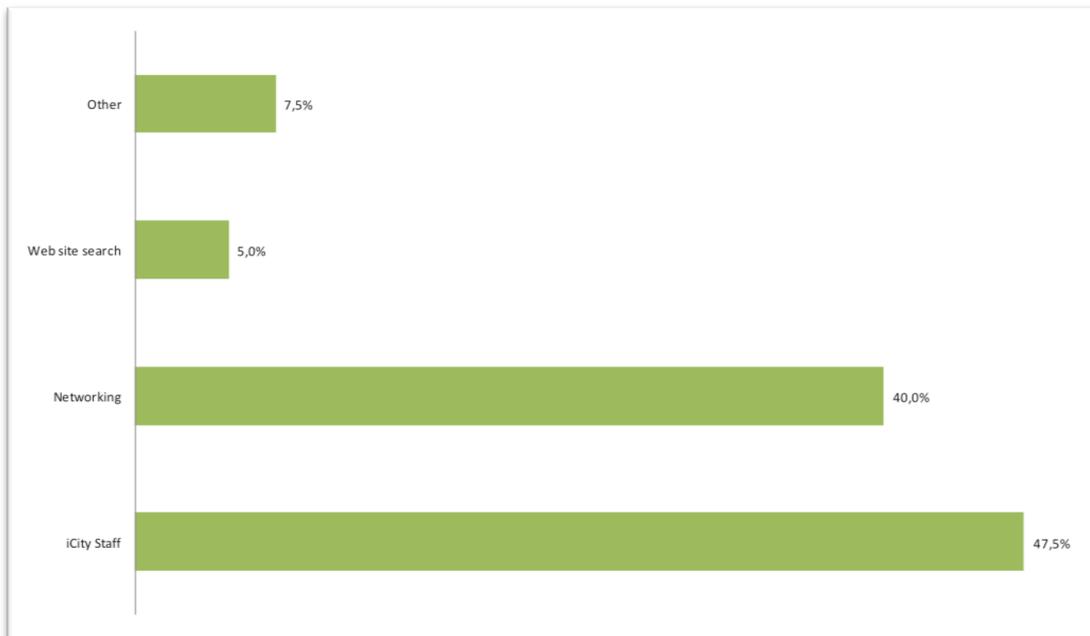
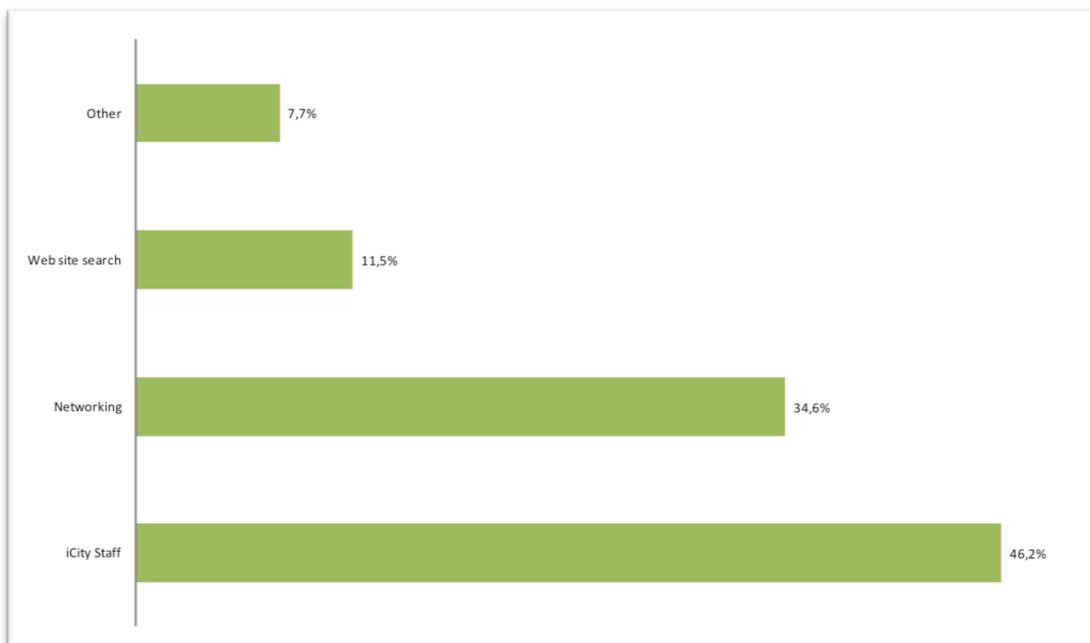
The dialogue with users and the mobilization of different communities of users are critical factors for the success of co-creation processes. Since users have to be knowledgeable and must be involved in all stages of the innovation process, a relevant presence in the engagement phase is very positive indeed.

Nevertheless, we could not state that actually involved stakeholders in the engagement period are very representative of the local communities and innovation systems. Obviously, these deficits seem to be most apparent in the Italian cities.

Though iCity staff in each city has carried out a hard, systematic and intensive work of engagement –contacting and inviting many people– attendance to the iteration meetings seems to be lower than expected. Nevertheless, people actually attending the meetings have produced useful feedback and high level discussions. Many of them were explicitly willing to get further information about the project and next events.

For a better account of the co-creation process, it is also relevant to know the motivations, experiences and interests of potential stakeholders to be involved in the iCity project. Our initial interest is to figure out how participants have been attracted to the project. We would expect that at the end of the process a certain process of bottom-up collaboration would have taken place.

Regarding this initial selection process, iCity staff has been the main actor providing public administration representatives and attracting developers and citizens potentially interested in the project. However, networking has also played a very active role:

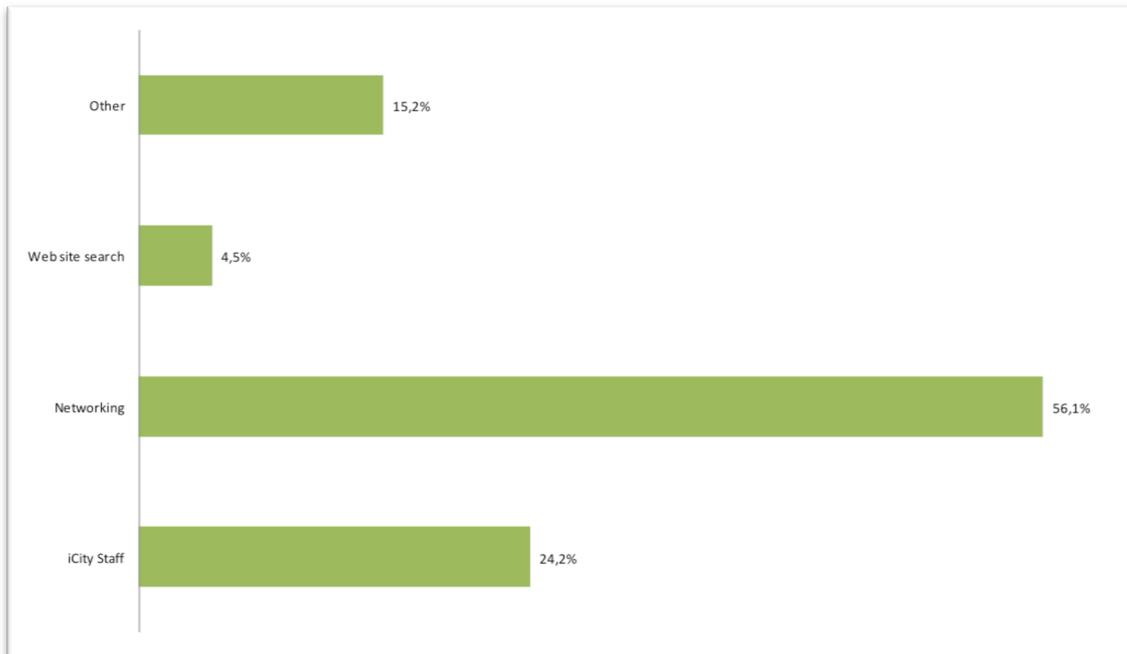
Figure 6. **Connection with the iCity Project: Business and companies**Figure 7. **Connection with the iCity Project: citizens**

- On one side, promoting the participation of members from the education sector and research institutions. However, some of the participants actually invited –university and vocational education students, for instance – were not a feasible target as

potential developers and had no previous knowledge about open data or open information systems.

- On the other, linking to the project already existing networks of developers. Two out of five participants of the business sector have joined the project throughout their personal or professional contacts.

Figure 8. **Connection with the iCity Project: research institutions**



### 3.2.3 Participants' perceptions

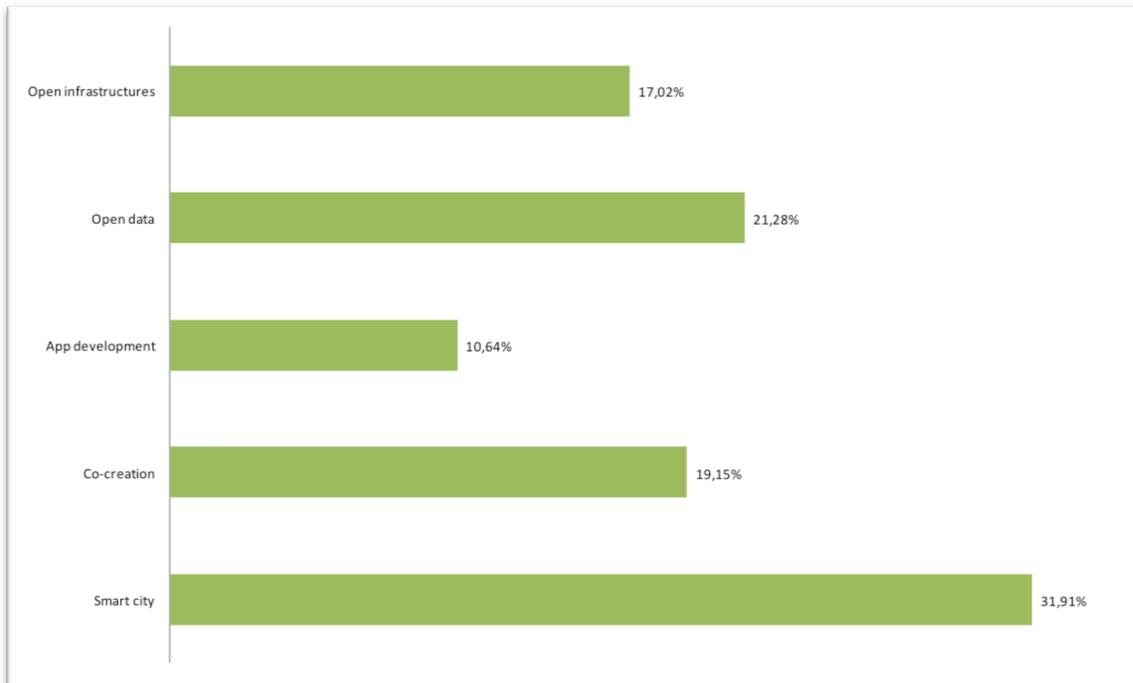
Through the questionnaires filled by participants and interviews with them, we grouped participants' perceptions in three blocks. First, we inquired about their vision of the project, and in particular how they would define the core of the pilots they were taking part on it. Second, we asked them about their satisfaction with the events and co-creation processes in the pilots. And finally, what was their overall vision about the future of the project.

Regarding to the potential stakeholders' perception about the purpose and the contents of the project (figure 9), most of them related the pilots as a Smart City (31.91%) and open data (21.28%) project (figure 9). Interestingly, possibly the three key terms novel of the pilot where used less. Only a 10.64% percent of them saw the goal of iCity as being an app development project or 17.02% as open information systems or 19.15% as co-creation. In other words, more than a half of participants prefer other more vague and common concepts such as *Smart City* or *Open data*.

This casuistic has also been detected in other similar projects: in the context of the Quadruple Helix model, participants are often not very acquainted with the essence of a co-

creation process and with the role of users and the procedures to involve them. It is obviously not straightforward how to fit easily users' concerns and expectations to economic interests of developers. Probably, this could also be the case of the iCity project. Though the project is aimed at providing a tool for innovation in the development of Apps for a better provision of services of public interest, by means of a cooperative model, most of the participants have not perceived this as the fundamental nature of iCity. Their perception seems to be clearly biased towards a more technological interpretation of the project in more "classical" terms.

Figure 9. iCity as a project on...



Significantly, the identification of iCity project with an innovation and app development process based on co-creation is lower among app developers (figure 10). In fact, co-creation is not even mentioned by the people interviewed when asked about the project aims or innovative features. It can be stated, then, that the final aim of the project seems to be more comprehensible and obvious for researchers than for citizens or entrepreneurs. This is one of the main methodological challenges for this kind of projects. There is not a unique *narrative of the iCity project* detected among potential participants.

In respect with their satisfaction and evaluation of the experience, it is important to note that stakeholders felt empowered and have had an active role and involvement at this initial stage of the project. Generally, the engagement activities have been positively evaluated by potential stakeholders:

- Information provided was relevant (68.4%).
- Information met expectations and needs (84.7%).

- Training with the iCity API was useful (67.7%).
- iCity project team encouraged feedback (85.1%).
- Improvement of personal knowledge and skills (59.3%).

Figure 10. Identification of iCity as Apps development/co-creation project

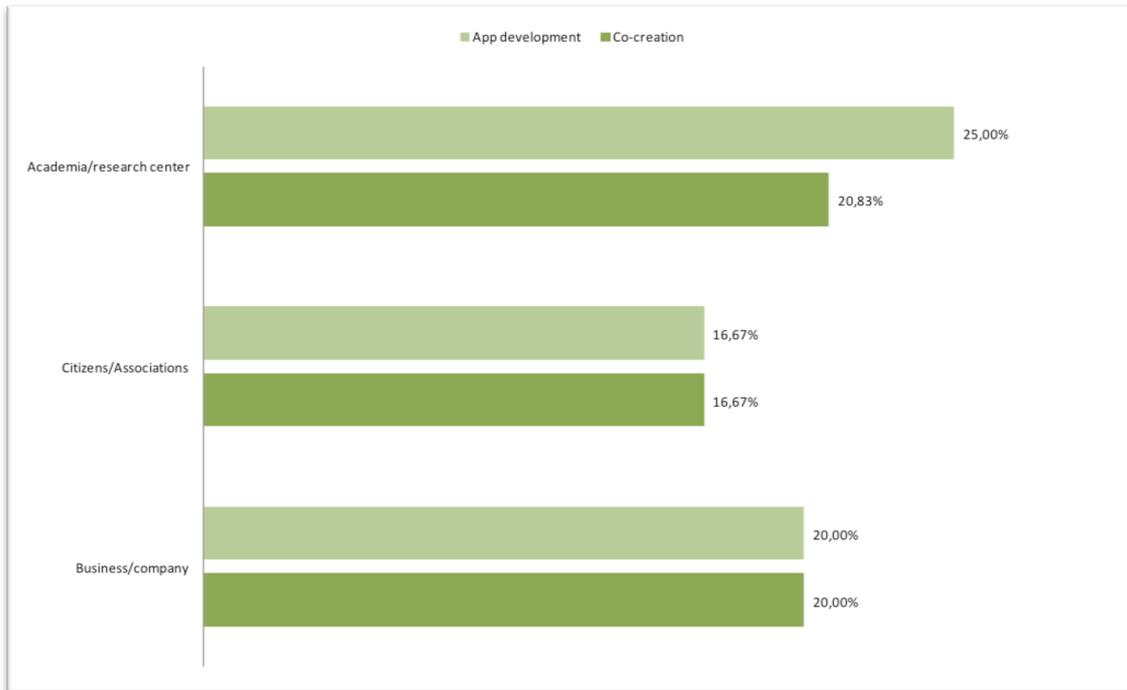


Figure 11. Overall rating of iCity project by cities

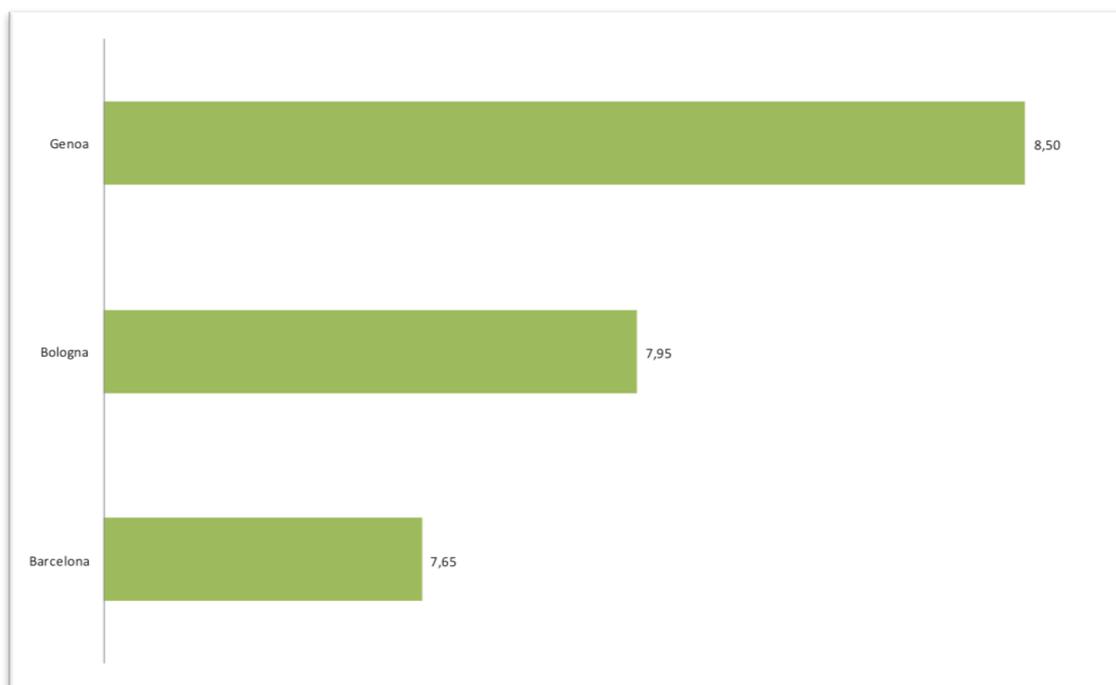
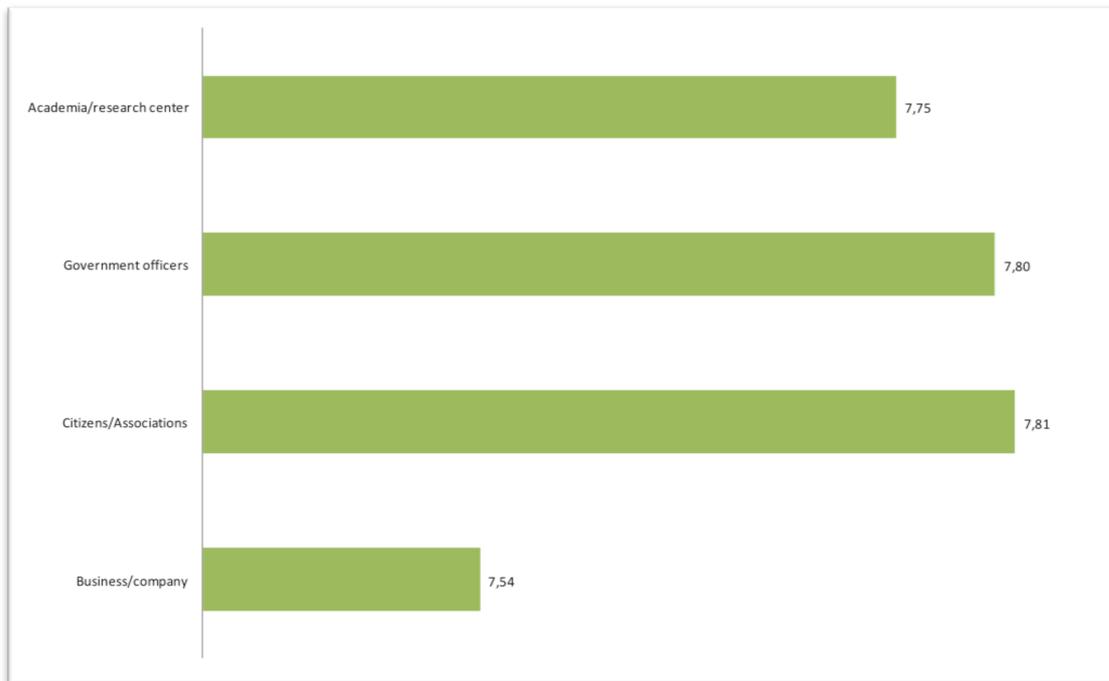


Figure 12. Overall rating of iCity project by stakeholder



Despite this generally positive assessment, a few technical problems with the information systems in the meeting venues caused some frustration among participants. Moreover, some potential stakeholders were concerned about the usability and interactivity of the platform. The interface is often seen as too complex and most of them think potential users need to fill in too many forms. Some participants even say there is not enough information about the project management and that the work schedule is not realistic and defined enough.

Finally, going beyond the engagement activities and moving forward with the project, most of participants clearly express their confidence in the platform. A large majority (76.9%) is convinced that iCity platform is an appropriate and helpful tool for designing and developing Apps in the near future. Most of them (78.8%) think that interaction is a key factor to move forward.

About half of potential stakeholders (48.9%) in iteration meetings and 63.6% of people attending the iCity Camp activities state that engagement activities were useful for improving their professional networks and for getting to know the framework of the iCity project. The seeds for a new ecosystem for co-creation were actually put in the ground – something particularly apparent in the city of Barcelona.

Significantly, most of them (93.9%) confirmed their interest in attending forthcoming events related to the project. In fact, the overall rating of the project by potential stakeholders is very positive in the three cities and among all type of stakeholders.

We could also state that participants are much interested about open data and show low knowledge about open Information Systems –when asked about that, they show concerns about the feasibility of open platforms. Many are really interested in having open data

integrated into the project's platform. Some even ask about the availability of open data about performance of the platform.

Regarding the next stages of the project, several specific concerns and opinions have been raised from the interaction and interviews with potential stakeholders. There has been two concerns that has been particularly common amongst different groups of stakeholders:

- Some serious concerns about the legal issues involved in the project –mainly those related to the use of public data and the heterogeneity of procedures and norms among different public bodies. In particular, some of them are concerned about licensing issues. In fact, they ask for more normative information (policies, guidelines and standards) about the project.
- Most of participants show serious concerns about the project schedule –they think is too tight to get enough results. Later on, the delay in the operability of the platform is likely to have caused them to lose faith in the project. The fact that few services and little data were actually available is also linked to some kind of disappointment about the whole project. Showing some readymade Apps would have helped – according to some participants.

By groups of stakeholders, the main concerns were:

- Potential developers – people with a technical profile – asked very detailed questions about the platform. Although they think the project is a great idea, are somewhat concerned about the available data in the platform. Indeed, they showed high concerns about the data updates in the platform; they were really interested in having dynamic and real time data available in the platform.
- Some entrepreneurs, though showing some concerns about future revenues, see a great point in simplifying their demands on data from public administrations. They also perceive very positively the fact that Apps could be developed to be used in different cities. However, they are also concerned about the quality and homogenous format of data in the platform.
- People from public administration bodies would like to keep some kind of control on the data; they would like to know and track who and for what is using them. They see the project as a potential and very valuable tool for surpassing existing bureaucratic barriers between different city councils and sharing resources among them.
- Some independent participants believe there is a risk that Apps will be basically centred on touristic and commercial services, not addressing other citizen concerns more linked to social and political issues.

### 3.2.4 Conclusions

In sum, the results of the engagement and co-creation process in the pilots were mixed. On the one hand, our analysis shows that the project has raised interest in the local innovation ecosystems in each city – though that has been uneven amongst cities. The platform has generally well received by attendants to iteration meetings, and it has asserted that a platform such the one that iCity delivers has a lot of potential for the creation of Apps devoted to generate services of public interest. Though, participants have raised many concerns on the business model, availability of data and reliability of the platform. We understand that precisely these issues are normal to be raised in any technological prototype as complex as the iCity platform, and that the consortium has progressed substantially on these fronts in the last months of the project.

It is important to note that one of the key innovative aspects of the project – and possible one of the greatest value added of the project – the development of open innovation systems has not been well understood by many participants.

Finally, despite the positive feedback from participants and the relatively good number of them and stakeholders showing interest, what it did not work as expected has been the co-creation dimension. Indeed, there has been a lot of interaction amongst participants, there has been initiated many Apps and projects within the iCity platform, but co-creation has been a minor part of it. As stated above, this is not a unique feature of iCity but a quite often characteristic of Quadruple Helix, that is to co-create – beyond collaborations between companies or public-private partnerships – with citizens and users in the whole developing process. This will be discussed more in depth in Section 4.

## 3.3 Results

The aim of this set of evaluation was to answer the question: do the platform and their new applications tackle efficiently the delivery of services of public interest and contribute to solve social problems in the city?

To evaluate the results on these terms, we have focused on the analysis of impacts and results of the project in achieving the delivery of new services. We have divided the analysis in three groups: First, the expected results on new services created through new Apps; second, results in engaging new local authorities in the project to develop the platform in their cities; and third, a priori unexpected results of the project.

### 3.3.1 Apps development

There have eventually been created 8 Apps over the iCity Platform (table 3 and 4). Given that they have been developed very recently, no data is available on their impact and their usability. However, they give as some clues on the potentiality of iCity in this front.

- Clearly, all 8 Apps provide services of public interest.
- They provide real open data is available to the public but also allow interaction with users.

- In addition, in interacting with users they are able to generate new data which can be useful not only for the individual users but for city councils and the general public.
- Apps focus on three areas: citizenship, environment and mobility. From these 3 areas they interrelate with cultural, lost & found, health and wellbeing and new patterns of consumption.
- Four Apps are created in the iCity consortium cities (Barcelona and Genoa), two in cities that are not in the consortium (Cornellà and London) and two are already shared with two cities outside the consortium (Barcelona with Lamia or Zaragoza).

Table 3. **Developed Apps**

Name	Description
<b>uCitizens</b>	Platform that allows the user to share any valuable information relevant to the city in four categories: Commerce, City Council, Mobility and Leisure & Culture. Each event contains description, category, subcategory, location, date and duration. Stores geolocalized information shown in Google Maps and the user can Search directly on map (current address automatically detected and allows filtering info).
<b>Ouner</b>	Aims to be the Internet Lost & Found Platform. Users can register all your belongings into a personal inventory (adding pictures, invoices or serial numbers by scanning its barcode) and allows searching geolocalized lost and found property. It also allows showing a message at mobile phone lost at its lock screen.
<b>RunCity</b>	Real time environmental information for planning outdoor exercise ( temperature, wind speed, humidity, Nitrogen Dioxide, Ozone, Suspended Particles and Sulfur Dioxide) with automatic detection of user's position and nearest environmental sensor.
<b>Eco City</b>	Personal recycling and waste management app. It monitors and scores user's habits, plans goals to improve recycling practices and advise in reducing the amount of waste generated. Also comparison of user results with neighbourhood and city average habits.
<b>uSpot</b>	Finding places of interest near to user's position, shortest paths to go there and information about place adaptation to people with reduced mobility. It allows sharing most beloved places amongst users.
<b>Mobiliy 4all</b>	To supports people with reduced mobility to move around the city avoiding architectonic obstacles. Allows planning point-to-point obstacle-aware city routes, both by public transportation and by car, and supports the citizen in real-time once she informs about the start of the route. Users can report about obstacles and their repair status.
<b>Hydrocube</b>	Hydroponic modular system assisting plantation supported by an App. The App also allows e to create a market place where exchange and buy vegetables and fruits (to be released).
<b>Goair</b>	Monitoring the air quality from wearable detectors and local fixed sensors. Mixing both sources of information, the App will generate city districts air quality indexes and real time quality air readings to users (to be released).

In sum, these 8 Apps give us an indication of the variety of different services of public interest that can be created through the iCity platform, the active role that citizens can have in using these Apps and sharing data and inputs to improve city life and services. Thus, the Apps created so far give us an idea of the potential of iCity to deliver services of public interest that are relevant to the local communities in the cities participating.

However, this number remains very low if we compare it with the original expected number (table 2) and the re-defined number in the last modification of the DoW (table 3). Therefore, *a prima facie*, this might be seen as a failure of the project. However, is the number the most appropriated way of measuring the success of the project? We will argue (section 4) that quantity is not the prime indicator to assess the failure or success of the project.

Table 4. **Distribution of Apps by area, information system and city**

Texto

	<b>Area</b>	<b>Information System</b>	<b>City</b>
<b>uCitizens</b>	Citizenship (city agenda)	Cornellà Agenda	Cornellà (Barcelona)
<b>Ouner</b>	Citizenship (Lost&found objects)	IRIS (bcn) & Incidencias (ZGZ)	Barcelona and Zaragoza
<b>RunCity</b>	Environmental/Health & wellbeing	Air Quality	London
<b>Eco City</b>	Environmental (waste management)	Sentilo and IRIS	Barcelona
<b>uSpot</b>	Citizenship/mobility	IRIS	Barcelona
<b>Mobiliy 4all</b>	Citizenship/mobility	Incidencias (ZGZ), IRIS (BCN), Citizen's Desk & Issue Reporting LAM	Barcelona, Lamia
<b>Hydrocube</b>	Environmental/Health & wellbeing	Weather station, airquality sensors and statistic opendata	Genoa
<b>Goair</b>	Environmental/Health & wellbeing	Weather station, airquality sensors and statistic opendata	Genoa

### 3.3.2 City enrolment

A second goal of the project was to engage in the project several more cities across Europe that – without being part of the core pilots of the project – were able to adopt iCity open innovation systems and create new Apps and services on top of that. This aim was developed in the late part of the project, once the iCity platform was well advanced. In this

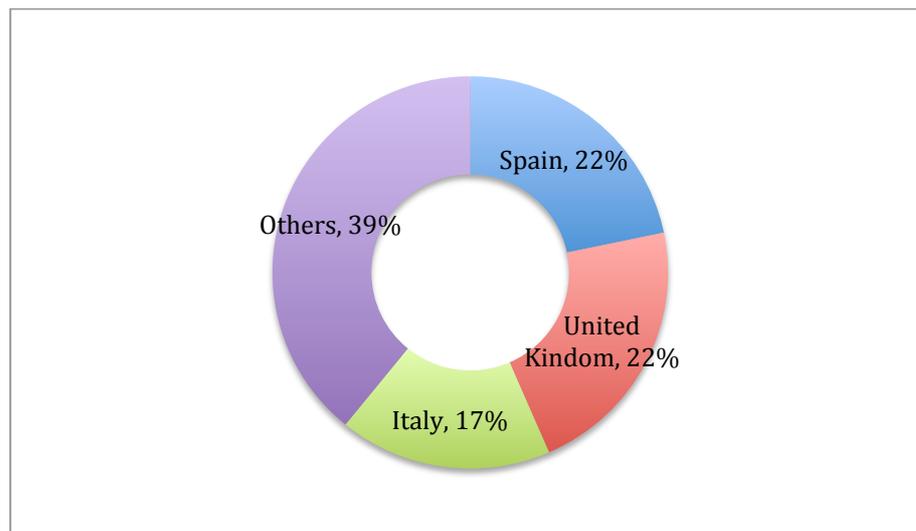
regard, the consortium has approached several cities in Europe (table 5). Twelve cities have shown interest in the project so far, seven have sign a letter of interest but involvement has not been materialized yet, four cities are already involved in the project and participated in opening information systems and developed Apps (including London, who left the consortium previously but kept the interest in being involved in it).

By country (figure 12), we can observe that the main number of cities involved or expressing interest are local authorities from the three original countries of the cities in the iCity Consortium: Spain, Italy and United Kingdom. This is an usual result, since inter-local relations within a country are normally more intense than international relations. In addition, the political and legal developments done by iCity Consortium can be quickly transfer and helpful for the new cities, and therefore, helping the involvement. It is positive as well that 39% of cities expressing interest (or eventually signing letters of interest or getting involved) come from countries other than the consortium. This might reflect the universality of iCity platform and its potential transferability as it has already shown in the case of Lamia. In other words, iCity can be seen as a trans-European solution for open innovation systems.

Table 5. **Cities in the iCity project**

<b>iCity Consortium</b>	<b>Cities involved in iCity</b>	<b>Cities that have signed a letter of interest</b>	<b>Cities that have interested in iCity Project</b>
Barcelona (ES)	Cornellà (SP)	Berlin (DE)	Amsterdam (NL)
Bologna (IT)	Lamia (GR)	Manchester (UK)	Birmingham (UK)
Genova (IT)	London (UK)	Milan (IT)	Belfast (UK)
	Zaragoza(SP)	Piacenza (IT)	Bordeaux (FR)
		Red Bridge (UK)	Ghent (BE)
		Reggio Emilia (IT)	Istanbul (TR)
		Torino (IT)	Murcia (SP)
			Oulu (FI)
			Tallinn(EE)
			Vienna (AT)
			Viladecans (SP)
			Vilanova i la Geltrú (SP)

Figure 12. Cities engaged in iCity by country



Given the complexity in implementing iCity open innovation systems – as their introduction in the consortium cities have already shown – and that this goal has been developed in the final stages of the project, we can evaluate it positively. Of the 23 cities showing interest, 30.4% have signed a letter of interest and 17.4% have been involved in the project. That is, in 18 months, almost the half of cities assessing participating in iCity (47.8%) has committed to the project. This is a very good ratio if we take into account:

- These cities have to find ways of financing their involvement just in a period where cities face the consequences of austerity politics at national level and a general reduction of own incomes in the form of tax collection.
- The complexity of opening their infrastructure (see section 4).

### 3.3.3 Unexpected results

The previous two sections have reported about the results expected from the beginning of the project. However, many times good innovations, and particularly disruptive ones, appear by a struck of luck or are unplanned, in what is usually termed serendipity. In this regard, the development of *iCity project* and the relation of the consortium with stakeholders have given rise to at least ideating three different uses of the platform that can complement the original purposes of the project.

First, from presentations in different universities in each city and the high number of academics in the engagement activities – in particular de *iCity Campus* – it has come clear that one of the uses of the platform can be for training purposes. Thus, the platform can be used by students – at under- and post-graduate levels – to experiment new Apps or processes in real time and open data from different city infrastructures. As collateral, this can lead to the production of new innovative Apps and platform applications.

Interestingly, iCity as a learning tool does not stop in higher education. Within the project, Citilab, for instance, developed Snapi! This tool was designed for its use by children and young adults in order to disseminate what an API and city information systems are on the one hand, and to allow them explore data and develop App prototypes. This opens at the same time a window for widening the project to local communities – beyond children - and investigating new ways to use the platform for open and citizen science projects and learning.

A second stream of potential uses of the *iCity* comes from the role that it can play in delivering a platform for new business opportunities that relay on the increasing generation of big data in real time in urban economies. In this sense, it is illustrative the talks that Barcelona City Council is maintaining with the electric vehicles market players (Endesa, GasNatural, Seat, BSM, Acció, Evectra, RACC, GTD, Circutor and Urbaser) to explore possible opportunities to get all the charging stations connected through a broker, thus getting a better management of the data provided by the charging stations and allowing offering of further and better services to citizens. Being the first critical develop Seat (Volkswagen group) has already formalized their interest by signing the interest letter with iCity Project. This is a clear example of a new business opportunity, the electric car – and new patterns of mobility – and how it can be improved by the existence of a platform that allow real time data on traffic and the provision of energy.

Last but not least, of the unexpected potential uses find by the consortium is that of platform management for outsourced public services and civil engineering works that need data from different infrastructures and dimensions. The iCity platform can be an ideal device for granting access to that data and control the dissemination of the data only to the authorised third parties.

These different uses of the platform have not been fully developed at the time of closing the project. Yet, they show that the platform might be useful not only for producing co-creation of services of public interest through Apps development. Indeed, they show that iCity platform for open innovation systems can have more uses than the originally planned goals.

### **3.3.4 Conclusions**

In sum, if we evaluate the results of the project uniquely on the expected quantitative results of the project, the numbers on Apps development are low and the number of cities engaged in the project is good. However, if we evaluate the results taking into the account qualitative measurements, the outcomes are positive and show a potential for the development of the project after the pilots finish. In this regard, as Davide Osmio, expert on open innovation processes, points out, the important is not “how many used the open (data, government, systems) but that the right people is able to access. It is not about quantity but about quality and opportunity.” There is evidence of the “right people” having access, quality and opportunity. Our analysis shows that local innovation ecosystems actors have been reached, that there have been some qualitative advancements in Apps (though still is to early to assess the impacts), other cities have engaged with the project and there have been unexpected results. In sum, the iCity pilots have open up opportunities for local innovation ecosystems. The full potential of these developments, we would argue, will start to flourish in

the next months. But before assessing the challenges and opportunities of the iCity in the nearest future, in the next section we present the results of the governance evaluation.

### **3.4 Governance Evaluation**

The evaluation questions behind this part of the analysis are:

- Does it create new forms of ICT-mediated governance?
- Do the platform and their new applications tackle efficiently the delivery of services of public interest and contribute to solve social problems in the city?

The aim is to evaluate the internal governance of the iCity project pilots – not the whole project management – and, on the other hand, how these innovations affect urban governance processes. This second part was designed in D6.1 having in mind that by the end of the project there will be several Apps up and running and with enough data to assess their impact. Unfortunately, that has not been the case. Thus, the evaluation team cannot assess the second question properly: Do the platform and their new applications tackle efficiently the delivery of services of public interest and contribute to solve social problems in the city? In this regard, in section 3.3 we have already discussed the potentialities in that front. In section 5 we will return to it. Thus, in this section we will focus on evaluating the internal governance of the pilots. To do so, we have based our analysis in an internal questionnaire to partners involved in the pilots, data from the engagement analysis (see section 3.1) and participant observation.

To assess the internal governance of the pilots we have divided the analysis in the following categories: transparency, adaptability, inclusivity and equity.

#### **3.4.1 Transparency**

In this dimension, our focus has been on exploring how stakeholders have been effectively engaged in the process through their knowledge of the available information, and their awareness of the running of the iCity project methodology of co-creation. For that purpose we have looked at how the access to participation is articulated and how information flows and their awareness of participating in co-creation.

As stated in section 3.2.2 iCity staff in each city have carried out a hard, systematic and intensive work of engagement –contacting and inviting many people. Regarding this initial selection process, iCity staff have been the main actor providing public administration representatives and attracting developers and citizens potentially interested in the project. There have been also other strategies to attract stakeholders such as social media, participation in other public hackatons or, as in the case of Bologna, using the Iperbole Civic Network and a local association working as a facilitator.

Again, as pointed out in section 3.2.3, stakeholders engaged in iCity events found that the information provided was relevant (68.4%) and met their expectations and needs (84.7%). They also find the iCity API was useful (67.7%) and that iCity project team encouraged feedback (85.1%). In relation to presentations in other events (e.g. hackatons, conferences,

etc.), cities reported that the project raised interest but due to the short slots allocated information given was seen uncompleted.

But in general terms, the main problem with the circulation of information was not in understanding the technical or legal dimensions of the project, but precisely on understanding co-creation processes, that is the co-production of Apps as a collaborative effort among different stakeholders. Indeed, as stated before, co-creation is still a very unknown or developed in local innovation systems beyond universities and few small companies.

### **3.4.2 Adaptability**

This dimension deals with how the iCity project manages internal conflicts and other aspects that interfere in the co-creation governance. In this regard is worth noting that there have been identified two sorts of conflict. First, there have been some concerns on the number of available infrastructures/API, and the difficulty to engage developers in producing Apps according to those infrastructures. And second, delays on the connection of these API and the generation of data in the platform. To solve these problems, cities considered important to keep the involvement activity low until they service of the iCity platform and API reached the high demanding expectations of its potential users. This caused a severe delay in the engagement activity. Adding up to these two issues, a third topic has been the diversity of actors between local innovation systems and different institutional settings. All three dimensions impinged in the development of the co-creation methodology. To adapt to this reality, the methodology was adapted to respond to them. The iCity Camp and the Contest responded well to those goals. Yet, once the platform was ready, the other factor was to provide as much valuable information services as possible and in that area, there was still potential to provide more information systems but this is a work in progress. These problems, however, once the iCity platform service works properly and is enough secure in order to convince the system managers might be solved. iCity needs to show successful sustainable models in the next stages after the end of the funded project.

A fourth cause of conflict has been over the lack of control by the municipality on many infrastructures and on their data, which often are updated by third parties. Not having control over them has caused problems in the accessibility and quality of data. In those cases, the only approach possible has been negotiation with providers. Presumably, as the iCity platform gets consolidated and their benefits came clear to providers, these problems might be reduced.

### **3.4.3 Inclusivity and equity**

In this dimensions we analyse how heterogeneous participants are, and how many different interest groups are represented. In this regard, as stated in section 3.2.2, there was a low balanced distribution among citizens, developers and members of academia (Figure 3, 4, & 5) and the presence of university members was manifestly prevailing (46.7%). Despite this disproportion, the configuration of these interest groups was tolerably heterogeneous and also seems appropriate to the aim of the project.

In this regard developers and research centres were well represented and had cover areas of expertise and have taken an active role in developing Apps – though not necessarily through co-creation processes. However, some participants in the project raised concerns that the design of the project has been centred in developers and the administration as core actors. In other words, citizens and SME has had a difficult inclusion. Being the project focused on the development of Apps it certainly put the pressure on attracting developers, research centres and the local administrations involved in the project. Thus, it was difficult to attract, and once attracted to find the way of involving citizens and create opportunities for SME interaction.

#### **3.4.4 Conclusions**

The governance of the pilots was carried according to the methodology set for the pilots. This methodology, as problems and conflicts arose, was swiftly modified to adapt to the temporal stage and institutional settings of each city. Thus, we can assert that the project reacted positively to the challenges find during the implementation of the pilots. Yet, some problems of inclusivity and equity persisted. These problems were due to the pressure on delivering Apps as end result of the pilots and assure a minimum number of them. This meant that engagement and participation of citizens and of SME was downplayed. This is an issue that have to be addressed, and that their inclusion can mean a boost in actually producing co-creation processes – particularly with citizens, and boost new uses of the platform in the case of SME involvement.

## 4 Challenges

The iCity Project has been a very ambitious project by aiming to create open innovation systems. It intended to deliver many things: to open city public infrastructure, create a platform where both open infrastructure and open data in real time was accessible to the innovation ecosystems of each city, and eventually that stakeholders (i.e. governments, universities, business and citizens) in these innovation ecosystem will be able to co-create Apps that produce services of public interest that will serve local communities in adding new services to their communities and improve both the social and economic wellbeing and innovation in the respective cities.

The proposal and the design of the project were of good quality, based on the experiences and expectations that Smart Solutions were given by literature and experiences available on those years. It was clearly aligned with the call and it was proposing an experimental exercise no exempt of risks. But precisely risk and the emergence of them during the whole project can be seen as a measure of its innovative and complex goal. After four years since it was awarded, many of the goals set at the beginning were achieved, others did not.

Regarding to the sociological analysis of co-creation and the Pilots, we have identified several challenges during the project that can serve both as a reflection on the shortfalls of the project but also learning lessons for the future.

### 4.1.1 Technical issues and technical-dependencies

As stated in section three of this document, one of the main challenges to implement co-creation methodologies and attract stakeholders willing to develop Apps over the platform has been to produce a platform running and with open infrastructure and data to test, play and foresee the potential uses that can deliver.

Data on section three clearly estates that when stakeholders and participants have had the chance to test the platform in the hackatons and iCity Campus, the feedback has been positive and participants have committed to follow the project outputs and get more information. However, (justified) delays in the delivery of the platform have impinged in the activities of engagement and co-creation practices. Indeed, the complexity of creating a platform that can connect different infrastructures, with different architectures and software protocols have been a major challenge.

Related to this process, a second layer of complexity has come from the difficulties of connecting different infrastructures in the city. This has not been a technical problem, but institutional. In fact, one of the novelties, to integrate different infrastructures beneath the platform has meant to deal with the owners of such infrastructures and their own agendas. Even in the cases where the city councils owned the infrastructure, if they were the responsibility of other units within the local government the process of connection was far slow than expected. Again, the pace of infrastructure connection to the platform played against a major involvement of stakeholders and developers in the engagement process. During the participant observation in engagement activities, these two issues were a

recurrent comment by some participants. In top of that, a serious challenge came as well about data access. Indeed, the open data published was not controlled at the end by iCity but by the owners of the infrastructure opened. Thus, there was no control on the flow and availability of data.

Yet, our evaluation finds these problems not as a failure of the pilots but a reflection of the ambition and complexity. Certainly, the pilots have been a great test to unravel the unexpected challenges of a very innovative facet of iCity, namely delivering *open innovation systems*.<sup>1</sup> Lessons learnt on this front have been taken into account by the coordinator and the cities participating in the project in the next stage that is passing from pilots to the deployment of the platform after the project is finished.

#### **4.1.2 The Apps hype**

A second challenge that has faced the project has been related to the assessment of the potential number of Apps that can be created. Indeed, in the first DoW the number of Apps promised was high (300). This optimism was not only in the mind of the participants of the project but it was a common feature in the high-tech industry five years ago. In a nutshell, the reason behind this optimism were based on (1) the exponential growth of smart phone use in Europe, and downloading of Apps at the moment; (2) the success of several killer Apps and exponential growth of an Apps industry; (3) Apps design more driven by innovative idea than technological complexity – i.e. if a need is spotted at local scale, the technological development is not the critical factor to deploy it.

Though the number of Apps expected in the project was reduced in the later DoW to a lower number, this clearly shows the evolution and difficulties of producing, through co-creation, Apps for new services for public interest. It was noted that if there was an already existing app developed or in process, this fact deters the success for a second similar app. For instance, if local authorities or private institutions already had transport Apps (e.g. public transport, traffic, taxi services, etc) and they were already in use, the market for a second or third app was small. And indeed, in particular for the case of Barcelona, there were already a substantial number of Apps in the fields where iCity was opening infrastructure.

Yet, as we already have pointed out, measuring success on Apps development or new (unexpected) services created in iCity is not a matter of quantity but quality. This quality can only be achieved (1) by guaranteeing that the right people is able to access and (2) by the success of the Apps and services developed regardless of the number. Our assessment is that in general terms, the project has been able to reach the “right” people in each local innovation ecosystems. Though in the next stages of the project after the pilots, efforts needs to be made to involve more actively citizens and SME though. It also has to exploit other uses beyond Apps development. Finally, to do so, the project has to go to the next phase,

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<sup>1</sup> As stated in the mid-term reviews of the project by the evaluators, the great challenges and value added of the project was to move from open *data* to open *infrastructure*.

that is, to achieve to open more infrastructure in each and new cities and to consolidate uses and Apps within the iCity platform.

#### **4.1.3 Ecosystem diversity and co-creation**

The third challenge that iCity pilots have confront have been implementing a common methodology to diverse local innovation ecosystems. The project started by assuming that the methodology for the pilots will reach their audience regardless of location. However the reality has been different. It is true that the consortium was quick to realize that and to adapt methodologies, but some lessons were learnt.

First, even within the same country local innovation ecosystems are diverse; there are different institutional settings and norms (i.e. tacit rules); and, different composition of actors, who also have different channels of communication and different roles and power relations. For instance in Bologna, through the Iperbole Civic network or in Barcelona, there exist strong collaborations between private and public institutions (both for profit and non-profit sectors) and developers are used to collaborate with local authorities and other institutions (e.g. Citilab) in developing common projects and interact. By contrast, in cities like London, developers are less inclined to do so and they have a more for profit orientation (market competition and venture capital potential is much higher). Thus, goals and objectives are different. Therefore, to introduce concepts such as co-creation poses problems. The understanding of concept of co-creation and its implementation between different stakeholders becomes problematic. Indeed, at different degrees, most of the developers involved in the project are used to work or either in developing Apps alone or following the demands of a customer, but not to co-create with users and citizens. That is another challenge that the experience of iCity pilots has find and that needs to be thought about it. Secondly, those collectives more inclined to co-creation, the peer 2 peer communities found in hackerspaces and social movements are usually wary of engagement with projects were institutional actors and (big corporate) companies participate too. Thus, part of the ecosystem diversity inclined to participate in co-creation is not available. A potential solution for this second problem is to attract to iCity cross-collaborations with SME and organizations working on the social economy, which are seen precisely the opposite of corporations. Thus a social economy space can be open in developing new Apps.

In a nutshell, it is not (all) about technology but how technology is embedded in social practices in different local innovation ecosystems. The backbone technological infrastructure of iCity can be understood by any engineer or developer across Europe. However, the application and uses in place of the iCity depends on how it is inserted locally. First, as stated in D6.7 Regulatory Issues – Final, it depends on how the project is adopted to the needs and priorities of each Smart city strategy, and different demands from citizens; there are politics at play (regarding open data, transparency, accountability but as well what technology for what). Second, there are different institutional settings (governance infrastructures and arrangements, social dynamics, etc.). Third, there are different socio-technological cultures, that is, understandings of technologies and social uses of it both within innovation communities and users. Fourth, there are diverse economic milieux and

structures in each city (with different actors in terms of size, industry and interests) that might respond differently to technological solutions. In this sense, iCity can be a powerful tool for local authorities to set common (technological and co-creation) standards and protocols across European cities. Yet, to enlarge its scope and establish across Europe, it needs to take into the account such existing diversity and be supported by political strategies.

#### **4.1.4 Definition of citizens and users**

As already mentioned, one of the challenges during the pilots has been to engage and get involved citizens and other actors such as SME in the project. This is not to say that there has not been these actors in the pilots but that their numbers and involvement could have been higher.

In this sense, it is worth noting some of the limitations and results of the project. On the one hand, co-creation methodology was initially designed with the idea that citizens could participate in selecting what infrastructures could be opened to help cover their needs. However, the already explained delays in the project and the increasing pressure to achieve results in a shorter time frame played in favour of an straight opening of available infrastructure and putting developers at the centre of co-creation processes. On the other hand, there were as well successful results, such as the development and launching of Snapi!, involving children and young adults, or to engage citizens in iCity Camp by opening 311 complains information systems scenario in the event.

In this regard, this is not only a problem of iCity but that is generally found in smart city projects that try to implement quadruple helix projects. These projects, like iCity pose a first hurdle, the technological complexity that needs to be translated to actors that potentially are not familiar with it. But there is a second hurdle. iCity, as many other smart projects, genuinely look for engaging citizens in designing and producing smart solutions, yet the lack of clarity of what sort of profile do they want to engage make them fail in achieving their goals. That has been the case of iCity. On the one hand, to allow innovation happens freely and in any field, there was not a clear profiling of what kind of citizens were targeted. Did we mean citizens, users, developers, consumers, etc.?

An explanation to that might be found in the lack of civic approaches in Europe if we compare it with the United States. Indeed, we are heading to the right direction, policies such as of RIS3 as a representation of European policies for regions, and cities are pointing this need of involving citizens in innovation bottom up projects but there is a lack of experience in the institutions to lead this process. In addition, new social movements and processes like the sharing economy are showing new forms of producing bottom-up innovations where citizens play an active role. But this means a paradigm change in which European city councils are only starting to learn, and in which, iCity can be seen as one movement in this direction.

To do so, local authorities need to understand the key position of citizen innovation in their policies. Institutions have started its own transformation but it is a long term process. At this moment just champions, lead users become those Innovators within the civic institutions (schools, universities, museums et) agree to be involved in this joint ventures but it is

important to provide rich living lab environments / time / human capital to really co-design and co-create services. This is a major challenge for iCity and Smart projects in general. And here is crucial (1) to engage both developers and scientific communities in each city to create and innovation alongside citizens; (2) to empower and technologically enabling citizens to develop prototypes and lease with the rest of quadruple helix stakeholders. But this is not (only) the task of iCity but requires a political commitment by local authorities.

#### **4.1.5 Conclusions**

In sum, the iCity pilots have been experiments within a very ambitious and innovative project that has aimed to solve many problems in a holistic approach. As any experiment, there have been challenges and design solidity has been tested. The important issue in this regard is not to point out to the measurement of indicators promised but to (1) assess if the experiment can be translated to a solid platform, transferable to other environments and sustained through time; and, (2) learnt from the challenges emerged in the pilots to improve and guarantee this temporal sustainability. In this regard, as it has been shown in the previous section and in this one, the iCity platform has evolved and have positive results – some of them unexpected – but with some dimensions underdeveloped or with margin for improvement. These dimensions have been evaluated and taken into account by participants. Also, as explained above these challenges are common feature in other smart projects, thus lessons learn in these fronts form iCity can be helpful not only for this occasion but for other projects on smart solutions. In particular, we believe that one common challenge that needs further reflection beyond iCity is how quadruple helix models engage with citizens and how smart projects can introduce successfully co-creation processes on top of open data and infrastructure.

## 5 Opportunities

Finally, the last part of the analysis is focused on the opportunities that the iCity project has beyond the pilots' experience of developing Apps of services of public interest. In this regard, we see four opportunities that can strength future success of the platform and their long term sustainability. The first three already mentioned in section 3.2.

1. **Training purposes:** students – at under- and post-graduate levels – to experiment new Apps or processes in real time and open data from different city information systems, can use the platform. As a collateral, this can lead to the production of new innovative Apps and platform applications.
2. A second stream of potential uses of the iCity comes from the role that it can play in delivering a platform for **new business opportunities** that relay on the increasing generation of big data in real time in urban economies such as the electric car.
3. As a **management platform** for outsourced public services and civil engineering works that need data from different information systems and dimensions. The iCity platform can be an ideal device for granting access to that data and control the dissemination of the data only to the authorised third parties.
4. iCity platform for resilient urban governance: i.e. in the event of social or environmental conflict/problems, the conjunction of coordinated and homogenized data from different open information systems can be of great use for quick and efficient responses.
5. iCity as a **sharing platform:** as the sharing economy is becoming a new emerging industry, iCity platform can be a useful tool to help to control and regulate sharing economy business in place such as car or housing sharing; or becoming a technological platform for open community sharing initiatives at local level. Indeed, the sharing economy is the next step for open data services. iCity can be a relevant actor in advancing the future in open data services in Europe that balance both economic and inclusive growth.

These are five potential uses that can add value to the platform and represent a key tool for new innovative forms of governance.

## 6 Conclusions

In sum, there are five main conclusions of the evaluation:

1. iCity project was a very ambitious project: open infrastructure, open data and co-creation with diverse stakeholders including citizens. Most of innovative projects try to do one or two at the same time upmost.
2. Clearly the big contribution of the project has been delivering a platform that joints open data with open information systems, mainly understood as opening information systems.
3. Pilots have been positively evaluated by participants in co-creation processes and some Apps have been created.
4. Though the positive results, the project has not been completely successful in developing co-creation processes in the development of Apps.
5. Many unexpected opportunities have been created through experimentation that can be the base for new uses and strength the utility of the platform.