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Summary

This document analyses and evaluates new models of relationship between citizens, public administrations, private companies and city in order to find growth models and to identify best practices and opportunities.

DOCUMENT HISTORY

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Abbreviations and Acronyms

Acronym	Description
MAN	Metropolitan Area Network
NGN	Next Generation Networks
CDB	Comune di Bologna
CDG	Comune di Genoa
GLA	Great London Authority
API	Application Programming Interface
AGSC	Genoa Smart City Association
SLA	Service Level Agreement
IoT	Internet of Things
SiG	Special interest Groups
SME	Small & Medium Enterprise

Introduction

Comprehensive approach to the deliverable

This deliverable contains an analysis on the challenges that each city faces, the relationships between the stakeholders in each city, and how the iCity project can improve the community, security, and efficiency of cities through the use of this technology.

The first part of the document identifies the challenges and the relationship models in the participating cities; it identifies the limitations on the stakeholder relationships and city structures, highlighting the areas that can be improved.

In the second part of the document, we identify several hot topics or trends that have great repercussion on the relationships between the stakeholders, and that greatly affect cities and their citizens.

The third part of the document will analyse the iCity project use cases, which reflect several of the topics or trends, and will explain those new relationships, identify new players, rules and basic information necessary to define the new business models and best practices.
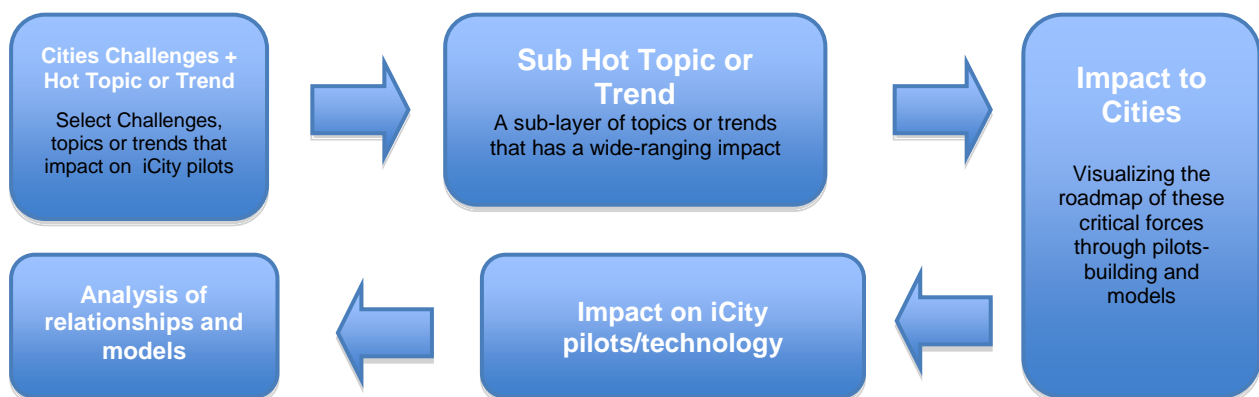
In order to develop the document we use the outcome of WP2, WP5, and specially WP6, plus city experiences with the use cases in their daily activity.

This document identifies and evaluates the existing relationship models between the citizens, public bodies, academics, and private companies that are stakeholders in the cities. The deliverable goes on to identify key measures and indicators of city growth, and the best practices for stakeholder and governance to maximise the opportunities for growth.

Measures and indicators of city growth, and therefore the benefits of the iCity to investors and the city will be analysed in detail in Deliverables D7.2 and D7.3 during 2014. The measures under consideration could include (under analysis):

- Investors:
    - Net Present Value, Internal Rates of Return;
    - Profit/ P&L
    - Annualised Return
    - Sales/Business Value

- Cities:
    - GDP/GVA
    - Sensitivity Analysis
    - CO2/CHG Levels
    - Employment
    - Happiness Index
    - New buildings started
    - Balance of public space to buildings
    - Time to commute
    - Broadband connectivity
    - Numbers of people with tablets/Smartphone's

1. Top level Challenges for the cities

1.1   Introduction

In the next few years, cities will need to change or redefine the actual relationship model according to their strategies and challenges. Each city has its own unique characteristics which can be defined according to stakeholder's relationships, local economy, political learning's, legal issues, economic opportunities, and the obstacles they face to achieve their strategic objectives. In this chapter we identify the top challenges and drivers for each city.

Some of those challenges are:

- Population growth
- Air pollution
- Unemployment and skills
- Increasing healthcare demands
- Changes in demographics profile
- Stressed and congested transport systems
- Resource inefficient building
- Energy demand and increasing costs

1.2 Challenges and drivers at city level

1.2.1 Barcelona

The main objectives of this global change that guide any of the projects taken in the city until this moment were to improve the quality of life of Barcelona citizens and to foster the economic development in the city, in an attempt to touch all areas of the city.

- **Environment and Energy:** Barcelona is firmly committed to work towards the achievement of an eco-efficient, self-sufficient, energetically renewed and zero-emission city status. For this purpose, many projects are being implemented regarding smart water management, smart lighting, self-sufficient building blocks, district heating and cooling networks, zero-emission mobility, etc.

- **Transport:** Barcelona aims to become a highly interconnected city with productive, human-scale neighbourhoods under the slogan "Many Slow Cities within the same Smart City". Smart parking projects, orthogonal bus networks and many urban areas transformation are projects aiming to connect the different city neighbourhoods in the most efficient way while preserving all the areas of the city in the best possible conditions.

- **Waste management:** Many projects are being implemented related to efficient waste management through the use of Automated Waste Collection Systems.

- **Urban-rural cohesion:** A new project is being designed with the purpose of connecting the city with the Collserola Mountains by implementing and integrating platforms and ICT applications to define and organize the transition spaces between the natural park and the city, giving value to the natural resources and the landscapes of the Park.

- **Quality of life:** Besides the clear improvements that imply all of the above projects for the quality of life of Barcelona's citizens, many other projects help to facilitate their everyday lives by saving a lot of time and effort in activities such as paying, all sorts of procedures with the Administration and internet and data access. Projects involving the spread of the use of NFC technology for contactless payment, deployment of public Wi-Fi networks and the installation of electronic kiosks in different points of the city for electronic administration purposes, are becoming very popular among the citizens because of the improvement they represent in the quality of their lives.

- **ICT Strategic Plan**: Barcelona has an ICT strategic plan, based on its belief that an efficient and integrated ICT infrastructures management is one of the key elements to achieve its goals. This strategy, that summarizes the city's ICT strategic plan, stands for:
    - Mobility: Barcelona is the Mobile World Capital (MWC) between 2013 and 2018 and wants to take advantage of it and use it to change the city and as an opportunity to the enterprises.
    - E-Government: Management collaboration using cloud, social networking, mobility…
    - Smart City: Barcelona is working on the development of the city as a leading Smart City and a referent to many other cities.
    - Information Systems: The modern and effective systems of information help the city achieve its strategic goals.

o <u>Innovation</u>: Key element to transform the Administration, to improve the productive processes and thus, to improve the citizen's life quality by ensuring that latest trends are included in the city strategy.

In addition, besides working with many private technology companies and having signed agreements with lots of international institutions, Barcelona has signed many agreements with Catalan research centres creating a Smart Cities cluster. Moreover, the Urban Lab space attracts many of these companies to try their most innovative projects in the city as they enjoy a real urban environment for results evaluation. These connections allow the city to be aware of the latest technologies being developed, potentially creating new opportunities and giving rise to new ideas.

1.2.2 Comune di Bologna

City's population is not static, instead it evolves over time. In the Bologna area, the changes in the socio-demographic profiles are creating different needs and expectation from the Municipality's offer of public services, policies and planning capacity.

All this changes (people, places, conditions, age, culture, etc.) are challenging issues for Bologna City and it is necessary to move rapidly in the "reconfiguration" of the public services/policies delivery models, and – at the same time – these redesigning plans could produce negative counter-effects that have impacts on the City "quality of life" and its long term sustainability. Fore sighting and getting on time to the evolving needs of citizens – in an increasing scarcity of financial resources - can support a sustainable growth of the city and its prosperity and smartness over the time.

Open government (we gov), transparency, open data / infrastructure are main levers for innovation and shared/agreed governance of the city and its communities; moreover these issues are crucial challenges in the process of designing of Bologna as a smart and 'social' urban environment, and fed by the creative contributions of citizens (civic commons and crowd sourcing).

All the Municipality plans, until 2016 and beyond (2020) are focused on urban/metropolitan sustainability in a broad sense, mainly exploiting the potential of ICT and the mobile, ubiquitous, free access to the net as an enabling new "public sphere" (broadband, Wi-Fi, NGN). In this framework, several projects will be developed also with the cooperation of private and non-profit bodies' resources (PPP), and the support of European networks and partnerships.

The 'in progress' definition of Bologna as a smart and sustainable city is a key part of the Metropolitan Strategic Plan and the 'Bologna Digital Agenda', whose main goals will be drawn up and shared according to a multi-stakeholder and participative methodology. Iperbole 2020, 'Tomorrow's civic network', will become a social and community-based "organism" - a kind of operating living lab - which will make crowd sourcing and user-generated contents as a backbone for the setting up of the new Administration's public policies and actions platform.

In this collaborative scenario the main challenges are and will be:

- **ICT as strategic support** in planning and decision making processes (formal and informal), and in the implementation of services in different fields as economy, mobility, environment, people, quality of life and governance.

- **Social inclusion and multicultural approach** in the policies design and in the provision of services, paying particular attention to all the diversities that enrich the community and also taking charge of the "weakest" people that risk to be "left aside" for different reasons (old people and children care, healthcare system, social marginalization fight, literacy actions…).

- **Education and culture as fundamental right** for all the citizens of the metropolitan area. Bologna oldest University in the western world is a unique asset for the development of creativities, talents and new professions also with the multimedia tools/channels and technologies (makers, digital artisans, innovative start-ups…).

- **Urban regeneration** with policies and plans to put in value / restore the existent buildings patrimony (not only the historical one) but also with the rehabilitation / renewal / revitalisation of the peripheries (new centralities). Stopping the consumption of the territory is a crucial issue, together with environment protection, sustainable mobility (public transports and inter-modality), the alternative energy provision for buildings and the abandoned areas public and civic reuse.

- **Green economy** as a promising field for SME and companies in general, that could give origin to new and innovative production chains and transform – in partnership with the University, Research Centres and academic spinoffs – obsolete technical infrastructures (as for example smart grid).

1.2.3 Comune di Genova

Genoa is a city of about 600.000 inhabitants with a decrease percentage of 14% in ten years. The population is characterized by a high percentage of elderly people. It covers an area of 243 square kilometres (151 sq. miles) between the Ligurian Sea and the Apennine Mountains. The city stretches along the coast for about 30 kilometres (18 miles). Its Medieval Old Town is one of the biggest in Europe with a strong presence of Ancient Historic buildings with specific preservation and energy retrofitting needs.

Genoese territory is highly vulnerable from a territorial point of view. Due to its geo morphological condition and high building density, its infrastructures are strongly congested and traffic is one of the main critical challenges together with its vulnerability to severe events related to geo-hydrological risks. Moreover, the city is living a process of reconversion from an industrial to a technological district. It is characterized by the presence of one of the most important ports in the Mediterranean Sea.

The main challenges are:

- **Broadband**: CDG started a process to spread broadband coverage throughout the city using a Public Private Partnership (PPP) mechanism. The Administration proposed the signature of the Memorandum of Understanding with the main telecommunication companies. This agreement will facilitate and provide free access of the cabling infrastructure owned by the city to telecommunication companies which commit themselves to extend freely the broadband infrastructure to the points of interests (POI) defined by the administration. This process goal is to increase the IoT access points in municipal strategic sites.

- **Safety and Security**: One of the critical aspects in the city is the monitoring of geo-hydrological risks and citizens safety. For this reasons Genoa developed a network of sensors and a monitoring system in order to ensure citizens' safety in case of weather

alerts. Moreover, the Municipality is partner of the FP7 Research HARMONISE project which aims at building a technological platform to improve urban resiliency through a holistic approach. This system will be experimented in a strategic area that is frequently affected by critical events.

- **Open Data**: The Municipality is actively involved in improving transparency and the participation of citizens. The availability of Open Data is a key issue to be considered as an enabling factor to improve the accessibility of information to build new and more efficient services and products. The Municipality has defined the main guidelines for the exploitation of the open data and has created the "Open Data Observatory", where public and private institutions will have the opportunity to more actively interact in order to create a data basis useful to private developers.

- **Sustainable Mobility**: Genoa is strongly promoting the use of electric vehicles. Some of the most important energy suppliers in Italy supported the creation of a charging infrastructure within the city. The Municipality is the coordinator of a very innovative project called "ELECTRA" which aims to create better conditions for the development of a sustainable electric scooter market.

1.2.4 London

London is a rapidly growing city of 8.5m people that is forecast to grow and further diversify as migration increases across Europe. Population demand is stressing the infrastructures and services of the city. This stress brings a wide variety of severe and interrelated challenges, which require innovative approaches and solutions, if they are to be overcome in a short timeframe.

- **Population growth**: Average population growth across London is approximately 14% and by 2050, a population of a city the size of Birmingham is expected to swell London's numbers.

- **Air pollution and CO2**: London's failure to meet EU air quality standards for NO2 has put the country at risk of £300 million in EU fines. Poor air quality in London contributes to as many as 4300 deaths a year and cost between £8.5 and £20.2 billion/year.

- **Stressed and congested transport systems**: Growth in power consumption has left the network 'at or above firm capacity' across several wards in the city. Congestion costs the economy an estimated £2 billion / year, with Londoner's wasting 70hrs in traffic each year.

- **Unemployment and skills**: Unemployment is higher in London than other large UK cities such as Birmingham or Manchester. Nine out of ten London boroughs, with the highest levels of unemployment, are in East London, with Newham at 15%.

- **Resource inefficiency and fuel poverty**: More than 20% of households in London are struggling to heat their homes, and water efficiency is similarly poor, with higher per capita consumption. Thames Water lost 669.9m litres of water a day in 2009/2010.

- **Increasing healthcare demands**: By 2035 the number of people over 65 years in UK is projected to be 25% of the population; c. 20% of the London population smoke, and Tower Hamlets has one of the highest rates of childhood obesity in UK.

- **Housing**: there are severe demand pressures already, on both property for sale and rental. Added to this the rate of new home starts and the forecast capacities are well

below the curve of future projected demand.

- **Energy:** in addition to an increase in fuel poverty because of high prices, the capability to fulfil its energy requirements is coming into question as demand is projected to exceed capacity. This is a national problem that could be solved through district/distributed plant and use of energy from sources such as waste.

1.3   Common challenges

		Barcelona	Comune di Bolongna	Comune di Genoa	GLA
Top level challenges for the cities	Population growth				X
	Air Polution	X			X
	Unemployement and skills			X	X
	Healthcare				X
	Changes in demographics			X	X
	Stressed and congested systems			X	X
	Resource inefficiency				X
	ICT (Strategic support)	X	X	X	
	Social inclusion and multicultural approach		X		
	Education and Cultural (Basic rights)		X		
	Urban regeneration		X		
	Green economy		X	x	
	Environment and Energy	X		x	
	Transport	X		x	
	Waste management	X		x	
	Urban-rural cohesion	X			

Table 1: Common top level challenges

The table above shows the fields that each city has set as priorities when identifying their actual challenges. This approach addresses each challenge as a standalone item, that is to say, with no interactions with each other.

Although this approach might have proved sufficiently good with regard to the resources and tools at the administrations' disposal so far, the new technological environment and new holistic perspectives suggest different approaches based on collaborative and horizontal views, where new stakeholders are considered and 'invited in' rather than the traditional schemes.

Further down in this document, this new approach will be presented and the iCity will appear as a tool that meets the requirements of such a new paradigm.

2   Relationship models in the cities

2.1   Introduction

Nowadays, the number of players and relationships between public administrations and citizens/companies is very limited, and is based on a service catalogue that local administrations offer to their citizen according to the population of the city, based on regional and national polices.

Mandatory Services of Municipalities (SPAIN)				
> 50.000 pop.	> 20.000 pop.	> 5.000 pop.	ALL	1. Street lighting 2. Cemetery 3. Waste collection 4. Street cleaning 5. Domiciliary supply of potable water 6. Sewerage 7. Access to towns 8. Paving of the public roads 9. Control of food and beverages
				10. Public gardens and parks 11. Public library 12. Markets 13. Waste processing
				14. Civil protection 15. Provision of social services 16. Prevention and Fire Fighting 17. Sports facilities for public use
				18. Urban transport of passengers 19. Protection of the environment

Table 2: Catalogue of services in Spain depending on City population

Some of those services are offered directly by public workers, basically in education and social areas or economy promotion, but in most cases the administration delegates the job to private companies via public tenders. At the same time the incomes are limited to a few sources (Taxes, Concessions, National contributions…). Each city manage their resources and public interest services according with their priorities, strategies and resources, but some of those services are necessary in order to reduce the social divide, and needs a special economic effort for Administrations, those efforts are necessary to be compensated with incomes in other areas, efficiencies, synergies, sharing resources, collaboration between administrations, etc.

On the other hand, citizens perceive that the numbers of services they receive are fewer and they are an intrinsic obligation for local administrations to manage/provide to them. The citizens don't perceive the effort needed to provide them.

Citizens' participation on government and administrations, sometimes, is limited too, and nowadays they want to have more influence in cities decisions.

That constrains and facts define the actual limited relationship models in cities.

2.2   City level

In this section, the cities analyse their service catalogue and the way the services are provided. Through this analysis, involved stakeholders and relationship between them are identified:

Service Catalogue & Recipient

Several stakeholders can be considered when determining whom the cities offer their services to:

Citizens: not only those included in the census but also visitors, tourism, foreign students, etc. Services offered by the cities to citizens may include a wide range of them, going from waste management to health, mobility, water distribution, transport, public lighting, etc.

- **Small-Medium Enterprises** (as per EU Classification)

Company category	Employees	Turnover	Or	Balance sheet total
Medium-sized	< 250	≤ € 50 m		≤ € 43 m
Small	< 50	≤ € 10 m		≤ € 10 m
Micro	< 10	≤ € 2 m		≤ € 2 m

  The cities offer to SMEs may range from economic promotion to authorizations and licenses, etc.

- **Companies**: big companies, normally those offering electricity, gas distribution, telecommunication networks, or city services providers. Under the traditional model, the services the city can offer to this type of entities remain limited to licenses, permits and public tenders. Under a bottom-up model with opened public and private infrastructures, stakeholders like SME and Citizens could widen up the relationship between companies and cities.

- **Other (other institutions, GNO...)**: the cities can offer these entities special conditions in order to attract them to the city domain and take advantage of their role as an attracting pole in specific economic or social areas.
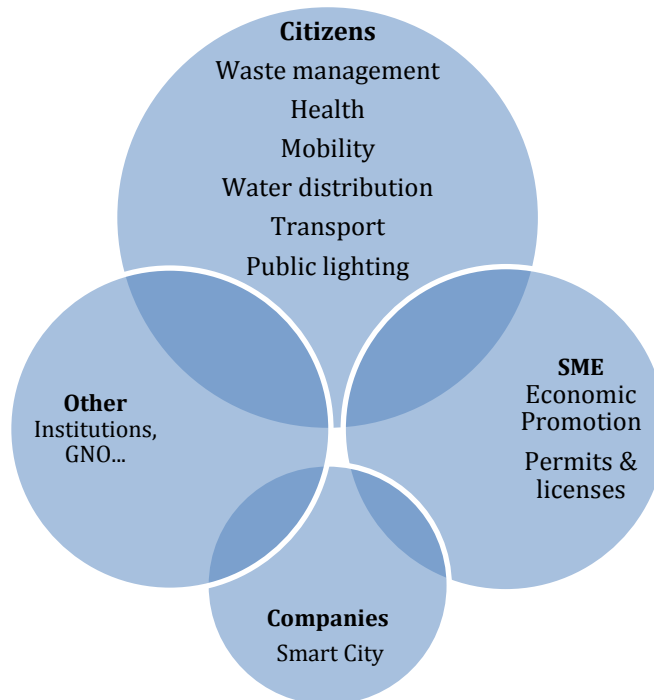
Figure 1: City catalogue

Modality

The catalogue above shows a rough classification of services with regard to the stakeholder whom they are offered to. How these services are offered may take several forms, ranging from public resources to private (through tenders) and depend on the administrative configuration (e.g. GLA vs. boroughs, Barcelona City vs. Metropolitan area, etc.)

Generally speaking, services can be addressed using the following approaches:

- Direct with own **public resources**: social care, education (primary school)...

- Direct with **collaboration of other public administrations**: waste management, health, education...

- **Private Public Partnership**: transport, highways, broadband...

- **Public tenders:** mobility...

- **Community**: Urban development...

- **Public participation companies**: waste management, transport...

How each city addresses the services with regard to their constraints, characteristics and administrative and legal models is explained in the correspondent points.

Direct with own resources	Direct with the collaboration of other public administrations	Private Public partnership
Social care Education (primary school)	Waste management Health Education	Transport Highways Broadband

Public tender	Community	Public participation companies
Mobility	Urban development	Waste management Transport

Table 3: How city services are offered

2.2.1 Barcelona

These services are offered and their modalities can be summarized in the following tables:

Citizens	SME	Companies	Other
Waste management			
Health			
Mobility			
Water distribution			
Transport			

Table 4: Service Catalogue

Direct with own resources	Direct with the collaboration of other public administrations	Private Public partnership	Public tender	Community	....
Social care	Waste management	Transport	Mobility	Urban development	
	Health	Highways			
	Education				

Table 5: How Barcelona services are offered

(This section will be developed and further analysed in following updates.)

2.2.2   Comune di Bologna & Genova

These services are offered and their modalities can be summarized in the following tables :

SME	Companies	Other
Economic promotion	Smart City	

Table 6: Bologna/Genoa Service Catalogue

Public services are delivered either directly by or indirectly by companies with public participation.

Direct with own resources	Direct with the collaboration of other public administrations	Private Public partnership	Public tender	Community	Public participation companies
Social care	Health	Broadband	Mobility	Urban development	Waste management
Education (primary schools)					Transport

Table 7: How Bologna/Genoa city services are offered

(This section will be developed and further analysed in following updates.)

2.2.3   GLA

The GLA is a 'family' of bodies that manage and deliver services for transport (Transport for London), policing (Metropolitan Police), international development (London and Partners), Olympics legacy (London Legacy Development Corporation), fire services (London Fire and Emergency Planning Authority), policing and crime (MOPAC Mayors' Office for Policing and Crime).

The London Boroughs have politically elected governing boards. As public bodies, they are responsible for the delivery of public services across the capital to citizens and businesses that do not otherwise form part of the GLA's responsibilities. In some instances, there are overlapping 'common' service interests between the Boroughs and GLA, such as surface transport where the TFL agency is responsible for the TLRN (Transport for London Road Network),while the Borough share responsible for the SRN (Strategic Road Network). Another good example is healthcare, which is of strategic importance to the GLA, with the

implementation at Borough level by the National Health Service who works increasingly through a joint health board with the Borough to deliver services to the community.

If we use the London Borough of Croydon as an example, we find the Borough offers services in these categories:

- Advice and benefits – welfare

- Business – licences, permits, tenders/contracts

- Community and living – youth support, equality and diversity, registering births, deaths and marriages

- Council and democracy – elections, customer feedback and complaints

- Education and learning – schools, nurseries, further education

- Environment – pollution, pest control, conservation, waste and recycling

- Health and social care – children and families, adult help, fostering and adoption

- Housing – landlord schemes, rental options and advice

- Leisure and culture – libraries, parks and open spaces, sports and physical activities

- Planning and regeneration – making and reviewing applications, policy framework

- Transport and streets – parking, roads and pavements, street care and cleaning

As part of the iCity and GLA 'Building a smarter London' initiatives, the GLA is working with Boroughs at senior management level (directors and heads of department) to determine what sort of 'smart city' the Borough wants to become (see cities workshop planned for Jan 2014).The following figure shows how the various elements work together to help the GLA identify the project areas of greatest interests, and put in place plans and actions to integrate the data and APIs into the iCity platform.
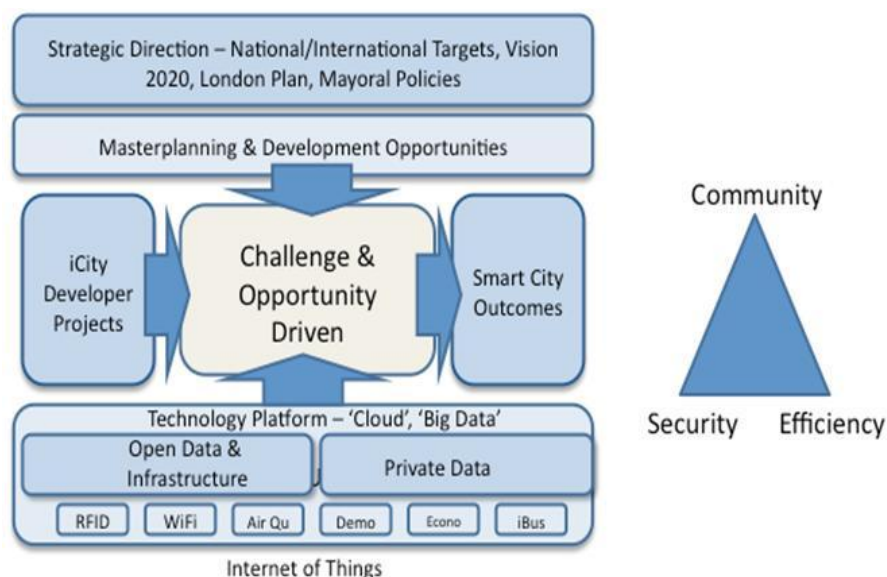

Figure 2: iCity & Smart City relations (GLA)

The priority areas at this time are transport (parking and road congestion), healthcare (GeoMedicine and tele-health diabetes), and 'Open Data' provision. Energy will follow on

within two years as the Borough improves the efficiency and consumption in residential and commercial buildings.

Public services are delivered either directly by the Boroughs, in collaboration with the relevant GLA department e.g. planning or transport, or indirectly by third parties. Public tendering and award of contract to third parties may be either the Borough, or a series of Boroughs working together in a group such as the South London Partnership. From the GLA point of view Public Private Partnership is generally considered a failed model and one that has been widely discredited and now rejected.

2.3   Stakeholders

The figure below shows different stakeholders who have been identified in the previous section 2.2. Future release of this deliverable (D7.4) will improve it by clarifying stakeholders and their interactions.

Figure 3: Stakeholders identification

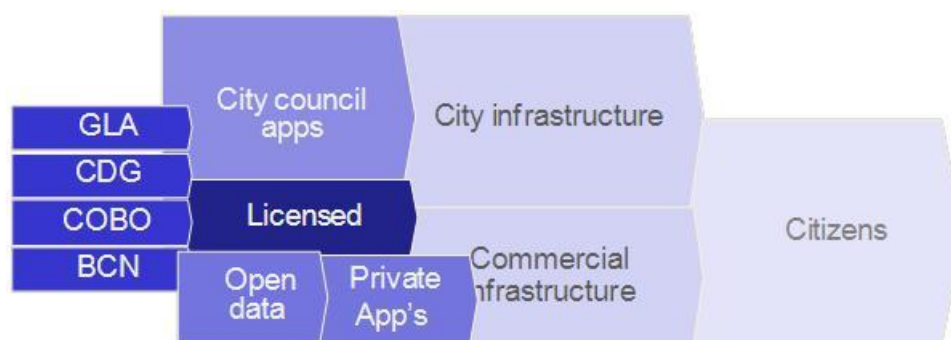The figure below shows the value chain that has been identified by WP7 T7.1 activities.

Figure 4: Identification of the value chain

3 City strategies

This section presents strategies that the cities (Barcelona, Bologna, Genoa and Great London Authority) are following in order to become a Smart City.

3.1 Barcelona

The transformation of the city of Barcelona to become a Smart City received a clear boost when, in 2011, the recently elected Mayor Xavier Trias, included the smart cities topic in the city strategy for the new tenure as a key strategic point to encompass, not only urban development, but also a global transformational plan aimed at introducing the use of the new technologies for the improvement of the overall functioning of the city.

The main objectives of this global change, that guide any of the projects taken in the city until this moment, were to improve the quality of life of Barcelona citizens and to foster the economic development in the city, in an attempt to touch all areas of the city. Accompanying this decision, the new area of Urban Habitat was created under which key areas like Urban Planning, Environment, Energy, Urban Services or ICT were included. This decision has facilitated that areas that traditionally worked in an isolated way are now collaborating closely with a single objective in mind: transforming the city of Barcelona hand in hand with the use of new technologies.

Furthermore, this change in the governance strategy of the city has led to a significant improvement in the way urban services are managed. Furthermore, the introduction of the wise use of technology in urban management it is clearly affecting the management of the city as a whole.

Barcelona's transformational approach is following a long-term vision that is based on building a "city of productive, human-scale neighbourhoods within a hyper-connected, high-speed and zero-emission metropolis".

Recognizing the leadership of the city of Barcelona in the Smart Cities field, the private companies and research centres that have signed agreements with the city have the role of enriching the key strategic projects with their expertise and to test their more advanced solutions in a real urban environment. Sometimes, there is more than one company working together and with the city on the same project meaning that there has to be a constant communication flow among all the agents in charge of the project that allows for a very valuable knowledge exchange while creating useful contact networks for future projects.

The main key areas are Urban Planning, Energy, Environment, Urban Services and ITC which are grouped together under the responsibility of a Urban Habitat department, guarantees communication channels and a constant information flow that proves the intention of working with the maximum attainable efficiency and collaboration spirit and will allow the different areas to allocate resources and use knowledge in the most profitable way for the development of the city projects.

ICT infrastructure is helping the city to become more efficient through smart city projects and this affects not only the environmental or mobility areas but also its governance. By achieving faster processes and better informed agents, the decision making processes can be done in a smarter and faster way achieving an overall efficiency that provides the right incentives to work towards a better city.

The Smart City strategy, in terms of energy, focuses in the development of the "Barcelona energy self-sufficiency Plan", which aims to improve the energy efficiency, reducing

greenhouse gas emissions in sectors such as buildings, mobility and transport, public space and infrastructure.

Regarding mobility, the energy self-sufficiency Plan foresees a reduction of 441.461,47 tons of GHG in 2020, over 10% of global emissions recorded in 2008, the base line year of the Plan.

3.2 Comune di Bologna

Figure 5**: Bologna directives**

Objectives:

- Promote the digital public administration

- Spread transparency culture and practice (open gov)

- Make the digital administration code applied

- Strengthen the PA role in designing Smart Communities

Roadmap:

From January 2012… 1/2/3…events per month, promoted by the municipality and shared with the community.

The guidelines are:

- Internet as a right and new digital rights:
  - o Internet as a right:
    - The Municipality of Bologna considers Internet as an essential infrastructure / public sphere to be guaranteed to citizens, enterprises, city users and city visitors/guests.
    - In 1995 the Iperbole civic network (www.comune.bologna.it) offered each citizen access to Internet and email account for free.
    - Since 2006 the civic network started becoming mobile and ubiquitous through Iperbole Wireless, continuously expanding (around 30.000 users).
    - In 2013 and beyond the aim is to guarantee the Internet neutrality and equal and broadband access to everybody, without barriers from the technological point of view and without economic, social and cultural disadvantages/divides.
  - o New Digital rights:
    - Social media & network interactions push also Pas in charging their consolidated organisational models and communication paradigms through an information/distribution approach:
      - Horizontality/plurality of voices vs. verticality/one prevailing voice.
      - "Communicating vessels" vs sealed rooms/silos patterns.
    - From a prevailing informative/broadcast use of social media to the promotion of crowd sourcing and user generated contents/apps (iCity is on the same line), building and developing an empowered community (also dev).
    - Social media feedbacks as complimentary to CZRM (Citizen relationship management)

- Involvement of citizens / communities.
  - o The definition, in progress, of the "smart city" is a fundamental element of the **New Metropolitan Strategic Plan** (changing administrative profile and levels, aggregating municipalities and overcoming the Province level starting from 1st January 2014) and of the **DIGITAL AGENDA FOR BOLOGNA.**
  - o The evolving objectives will be shared through a **multi-stakeholders methodology**, both through the network and on the territory/districts **and in this perspective the iCity project it's strategic both for the open approach (API, open data/infrastructure) and the civic platform/middleware that will be the result of it**.
  - o Within this **innovation framework** several projects and services are already running and in the course of development for environment, mobility, culture, local economy.
  - o Wake them operative also through the mobilization of external resources **(private and no profit), networks and European partnerships**.
- Innovation through ICT for companies.
- Open data/Open infrastructure/Open government.
- Smart City & Community.

Process / methodology:

- A scientific committee to feed and enrich the process
- A participation (on line and off line) warrantor, external to the Administration, a media activist recognised by the digital community.
- Meetings, bar camps, workshops
- A dedicated blog to inform citizens and interact
- Space for debate, ideas…
- On line form to send proposals and projects (about 80)
- The results of the process will (both on line and off line) were taken into account for final decision, formally adopted by the executive board.

Actions:

- Internet as a right:
  - o Internet access as a new right, to be included in the Municipal Statute.
  - o An official policy act approved by municipal Executive Board on the main topics and priorities of the digital agenda.
  - o Commitment for the widespread of broadband (MAN – NGN – Schools and civic centre's connected, also to train the young dev).
  - o Shared city plan on digital inclusion (networks, access, use of line resources…)
  - o Mapping of the training opportunities on digital issues within the city & community.

- New digital rights:

  o Opening of co-design and co-projecting spaces, contents, services, apps with the community/ies (internal and external to administration), also through the iCity infrastructure.

  o "The Iperbole2020 We are making together": online and offline participation process, Iperbole community will contribute to design, with new ideas & proposals, the new technological-functional-management model of the portal & of the civic network services.

- Enterprise & technological innovation: The municipality commits itself in crating fertile ground for the start-up of enterprises and in supporting the existing productive tissue:

  o Increasing of online services for enterprises

  o Giving value and promote of tenders start-up oriented

  o Mapping and supporting co-working spaces also for non profit bodies

  o Synergy with local stakeholders, in particular research and ICT centres: Cineca, Aster, UniBo, Spinner...

  o Meetings with entrepreneurial associations for the diffusion of social media and digital culture for enterprises

  o Training in management and in digital creativity / innovation

  o Support to local credit

- Open data/Open infrastructure/Open government

  o Document approved by City Council agenda indicating the topic of open data and open gov as a priority issue (primary data, re-elaborated by third parties – www.datagov.it)

  o Internal working group and mapping of data owned by the Municipality that can be disclosed.

  o Creation of a dedicated site, connected to the Iperbole portal (www.dati.comune.bologna.it) for the in progress publication of data and a space for civic apps http://iperbole2020.comune.bologna.it/bologna-apps/

  o Dedicated unit in the ICT department to implement and monitor the Local Digital Agenda with a holistic approach.

  o Agenda as one of the priorities of "Municipal General Plan of Development" for the next years.

  o Agenda inserted in the metropolitan strategic master plan.

  o First call of projects launched at the end of 2012 and to collect ideas & proposals to be realised in the digital agenda framework.

  o 113 projects were submittedand 24 out of them selected to be co-founded and in different ways supported within the "Digital Agenda Community Building Activities (http://iperbole2020.comune.bologna.it/blog/progetti/).

3.3   Comune di Genova

Genoa is developing a new model of integrated strategic planning. This approach aims to link together the Municipal internal goals with the objectives defined by the European Commission for the Europe 2020 strategy. This method aims to collect all the needs identified by the Administration as priorities in order to get the proper way to finance them both for what regards structural funds and thematic programmes. Our city planning map is open to the integration among public and private financing in order to optimize the use of resources and the efficiency of the incomes acquired by EU funding. This process aims to concentrate the resources on those issues which are considered as critical in order to supply better services to citizens and improve the socio-economic structure of our territory. In this context the process towards a smart city keeps being a key issue to improve the opportunities and quality of life of citizens.

Genoa Smart City Strategy

In 2010 Genoa, aware of on-coming crisis and societal challenges, started a transformation process towards a Smart City, which improves quality of life through sustainable economic development based on innovation and research and led by the local government in a process of integrated planning.

Under the Municipality's leadership a fertile ecosystem has been created and fostered, involving public bodies, business, academia and citizens working together in a comprehensive strategy to promote innovation and its concrete application in the real world, while thriving towards the shared vision, coherent with Europe 2020 targets, of a Smart City where people lead better lives.

Genoa promoted the creation of an innovative involving governance methodology – even more so in Mediterranean cultures - connecting the quadruple helix (Institutions, academia, business, civil society):

- Citizens' needs

- Political vision & strategic planning

- Academia's creativity

- Businesses' marketing strategies

- Job creation opportunities

- Regulatory systems

- Funding opportunities

By giving life to the **Genoa Smart City Association** which counts over 90 members working together towards the common goal of making the city a fervent and productive ground where intelligence is applied in planning and actions in a collaborative and positive environment supported by stakeholders and networks.

The strategic vision is shared with stakeholders and translated into concrete proposals, through European projects, national initiatives, specific tailor made business cases and projects.

The Genoa Smart City Association enables connection through a challenging, interactive and

stimulating environment, promoting innovation leading to concrete results integrated in the overall strategy of environmental safeguard and improved quality of life, which will inspire further innovation triggering a transformation process involving academia, business, the city, and the people.

This self-supporting tool (businesses pay annual fees) has demonstrated its usefulness and solidity having worked for three years and undergoing a change in Administration; the new Mayor and his team confirm support and strong political commitment to the important smart city and innovation processes it triggers.

AGSC juxtaposes needs, strategies, technologies, funding and legal framework finding right slots for each project.

Talent

Genoa University, AGSC co-founder, & other research institutions (CNR Nat.l Research Council, Maritime Research Cetena, Italian Institute of Technology), integrate research creating strong links with business & institutions where projects can be translated into real actions.

The Technical Scientific Committee (CTS) includes institutions, research and business; it leads thorough analysis of existing data, classifying members' projects into updated database of possible actions available for arising opportunities.

The holistic process keeps inspiring actors proposing initiatives and projects. Local bodies spend 15% of GDP, so City workers need to share inspiration & commitment.

Successes include 20 Ministry funded Internships on Smart projects, participation in the Orientation Expo for students,

A joint Smart City Master & a book with Turin's Politecnico, various theses were written on Genoa Smart City.

Cooperation with the excellent pre-existing Science Festival – over 200.000 visitors per year – promotes communication of smart city vision and method.

Genoa co-founded City Protocol Society, aimed at sharing knowledge and best practices in smart city growth.

Funding

This systematic approach led to winning several European calls -only city to win all 3 Smart Cities & Communities 2012 call- solid state lighting, energy efficiency, open data platforms data, electric mobility. Most included research on the chosen topics.

Public bodies, companies, research jointly won & cofound 3 University & Research Ministry Smart Cities Call projects, including health care & connection for long illness patients.

Investment

AGSC has become an appealing organization reaching over 90 members investing in it. A smart city needs smart people: for the transformation process to be effective and continuous, the citizen's involvement is essential. Members include civil society to better understand needs, projects and proposals improving quality of life through innovation, be it technological, methodological or organizational.

City & Companies signed Memorandums of Understanding for joint studies, energy audits, projects including innovative funding proposals.

Citizen's involvement & engagement

AGSC includes civil society honorary members & works with Creative Cities to promote involvement & engagement. An Intake Workshop was held to involve & empower politicians, directors, business and research confronting Strategic Smart Goals, SEAP actions, Smart City Vision, prioritizing topics and making SWOT analysis.

Goal of Genoa Smart City Association is to help transformation towards a smart city integrating institutions, research, business and civil society. People meet, discuss, plan, investigate, share and build together a better future for each and for all. The existence of a common forum for proposing ideas, needs, experiences and funding schemes has shown the previous vacuum and the usefulness of a city-led global and holistic process fostering innovation through an innovative model. Research can discuss its findings and orient them towards market needs and business models; companies interact with academia and acquire knowledge on real needs from institutions and citizens for productive market-deployment assured by good integrated planning and sufficient dimensions of cities; institutions overcome rigid bureaucracy co-projecting products and services catering to citizens' needs e.g. Active Ageing projects.

Defining a smart city as "**improving quality of life through sustainable economic development based on innovation and research and led by the local government in a process of integrated planning**", Genoa has touched all important aspects of a transformation leading to real improvement for the city and its inhabitants.

Genoa' SEAP, aims minus 23% emissions by 2020. Baseline study & actions proposed show advantage of integrated process. Green Digital Charter was signed. New Urban Master Plan (PUC) integrated concepts into development areas favouring smart buildings. Port Authority, AGSC member, approved its SEAP linked Energy Plan; its Development Plan is linked with PUC.

The CTS's extended database on AGSC members' projects consented participation in European and national projects integrating City, research and business.

The City has also been working together with Liguria Region, at political & technical level, defining Horizon 2020 funding schemes & areas, following EU & national leads & smart city process results.

Projects for Active Ageing

Involving several stakeholders, Erzelli's Scientific & Technological Park based on Smart Cities will create a lab and venue consenting permanent multi-discipline experiments.

Another important integration step was promoting national awareness through SmartItaly, starting from a Memorandum of Understanding signed by Genoa, Milan and Turin to work together on smart cities leading them to a joint stand in Barcelona's SmartCityExpo, sharing experiences, best practices, contacts, knowledge.

Through the smart city process the City investigates innovation whenever a new product or service is needed, and includes in the process all in-house and participated companies.

3.4   Great London Authority

To help guide the building of London as a smart city, the GLA has established a governance structure under the Smart London Board (SLB), which is chaired by the deputy mayor Kit Malthouse – see figure below:
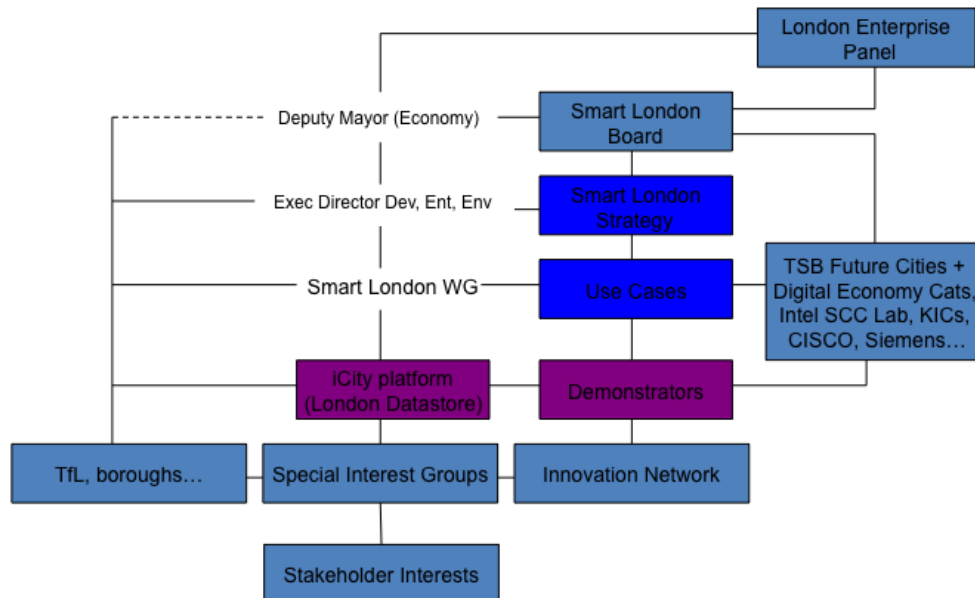

Figure 6: Smart City Governance Structure (London)

The SLB is providing the vision and strategy for the capital to move forward and the city is to adapt to meet these growth challenges. London must harness new technologies, its creative strengths and the vast amount of data that the capital generates each second of every day. This effort will require new forms of collaboration between Londoners, government, businesses and academia to approach London's challenges in an ever more integrated way.

Harnessing expertise

The Mayor of London formed the Smart London Board in March 2013 to shape and implement London's strategy to ensure digital technology makes London an even better experience for all. The board is comprised of a group of experts, including academics, business leaders and entrepreneurs.

The board will advise the Mayor and the London Enterprise Panel, on how the capital can best use technology and data to enable more integrated solutions to addressing London's challenges to ensure it remains one of the world's most competitive and liveable cities. The Board will put Londoners and London's businesses at the heart of this process.

Building on London's innovation lead

London is not starting from scratch, the city is already recognised as a leader in digital innovation, and a pioneer in open data.

The London Datastore was one of the first platforms to make public data open and accessible, spurring citizen engagement, innovation and the development of new

applications. London's dashboard visualises the 'pulse' of the capital – displaying data on anything from tube delays, to house prices and crime rates. The Centre for Advanced Spatial Analysis at University College London has linked London's data to an iPad wall at City Hall. Built around the concept of a control room, the Mayor can visualise the capital's performance in real time.

The management of London's passenger and road transport systems is amongst the most advanced in the world. Innovations include: Congestion Charging using number plate recognition (which has reduced vehicle numbers in the central business district by over 70,000 a day), the intelligent road network management systems trialled during the Olympics, the Bike Hire Scheme and Wi-Fi on the Tube. London's move towards digital money is bringing efficiency savings - from Transport for London's contactless Oyster card to using credit and debit cards to instantly pay for travel.

Technology companies are establishing London as a global showcase, and are collaborating with London's world-class research institutions. Examples include Siemens' £30 million investment in the Crystal to explore how technology can create a better future for our cities, and Intel's investment in a Connected Cities' institute with Imperial College and UCL, which will engage Londoners in the development and design of new technology to ensure it meets the needs of people, not just systems. Earlier this year Google announced its £1 billion investment plans to establish a new UK headquarters at Kings Cross, and London is now also home to the newly formed UK node of the European Institute of Innovation and Technology's €100m/yr. Knowledge and Innovation Community on ICT, known as 'ICTLabs', working with Imperial College, UCL, BT, Intel, Vodafone, IBM, and others. Over the next two years ICTLabs will develop demonstration projects that focus on London's requirements to create 'smart' infrastructure.

iCity offers London the opportunity to build on each of the above initiatives and disciplines, including urban design, to create an 'Urban Platform' where technology and innovation work together to produce unique integrated solutions.

Driving change

If we build on this lead, further investment in technology and data will deliver better services to Londoners, bring efficiency savings, and drive improvements in:

- Enterprise - spurring innovation, creating new markets, creating new jobs.

- Skills & training – access to knowledge and the information that will enable everyone to take part.

- Infrastructure & the environment – absorbing additional pressure, reducing environmental impact.

- Health & well-being - new and better ways of responding to Londoners' diverse needs.

- Transport – planning and managing journeys, reducing congestion.

Adopting new approaches, through bringing people, technology and data together, will enable more integrated solutions to addressing London's challenges. The Smart London Venn diagram below depicts the starting approach that puts Londoners at the heart - driven by the principles of openness, collaboration, innovation and engagement.
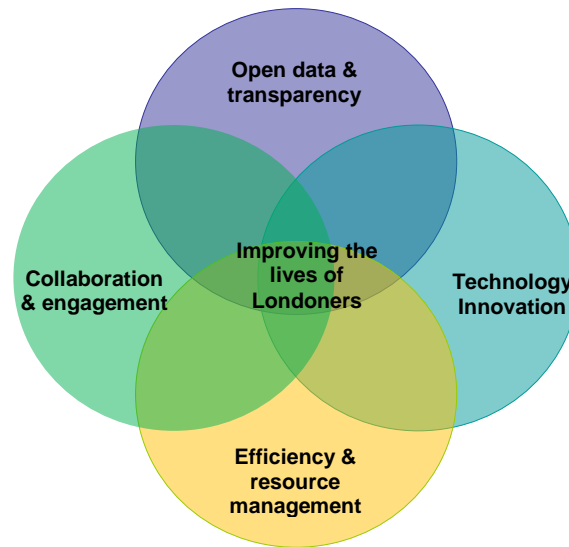
Figure 7: Smart London diagram

The implementation of building a smarter London will be through a London Masterplan (Figure 8), the emphasis will be on upgrading the underpinning communications infrastructure, enhancements to the Open Data platform to meet stages 2 and 3 of the development plan and to integrate the Open Infrastructure components such as iCity, whilst focussing on delivering the value added solutions required by Londoners.
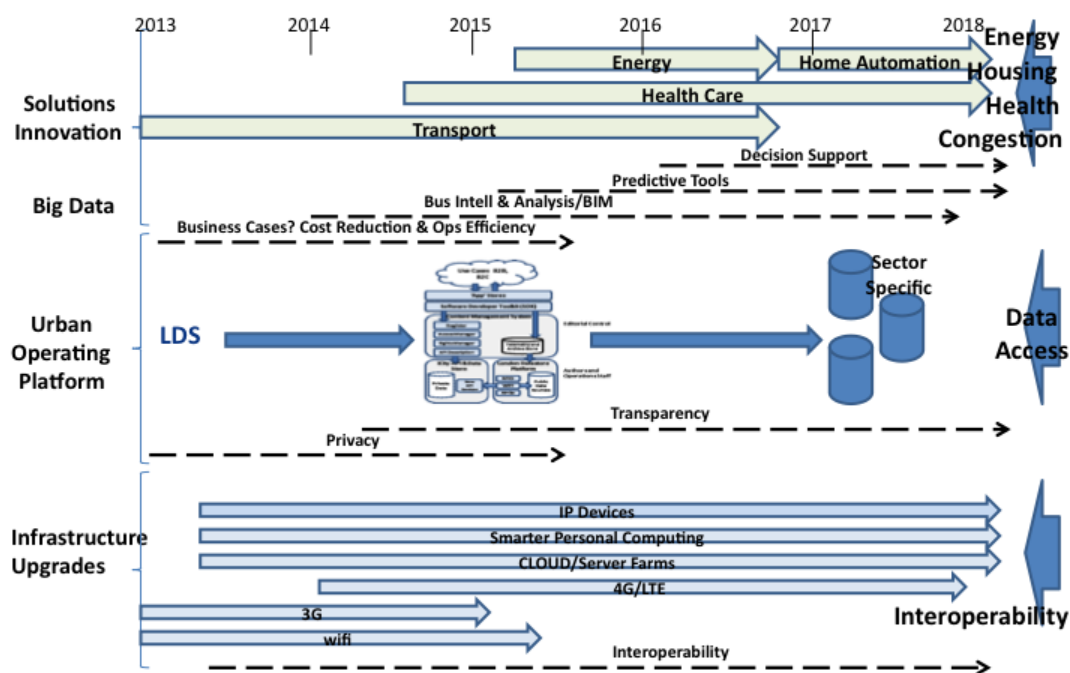
Figure 8: Smart London roadmap

3.5   Comments

As previous sections describe, there are different key points that feed the city guidelines to become a smarter city (see Figure). Those key points have been taken off from different directives and challengers that will be the drivers for the smart city. A deeper analysis will identify opportunities or improvements on the guidelines.
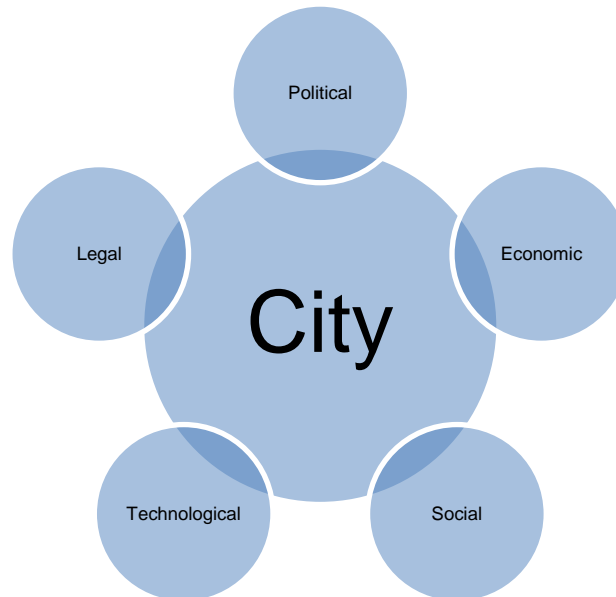
Figure 9: Key points

These key points will be part of the works that we need to do during 2014, specially related to Business models (D7.2) and Exploitation plans (D7.3).

On the other side, we see some common aspects in all the cities:

- Focus on infrastructure
- Open data
- Apps for the citizens in a wide range of areas (different focus)

Each city has different focus depending on social, political or economic aspects that affects their cities.
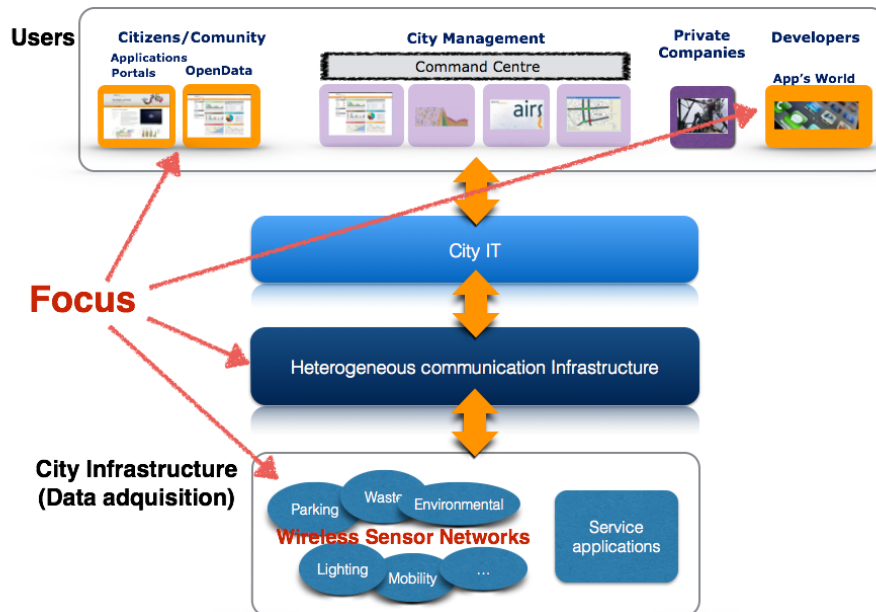
Figure 10: City focus

The objectives are very similar, but the process and strategies to achieve are quite different. We find some common elements and synergies between them, like:

- Community creation

- Different infrastructure but same service or app

- Very similar city catalogue

- Smart strategy

- Collaborative projects

These are the key points where iCity can help the cities that share a common vision, by using a common platform. This facilitates the access to heterogeneous infrastructures and data present in the cities. The goal is:

- Fostering the development of common apps for citizens,

- Creating different special interest groups that share knowledge and

- Building new services related to the cities areas of interest.

4 Hot topics and trends

4.1 Introduction

Hot topic or trends are transformative, global forces that define future scenarios with their far reaching impact on cities, business, societies, economies, cultures, and personal lives.

We identify several topics:

- Smart is the new blue ocean
- Social trends
- Health, wellness and well being
- Value for many
- Innovating to zero emissions
- Connectivity and convergence
- Future of mobility
- Buying tendencies
- City as a customer
- Future infrastructure development: intelligent infrastructure

4.2 Hot topics

4.2.1 Smart is the new blue ocean

Smart is one of the most used words in the last years. Everybody talks about smart as a new space where is easy to develop or renew opportunities. Smart concept is based on, innovation; improve of overall efficiency, better returns on investment. We can highlight some of the most popular smart concepts:

- Smart cities

- Smart technology

- Smart infrastructure

- Smart energy

- Smart buildings

- Smart clouds

- Smart mobility

- Smart materials

- Smart meters

- Smart healthcare

The opportunities in that areas are huge and some analyst (Frost & Sullivan) estimate that smart cities could reach a global market value of $1,5 trillion by 2020, and Europe will accounts of 25% of key market segments such as smart Energy and buildings:

Segment	% Market	CAGR 2012-2020
Smart Governance (e-governance, smart education and smart security)	36,8%	11,9%
Smart Energy	23,4%	19,6%
Smart Infrastructure	11,4%	8,9%
Smart Transportation	10,5%	14,8%
Smart Healthcare	10,4%	6,9%
Smart Building	7,4%	8,8%

Table 8: Smart global market by 2020

4.2.2 Social trends

There are a lot of social trends globally that suggest a changes in their relationship with the cities and the society. For example, younger population between 15 and 34 are very familiar with the technology (Gen Y) and they want connectivity, quick answers, social networks…

Other important aspects are:

- Geo-Socialization, people are closer than ever before to social media:

  "Social networking will focus on geographic services and capabilities such as geo-coding and geo-tagging to enable additional social dynamics. User-submitted data

with profiles and interests will be matched with location-based services to connect and co-ordinate with surrounding people or events. This type of geo-networking will drive markets, businesses and individuals to interact advertise and promote in real time." [*http://www.commodityonline.com/news/mega-trends-2020-suburban-growth-geo-socialization-e-mobility-38112-1-38113.html*]

- Aging population is a great trend in Europe:

Europeans will live longer than ever. By 2020, 1 out of every 5 people will be age 65 or older and by 2050, the number of Europeans over 65 will double and the number of those over 80's will almost triple.

In this regard, in the period 2008-2060 the life expectancy is thought to increase from 82.1 to 89 years for women and from 76 to 84.5 for men.

- Generational political shift

The way traditional hierarchies government organizations tackle complex problems or deal with changes are proving to be increasingly less appropriate. The emergence of a more connected world is expected to change the way all organizations operate, enabling distributed operating models, more transparent, where reputation and status are increasingly earned and sustained as a function of contribution, not status.

Therefore, policymakers, public leaders, and public services are searching for new governance that can:

- o Predict and pre-empt change (anticipation)
- o Deal with failure (resilience)
- o More effectively generate and implement change
- o Distribute power, authority, and accountability back out to the edge (in the form of frontline staff in public agencies and to communities and networks)
- o It is a model in which public value is often created beyond the formal structures and
- o Boundaries of the public sector.

The new point of view will necessarily imply the empowering of employees, citizens and communities. The traditional e-government agenda of online services can make public-sector transactions more convenient and less time consuming for citizens, but more radical change would involve enabling citizens to coproduce public services and Involve shifting some control directly to citizens.

- Middle bulge class from India and china (in UK, not in Italy or Spain at the moment), the second generation of immigrants from India a China has the influence of two different cultures (original from their parents and educational from their countries), and those it means new expectative and aims.

- She-economy: Over the next decade, women around the world will enter the workforce at an unprecedented rate. Close to 1 billion women, many of whom have either never worked or worked at a subsistence level, will be contributors in the world economy. Because of urban migration, increased access to education, mobile technologies, micro-credit and low market entry costs, women will create work and start businesses more readily than ever.

In the industrialized world, women will continue making educational, economic and political advances. The gender gap in earnings will narrow over the decade, approaching parity by 2020. In academia, women will enter and graduate from colleges at a higher rate than men, better preparing them to lead in a knowledge economy. They will be a dominant force in the health, education and service sectors, which are all expected to grow significantly in the next 10 years.

Over the next decade:

- o Globally, about 870 million women who have not previously participated in the mainstream economy will gain employment or start their own business by 2020. Most of these women – 822 million – will come from non-industrialized countries, while roughly 47 million will come from North America, Western Europe and Japan.

- o Gen Y women – across races and ethnic lines – will dominate both college graduation rates and professional workforce entry, expanding their role in management and in professions such as law, business and medicine.

- o In countries with limited support services, such as viable childcare, many women will start their own businesses to provide flexibility for their families and avoid traditional constraints that once kept them out of the workplace. Others may choose a hybrid solution where one spouse works for the benefits and job security while the other starts a business.

- o Women will overcome the legal or traditional barriers that prevented them from participating in some regions by using virtual, mobile and Internet technologies to run businesses without having to be physically present.

4.2.3 Health, wellness and wellbeing

Health care spends are increasing and could be a clear contributor to GDP, special in wellness and wellbeing areas. In this sense, because of the increase of aged people and because of new and expensive treatments, the costs of health and social care will rise substantially to about 9% of EU GDP in 2050. ICT can be a most powerful ally to maintain cost efficient and high quality health and social care, as it empowers people of every age to better manage their health and quality of life, in any place.

ICT can contribute by providing European citizens with better and cheaper services for health and ageing well. The introduction of ICT and telemedicine alone is estimated to improve efficiency of health care by 20%. Moreover, ICT empowers users of every age to better manage their health.

As the global tele-care and tele-health market is forecast to grow from 7.6 to 17.6 billion Euros already by 2017, also the economy can profit from this. A triple win can be achieved: a better quality of life for citizens, innovation and growth for a competitive industry and more sustainable healthcare systems for society.

A service, product or solution in this booming field will need to have care on three aspects, body, mind and soul, and technology will be of help with solutions in **e-health** or **m-health**(practice of medicine and public health supported by mobile devices), **health kiosks**, **robotics**, **wearable technologies (**clothing and accessories incorporating computer and advanced electronic technologies**)** by providing:

- • Faster, safer, better healthcare by placing medical information in the right hands at the right time.

- Improvement in patient safety–a complete overview of clinical and medication history helps to avoid potential errors and complications.

- Better access to specialist care in all geographic isolated or rural areas through the increased use of technology and information systems.

- Reduction of travel time allowing care closer to home.

- More efficient, convenient and potentially more cost effective delivery of care.

- Increase of timeliness of treatment and decrease of transfer rates while reducing medical costs through video technology.

- Preventive and personalised care through telemedicine and remote in-home monitoring.

- Improvement of patient's adherence through their active participation and awareness.

Clearly, cities will play an important role in that area by setting and providing the appropriate infrastructure all over their domain and boosting the use of these services among their citizens.

4.2.4 Connectivity & Convergence

The topics and trends considered in the scope of this chapter need to be supported by the appropriate infrastructures, mainly deployed in city domains. The ultimate goal of these infrastructures is the provision of connectivity of citizens and objects and their interactions through services as those exposed to this extent.

The booming of the IoT (Internet of Things) and the evolution of the correspondent standards (IPv6, 6LoWPAN, 802.14.5e, MQTT, CoAP...) contribute to increasing the number of connected devices. By 2020, 80 billion devices are expected to be globally connected:

- 10 connected devices for every household (Smartphone's, tablets, connected TV's)

- 5 connected devices for every user

- 5 billion internet users

- 500 devices with unique ID (IoT) per square kilometre

This huge interconnected ecosystem is expected to create new opportunities:

- Social media: increasing number of internet users actively rely on social media for communications

- Commerce: increase of sales performed through mobile phones.

- Banking: increasing number of Smartphone owners using mobile banking services.

- Cities: provision of public ecosystems to boost the number of applications that interact with cities' infrastructures, thus fostering a **bottom-up** relationship with the public administrations. This means, new paradigms of e-government, as exposed points above.

- Incorporation of those population segments risking to be left aside while this

evolution becomes increasingly a reality: youngest and aged people.

On the other side, connectivity depends on the quality and resilience of the infrastructures, and has implications on:

- Mobile data increased usage: business case for faster speed (4G/5G).

- Unlocking mobile commerce and payments potential.

- Increase the "digital revenue" per citizen.

- ICT business incubators-hubs.

- New revenue streams for treasury through e-governance

- Digital city infrastructure revenue.

4.2.5 Value for many

New business models are oriented to give value for many, increasing the user experience and sharing experience or services. We detect tendencies that influence on that:

- Co-creation, analysing and searching for a solution for a sector we can solve another problem. This value arises in the form of personalised, unique experiences for the customer (value-in-use) and ongoing revenue, learning and enhanced market performance drivers for the firm (loyalty, relationships, customer word of mouth). Value is co-created with customers if and when a customer is able to personalize his or her experience using a firm's product-service proposition – in the lifetime of its use – to a level that is best suited to get his or her job(s) or tasks done and which allows the firm to derive greater value from its product-service investment in the form of new knowledge, higher revenues/profitability and/or superior brand value/loyal.

- Service as a business model based on location services. Relies on connectivity – Location-Based Social Networks are online communities that provide smartphone or another electronic device users with user-generated and geo-tagged (using digital maps) content, offering localised rewards (vouchers for discounts or gifts) and feedback (ratings) on the featured places and venues. The businesses use communities to build strong and as personal as possible relationships with the customers. They invite users to co-create value by asking to write recommendations that are valuable for the rest.

- One-off experience stands for a smart connection between customers in markets of abundance and cities and their experience seeking equivalents. This new business model offers unique experiences to customers at a given place during a specific event. The platform on which its online communication channels come to live will spark the engine of experience seeking customers. Events will have to be combined with commercial opportunism.

- Personalization & customization under one-off experience frame, each user has an identifier and the static city can be converted to dynamic city, depending on the use and priorities of each user, creating one-off experience.

- Sharing services, objects, information and experiences refers to the provision of a service by one part of an organization or group where that service had previously been found in more than one part of the organization or group. Thus the funding and

resourcing of the service is shared and the providing department effectively becomes an internal service provider. The key is the idea of 'sharing' within an organization or group.

- Freemium business models, contrary to what some people may think freemium is not a form of socialism. Freemium is a business model, employed with the main objective of making money. Adopting this new business model is a way of adapting to the changing market and the conditions of production. Freemium is a business model by which a product or service (typically a digital offering such as software, media, games or web services) is provided free of charge, but a premium is charged for advanced features, functionality, or virtual goods.

- Group buying, offers products and services at significantly reduced prices on the condition that a minimum number of buyers would make the purchase. In recent time, group buying websites have emerged as a major player in online shopping business. Typically, these websites feature a "deal of the day", with the deal kicking in once a set number of people agree to buy the product or service. Buyers then print off a voucher to claim their discount at the retailer. Many of the group-buying sites work by negotiating deals with local merchants and promising to deliver crowds in exchange for discounts.

4.2.6 Future of mobility

Nowadays, we can find several known solutions that meet the needs of the cities & citizens but require some improvement. People's travel habits are changing, as is the mix of transport modes and services offered to them. But it is clear that, going forward, transport providers will have to satisfy demand for services that are increasingly convenient, fast and predictable. At the same time, consumers are becoming more concerned about the sustainability of their mode of travel and some are prepared to sacrifice individual forms of transport in furtherance of that cause, leading to the successful introduction and rapid penetration of new mobility services such as car sharing and bike sharing.

Or an application innovation, by deploying fleets of lightweight, folding electric cars at strategically distributed electrical charging/renting stations throughout a city and its suburbs. These vehicles could help ease traffic congestion, parking problems, and might even keep the urban air cleaner as well:

The evolution in that area in order to meet the needs come from technology innovation with:

- Traffic prediction systems, which have the potential to improve traffic conditions and reduce travel delays by facilitating better utilization of available capacity. These systems exploit currently available and emerging computer, communication, and control technologies to monitor, manage, and control the transportation system. They also provide various levels of traffic information and trip advisories to system users, including

- Parking search assistance. This innovative management of surface parking permits optimization of road space regulated, to inform the user about the location of seats and provide cashless payment. With this tool, not only the work of control and management concessionaires will be optimized, if not will contribute to better management of urban traffic, providing significant benefits to drivers who use these parking lots.

- Cashless payments

There are some services where future innovation in mobility will be focused on:

- Mobility integration
- New mobility products
- Motorized mover
- Two seated electric car

The future of mobility is multi-modal commuting, combining door to door solutions using dedicate mobility platforms, where:

- Vehicle manufacturers offer smart mobility solutions, ensuring first and last mile connectivity.
- Government to club public transport with bike / two wheeler / car rental schemes
- Market will see new players in market as "mobility integrators".

4.2.7 Buying tendencies

Retail model will evolve from a single / multiple channel models to an integrated cross channel model.

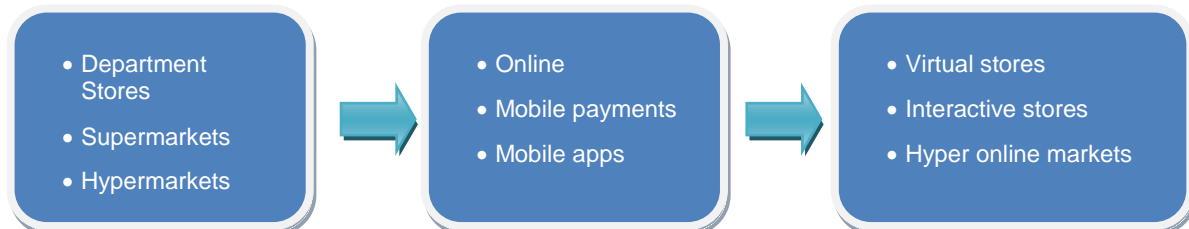| Department Stores, Supermarkets, Hypermarkets | → | Online, Mobile payments, Mobile apps | → | Virtual stores, Interactive stores, Hyper online markets |

Figure 11: Retail model

Changes to the consumer psyche aren't the only things changing the way we purchase things. Technological advances and evolving expectations are also altering the shopping experience.

Increase in online retailing is ushering new urban logistics business models and will be necessary to think about new strategies for urban logistics.

The trends are the following:

- **Mobile purchasing goes mainstream.** E-commerce has been growing for years, but now consumers are shifting away from purchasing items from their desktop or laptop to buying via their phone or tablet
- **Delivery times will decrease.** Just as most online retailers have made free shipping de rigueur, they're also shortening delivery times

- **Everything will be personalized.** Advances in manufacturing and other technology are allowing more retailers to offer customers what's known as "mass customization," or the ability to personalize everything from sneakers to cell phones. Consumers can create products to their exact specifications, including colours, size, and features.

- **New outlet stores abound.** Today's consumer is both brand-aware and cost-conscious, making him the ideal outlet store shopper, and developers and retailers have taken note

- **Your phone is your wallet.** Although making mobile wallets mainstream is still a few years off, their acceptance at major retailers and by consumers will continue to grow year to year.

- **Big Boxes continue to get smaller.** Accelerating the shift is a trend among consumers away from malls and exurbs back to traditional urban centres and smaller downtown "Main Street" type areas that don't accommodate 40,000-square-foot storefronts.

- **Couponing will go high-tech.** The post-recession consumer is still spending carefully and looking for ways to stretch his dollar, with 51 percent of consumers using coupons more often.

- **Buying local goes beyond the grocery store.** The move toward locally sourced items has taken firm root in the food space; both in restaurants and at grocery stores, but now the trend is expanding into the broader retail space.

- **In-store experiences will be better.** After years of lamenting show-rooming — the practice of seeing, touching and testing a product in a store before buying it online — retailers are now finding ways to differentiate the in-store shopping experience from the one shoppers find online. They're offering in-store only products, events, and services, aimed at bringing and keeping customers into their stores, and getting them to spend money while they're there.

- **Big data will bring more dynamic pricing.** Like all industries, retail is turning to big data to find ways to maximize profits, which often means instituting dynamic pricing models both online and in-store. Retailers have always increased prices during times of high demand and slashed them when traffic is weaker, but today's data allows them to do this in a much more relevant and real-time manner. In addition to shifting prices based on demand, retailers will use geo-targeting and other technology to maximize prices based on both geographic and consumer-purchasing history.

4.2.8 City as a facilitator

The concept of City itself, under the 'smart city' perspective will have to be rethought as a community sharing resources and solutions to meet special interests and/or priorities. This makes the question independent from traditional geographic or demographic based paradigms and approaches to the concept of the 'invisible city'.

From this point of view, a smart city could take the shape of a small community (e.g. a village or small town) up to more complex configurations, e.g.:

- Mega Cities or metropolis

- Mega region: conglomeration of cities with more than 3 million

- Mega corridors: connection of mega cities

Other classifications can be done by taking into account other parameters, e.g. impact in the national GDP, compactness, etc.

In all cases, the nuclear entity must be a much interconnected area or region, with intelligent infrastructures and technologically efficient. This is the *sinequanon* condition for a community to support new services, new interactions, new citizen-public administrations relationship models...

Technology infrastructures, shared interests and new government models will provide an area or region the possibility to boost and facilitate appropriate answers to the foreseen topics and trends.

- o Smart and sustainable cities: heavily interconnected cities, with intelligent infrastructures and technologically efficient

- o Small-medium cities: cities with less than 2 million

- o Mega cities: urban cities of more than 2 million or with a great impact in national GDP

- o Mega regions: conglomeration of cities with more than 3 million or great impact in national GDP

- o Mega corridors: connect to Mega cities or corridors with a combination of more than 10 million of population; their impact in national GDP is very high

In these new situation cities, not countries will drive wealth creation of the future as a consequence of great part of the trends and their contribution on the nations GDP.

4.2.9 Future infrastructures

Infrastructures will be the basic element to support those evolutions and topics they need to evolve in aspects like:

- **Resilience** is the capacity of the infrastructure, either security or IT, to provide and maintain acceptable performance in spite of faults and challenges to normal operation, e.g. overload, malicious traffic, and so on. The ultimate goal is for each component measure aspects such as availability, performance, bandwidth, latency, packet loss, jitter, etc., so that we can assess, in real life, how tough are our countermeasures and security technologies implemented as well as the capabilities of the IT infrastructure.

- **Decentralized intelligence**, the distributed intelligence is based on emergence, where a system of relatively simple elements is organized spontaneously and without explicit laws to give rise to intelligent behaviour. The lower-level agents adopt behaviours of a higher level.

- **Seamless connectivity** allows customers, employees, suppliers and citizens easy access to a company or corporation or city using the Internet. The more ways someone can connect to your business, the better, whether it's with a computer or from an Internet-enabled cellular phone. Even smaller businesses can benefit from

introducing seamless connectivity to a network.

- **Share services and customers with different SLA** in order to secure the agreed level for the quality of the service between a service provider and client. It is a tool that helps both parties to reach a consensus in terms of the level of quality of service in areas such as response time, time availability, available documentation, personnel assigned to the service.

- **Speed** is emerging as a top issue for internet users according to the latest EU-wide survey of how Europeans use the internet. Users increasingly care about their internet being fast enough to watch videos, for example. And for those who run businesses from their home, speed is also a competitiveness issue. Consumers now focus on both speed and price when making their choices.

- **Coverage**, the future is to deliver a step change in people's ability to access the internet, enabling people to connect from their homes, businesses and while on the move. These improvements to our digital infrastructure are essential if we are to maintain and improve the ability of our cities to compete in a global market place. Modern digital connectivity is one of the essential components of creating a successful country. For businesses and social enterprises, it enhances productivity and drives innovation. In rural communities and fragile areas, it has the potential to boost economic development, retain young people and attract new residents. Connectivity, both fixed and mobile, is central to the successful development of emerging sectors such as renewable, digital healthcare and cloud computing, but also to more traditional sectors, such as tourism or business services, which are increasingly using digital technologies.

4.3   City level

4.3.1   Barcelona

Key agents and stakeholders involved

Strengthening links with other entities is also promoted with key leader world institutions with the objective of allowing space for international collaboration and knowledge exchange. Those include the European Commission, where Barcelona is participating in the Smart Cities Stakeholders platform initiative as well in a large number of European-funded projects, the World Bank, that has decided to open their first Smart Cities office in Barcelona or the United Nations that have recently opened an office for resilience in the city of Barcelona.

Furthermore, to consolidate said partnerships that benefit the city and its international position, Barcelona is creating the Smart City Campus in the 22@ district (ready in 2013-2014), as a new hub for urban innovation that will hold research centres and a business cluster to develop solutions and services for smart cities.

Barcelona: Mobile World Capital

The city of Barcelona is also proudly hosting the title of Mobile World Capital (mobileworldcapital.com) since it was elected by GSMA to host the Mobile World Congress event since 2018, recognising also its leadership in this field. In this sense, the city promoted the creation of the Mobile World Capital foundation aimed at advocating for the use of mobile technologies all over the world recognising this as key technology for urban development.

The city has also made strong bet to foster the use of mobile technologies at local level. "Barcelona In Your Pocket" is the name under which several successful projects have been developed, namely:

- **Apps4Barcelona** (apps4bcn.cat) a web that groups apps tailored for Barcelona and aimed at improving the life in the city and that is based on the marks given by a board of experts in the field.

- **Barcelona Contactless** aimed at fostering the use of NFC payment technology in the city and that, in partnership with La Caixa, has delivered more than 1.000.000 contactless cards in the city and 19.000 NFC-enabled data phones.

- **IdBCN** (www.bcn.cat/idbcn): a project that allows the secure remote identification of citizens through their smartphone through the installation of an app and the validation of an identity that is hosted in their mobile phones (Android or iPhone).

On-going key strategic projects

The Barcelona Smart City program is a compendium of initiatives touching all competence areas of the city. Here there is a list of those considered to be strategic for the complete transaction towards an intelligent city

Transversal projects include:

- Creation of a **single corporate telecommunications network,** unifying all the pre-existing ones in the city, including optical fibre and Wi-Fi. At the end of the project the city will own a total of 500km of network and 721 Wi-Fi points.

- **Urban platform**: a program that consists of the creation of a platform to collect and unifying data coming from different sensors and actuators in the city (available end of 2013). This data will be interpreted by a CityOS that will provide intelligence to the data collection (available mid 2014).

- **Intelligent data**: a program that includes several projects to apply visualization tools to the data collected and interpreted through the Urban Platform. It will offer a web-based solution for policy makers and for citizens in order to control real-time the pulse of the city from one single point. Available end of 2013.

Vertical projects include:

- **Smart Lighting**: including a master plan presented in 2012 defining the lighting needs of the city, or projects to deploy sensors and remotely control the lighting at street level (ready in mid-2013). This plan has allowed a total of 50 streets using LED technology with a total of 1155 lampposts. 50% of the lighting power is also remotely controlled covering a total of 1228 power controls.

- **Smart Energy**: a whole program to achieve energy efficiency throughout the city, from smart grid projects to self-sufficiency in blocks. At this moment the city has deployed more than 19.500 smart meters in the Olympic Villa and 22@ neighbourhood and is self-producing electric energy in public buildings through the use of 53 photovoltaic, 1 mini-eolic and 2 thermically activated cold installations.

- **Smart Water**: a program that includes projects like the remote control of irrigation in parks and gardens in the city. At this moment 77 fountains are controlled remotely. It is calculated that 12% of parks will be smart by end of 2013.

- **District heating and cooling**: two networks have been deployed so far in the city to provide hot water in different districts of the city. The two networks cover a total of 21km and 64 buildings in Zona Franca and 22@ district.

- **Smart Transportation**: including a master plan presented in 2012 to improve mobility efficiency in the city or the deployment of orthogonal bus lines to improve public transport efficiency. At this moment the city has set up 17 vertical lines, 8 horizontal lines and 3 diagonal lines. The estimated savings are calculated to remain between 5 and 10% (http://www.tmb.cat/en/nova-xarxa-de-bus).

- **Zero emissions mobility**: a complete plan to foster the use of electric vehicles in the city, from deploying electric charging points to fostering electric vehicles renting. The city has more than 500 hybrid taxis, 294 public electric vehicles, 262 recharging points, 130 electric motorbikes and an estimation of 400 private electric vehicles.

- **Open Government**: an integral approach to opening municipal government towards citizens. The program has several parts, starting with the deployment of 44 citizen's attention kiosks and the Open Data portal launched in 2010 (www.bcn.cat/opendata) where more than 500 datasets that have been put at the disposal of the general public. The city also promotes its reuse through the organization of several hackatons and app challenges.

- Use of **intelligent urban furniture**, like the installation of 45 citizen's attention kiosks at street level in 2010.

- **Urban Lab**, an initiative launched in 2008 and rebuilt in 2013, to allow the use of public space for companies to test solutions and services in a real urban environment.

- **New generation networks** (4G): LTE, antenna regulation and radio electric governance.

- **Intelligent buildings**: Smart metering for the citizens to measure their electric consumption.

- **Smart Parking**

- **Urban transformation** (renovation of different areas of the city such as: Passeig de Gràcia, Av.Paral·lel, Passeig Sant Joan, La Sagrera...)

- **Urban resilience**

- **Community development**: Whabit is a platform created to share resources among members of the same neighbourhood in the context of Smart Citizen initiatives. Fab Labs and citizen sensors are also included in these initiatives

- **Cloud Barcelona**

- **Waste management**: Optimized waste collection through the use of Automated Waste Collection Systems.

- **Smart Tender** (biddings and government measures)

- **Economic stimulus**: Smart Innovation includes the following projects: Innovation District 22@, Smart City Campus, Smart City Tour, Smart City Cluster, Urban Lab, and Competence centre mSmart City.

4.3.2 Comune di Genova

The City of Genoa is mainly involved in the following hot topics and trends:

- Connectivity and convergence

- Future and mobility

- Future infrastructure

- City as a facilitator

- Health, wellness and well being

- Innovating to zero emissions

In order to achieve these goals, in the framework of the City Strategic Planning documents such as the (PUC) Urban Planning Document, the SEAP (Sustainable Energy Action Plan),PEAP (Port Authority's energy plan) the Urban Mobility Plan and the Urban Civil Protection Master plan the Municipality has defined some strategic actions to carry out.

In particular, the Municipality is involved in many research projects focused on education and solidarity, quality of life, eco-sustainable growth and natural environment care, economy and employment, communication and promotion of the City, Port and infrastructures, city management.

Genoa is following a step by step process of digital innovation enabling the growth of our city into a Smart City from the ICT point of view through:

- Connectivity and convergence
- Future infrastructure

Development of broadband connectivity and investments in IOT

Genoa is developing, through agreements with the most important telecommunication market players, a broadband and Wi-Fi connectivity infrastructure.

Together, with the development of this enabling infrastructure, Genoa is planning and realizing a local IOT coverage devoted mainly to monitor hydrological risks, security, safety and future of mobility. This is in order to give benefits in terms of qualified services, much more efficient in terms of response performances.

- Future and Mobility
- City as a facilitator
- Health, wellness and well being
- Innovating to zero emissions

On the basis of the development of the enabling infrastructure, Genoa is managing the spread of services capabilities, with interoperability of existing services through middleware platform, the release of application for internal user both for PC and mobile device and local development on mobile apps to citizens.

Also, the local investment on IOT, like geo-positioned weather stations on critical sites for the hydrological risk, connected to web server based applications deployed for inner user to manage and control the territory, demonstrate the strategic role that the correct use of ICT has in terms of improve urban resilience.

The investment on mobility management, in terms of ICT developing, is also represented by the new Road Visor System; it has public and private access and it is involved in the elaboration of traffic data directly coming up from the traffic sensors positioned on the city roads.

The spread of mobile devices during the last years has encourage the development of mobile and/or webapps on several themes, on touristic and cultural heritage (Unesco Recognition), on natural and hydrological risk, on best practices on energy saving (beta version) and on architectural barriers.

On the other hand the Open Government Issue is a *hot point* on which the city is carrying out the document dematerialization and the on-line counter.

Other ICT-related European projects are:
- **HARMONISE** on urban resilience will result in significant resilience enhancement methods for large scale urban built infrastructure. It seeks to deliver (a) a holistic urban resilience integrated information platform; (b) a suite of innovative tools (toolkit hosted within the HARMONISE platform); (c) greater understanding and awareness of urban security and resilience, (d) commercialisation opportunities among emerging new markets in this field.

- **ClouT** (Cloud+IOT). ClouT's overall concept is user-centric, leveraging the Cloud Computing as an enabler to bridge the Internet of Things with Internet of People via Internet of Services, to establish an efficient communication and collaboration platform exploiting all possible information sources to make the cities smarter. ClouT will help cities to provide their infrastructures as services (City infrastructure as a service, CIaaS) that can be reused by different platforms and service providers. ClouT with its user-centric approach, will also offer to end-users the possibility of creating their own Cloud services and share them with other citizens.

- **I-Locate**: The goal of i-locate is twofold. First it will create a virtual hub for indoor open geographical data regarding public spaces (hospitals, public offices, shopping malls, museums etc). This will have significant economic business impact and it will be enabling a number of indoor/outdoor (based on existing open data) businesses. The second goal is to create an easy-to-integrate open middleware for indoor/outdoor tracking and management of people and asset.

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5   How iCity addresses the challenges and topics and generate new relationships models

5.1   Introduction

The next table shows the matching between top level challenges for the cities and hot topic & trends:

		Barcelona	Comune di Bolongna	Comune di Genoa	GLA
Top level challenges for the cities	Population growth				X
	Air Polution	X			X
	Unemployement and skills			X	X
	Healthcare				X
	Changes in demographics			X	X
	Stressed and congested systems			X	X
	Resource inefficiency				X
	ICT (Strategic support)	X	X	X	
	Social inclusion and multicultural approach		X		
	Education and Cultural (Basic rights)		X		
	Urban regeneration		X		
	Green economy		X	x	
	Environment and Energy	X		x	
	Transport	X		x	
	Waste management	X		x	
	Urban-rural cohesion	X			
	Quality of life	X		x	
Hot topics & Trends	Smart X (Building, Infrastructure, Governance, transportation…)	x	x	x	x
	Social trends		x		x
	Wellness and wellbeing		x		x
	Connectivity & Convergence	x		x	x
	Value for many				
	Future of mobility	x		x	x
	Buying tendencies				
	City/areas/regions as a facilitator	x			x
	Future infrastructures	x	x	x	x

Table 9: Matching cities with hot topics and trends

By comparing both the Cities' Challenges and Hot Topics, it is clear that each and every one of the former can be included in one of the later. The other way round, addressing one single Hot Topic will simultaneously impact on several Challenges, e.g.:

- **Smart X**: Urban regeneration, green economy, ICT, Educational and Cultural, transport

- **Social Trends**: Population Growth, Unemployment and Skills, Changes in demographics, Social inclusion and multicultural approach, Educational and Cultural

- **Wellness and wellbeing**: Quality of life, air pollution, healthcare, changes in demographics, social inclusion and multicultural approach

- **Connectivity & Convergence**: ICT, Urban regeneration, Stressed and congested systems...

- **Value for many**: Quality of life, unemployment and skills

- **Future of Mobility** has a clear impact on Population Growth, Air Pollution, Healthcare, Stressed and Congested Systems, Green economy, Environment and Energy and Quality of Life

- **Buying tendencies**: Quality of life, unemployment and skills

- **City/area/region as facilitator**: Urban rural cohesion, waste management, transport, urban regeneration, stressed and congested systems.

- **Future Infrastructures**: Stressed and Congested systems, resource inefficiency, ICT, Urban regeneration.

Using the relations above, we can also identify some of the risks taken by not addressing the issues or managing them with a top-bottom service perspective:

Risks and implication for the cities

Smart X	Isolated smart systems that cannot be centrally operated/monitored
	Data islands, which cannot be taken into account by central analytics
	Expensive maintenance of non-standard, vendor-bound systems
Social Trends	Missing contents for aging population, people with disabilities or people at risk of social exclusion
	Late or misguided response to social demands and political shifts: administration is perceived as opaque and non-participative
	Improper use of city services and infrastructures, mainly due to misinformation
	Security threats, impersonation, exposure of sensible personal information
Health, wellness and wellbeing	Inadequate accessibility of the services to aging population and people with disabilities
	Lack of legal coverage to the new scenarios, in which there are new relationships between patients, health professionals, insurance companies and the public administration
	Security threats, exposure of personal health data
Connectivity and convergence	Regulatory risks and conflicts with private operators if these public services shift demand away from commercial services
	Lack of optimization of the infrastructures
	Delays in the adoption of new communication standards
	Conflicts in the management of the radio-electric spectrum
	Security threats to communication systems that may compromise electriciy, water or other critical systems

Value for many	Inability of start-ups, SMEs or individuals to gain momentum without support from the public administration needed to promote co-creation, sharing or any other innovative business model
	Fablabs require public spaces to develop their activities
	Exclusion of traditional local business (SMEs) from the digital world
Future of mobility	Inefficient city infrastructures needed to accommodate the electric car, biking or other mobility solutions
	Immature technological solutions to address the problem of mobility, which requires the integration of data acquisition, video surveillance, complex event processing, big data and analytics
	Missing indicators needed to evaluate the impact of the mobility plans in the quality of life (environmental and pollution control, health, CO_2emissions…) or the economy of the city (productivity, connectivity…)
Buying tendencies	Inability of local businesses to keep the technology pace without the proper public support
	Loss of synergies with other communities reduces the collaboration between public administrations and trim market opportunities for local businesses
	Mobility changes due to new urban logistics implications boosted for the distribution of products.
City as a facilitator	Inability of developers, solution providers and citizens to create value for the city without the opened infrastructures, opened tools and opened data
Future infrastructures	Unreliable or low performance infrastructures
	Monolithic architectures with single points of failure instead of distributed modular components and cloud architectures
	Dark spots, places without the proper coverage to ensure connectivity

<p align="center">**Table10: Risks and implications**</p>

It seems, therefore, reasonable for the administrations to look for a new approach when addressing actual problems and priorities. New tools should be applied in order to tackle holistic, collaborative visions rather than deal with single, specific challenges.

The nature of this new perspective requires tools to make possible collaborative, horizontal, inclusive projects, involving wider segments of the citizenship and **new stakeholders**, rather than the traditional scheme with the Public Administration and the public service providers as the only stakeholders. That is to say, an evolution from the Top-Down paradigm to a Bottom-Up should be considered.

Opening data and **city infrastructures** provides the cities with the new ecosystem where these goals can be achieved, and iCity appears as the tool that makes it possible.

The hot topics & trends set the broad direction of demand and form the testing ground for public interest services. SiG and business drive the innovation, addressing the local community needs and opportunities for national and international growth, drawing on micro-initiatives, technologies and other processes to gain competitive advantage. This is the spirit of iCity ecosystem build over a new relationship models.

5.2   Relationship models – iCity project

Barcelona

In order to ensure that this is a transformation that goes beyond an institutional will and that it is truly aimed at achieving long-term benefits, the city has promoted an intense contact with other public and private institutions and entities.

This strengthening of the relation with private companies interested in participating in the transformation of Barcelona towards a Smart City has led to the signing of strategic collaboration agreements with key multinationals that are playing a key role in the Smart City sphere and that recognise the leadership of Barcelona in this area. These multinational companies include Cisco Systems, GDF Suez, Schneider Electric, HP, Microsoft, Telefonica and abertis telecom. Their role in the transformation process of the city of Barcelona is to enrich the key strategic projects of the city with their expertise and to test their most advance solutions in a real advanced urban environment.

In its aim to collaborate with worldwide cities, Barcelona promoted the creation in 2012 of the City Protocol Society www.cityprotocol.org – nowadays with over 130 members (45 cities, 19 universities and academia, 28 institutions and centres and 38 companies)-, a community that leverages knowledge and experiences in real city transformations throughout the world by developing common approaches and solutions.

There isn't a single business model for each project but many possibilities:

a)   Profit associated to the savings obtained by an improvement in public services efficacy. For example, the corporative City Council's communications network seeks to obtain improvements and savings associated to the management and optimization of the efficacy in energetic systems, waste or water management systems, etc.

b)   Intangible profit associated to social improvements achievement, quality of life, services improvements, environmental factors, etc. This implies a better citizen satisfaction level and an improvement in the accomplishment of governmental functions (main goal of public administrations).

Alternatively, in the long run, Barcelona is involved in projects that promote new businesses or attract.

Comune di Genova

The Smart City association involves external stakeholders, research community and business world.

The process tries to juxtapose needs, strategies, technology, funding and law in order to find the best possible way of planning and implementing actions, projects, plans in a tailor made way, involving European, national, regional funds as well as innovative financing.

The Association has created and fosters a network among stakeholders leading to an innovative way of working together towards a common goal.

ICity project fits perfectly with this vision because it allows you to move from a planned and integrated participation city model in a shared resources and tools model to step from a Smart City to a Smart Community growing from citizen to smart citizen

City of Genoa is a member of City Protocol Society, like Barcelona; Genoa was a member of Interim Board of directors and is one of the first cities that joined formally the CPS. Genoa should create the CPS' Italian Chapter.
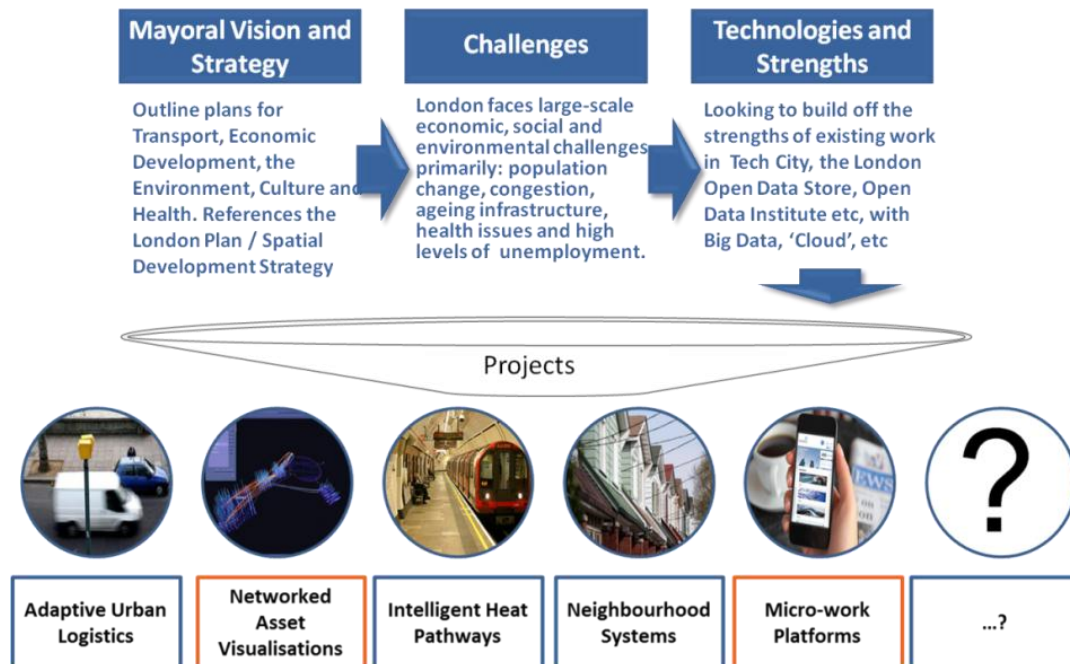
London

Figure 12: Challenges, hot topics and existing strengths provide useful inputs to shaping the iCity project

Strategic	High Potential
GLA Strategic & Local Planning	TfL RFID &WiFI
Operational	Factory
B2B e.g. Utilities Database	B2C e.g. App Developers

•GLA Family - TfL
• Software Developer Community
• Opportunity Areas - London & Partners
• Tech City (Pru Ashby) – digital Shoreditch
• Mayors Smart London Board
• Digital Greenwich Peninsular
• Creative Works London
• Digital Cities Exchange (Imperial/UCL)
•Institute for Sustainability
• New London Architecture (NLA) – affiliates
• Universities – Kings College, CASA, Saaid Business School

Figure 13: London Use case definition - Partnership working

5.3   Stakeholders

When we combine open infrastructures + open data, generate Special Interest Groups around it and provide those groups with some tools that facilitate the relationships and the creation of new services, then the number of stakeholders and opportunities grow exponentially, generating a new ecosystem and reducing the gap between the society and the public administrations.

Figure 14: Stakeholders from the iCity ecosystem

This new ecosystem around iCity shares four primary characteristics:

- Wide scope for improvement and elaboration.
- Potential for use in a wide variety of services and processes
- Applicability across a broad range of uses
- Strong complementarities with existing or potential new technologies.

What it means Social growth in a real economy as opposed to a financial one, builds on the transformational benefits of new general purpose services, technologies and relationships.
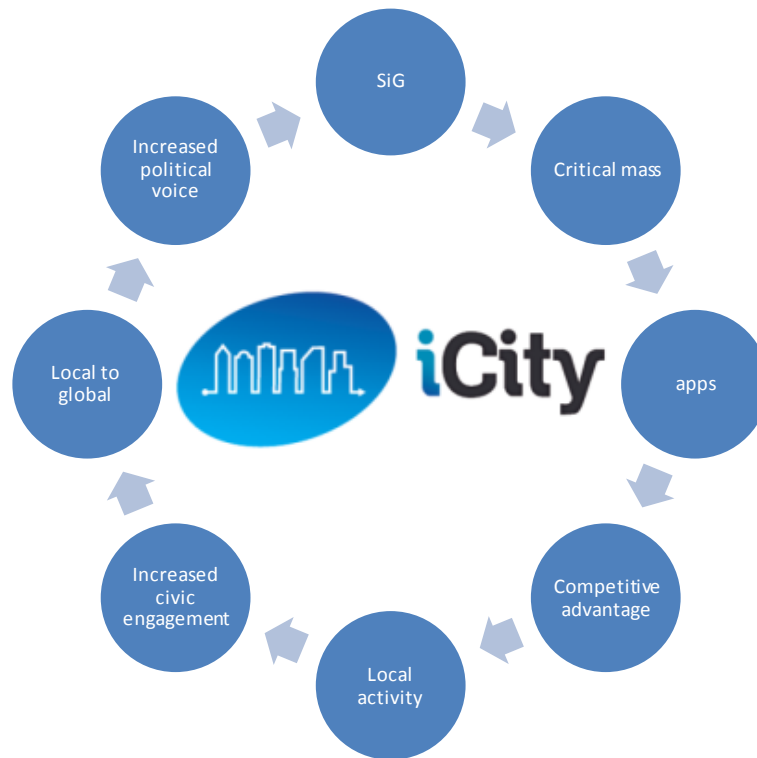
Figure 15: iCity synergies

During 2014, with the deployment of the first apps, we need to verify those changes and synergies.

iCity ecosystem will enable new forms of collective engagement that increase the appetite for more involvement in local decision making, enhancing the desirability of the cities, attracting more entrepreneurs, investors, active citizens, and civic finding.

The importance of multiple actors forming part of the iCity ecosystem approach able to serve the specific needs and resources of each city shared by a common tool (iCity platform), and thereby accelerate its transformation.

5.4 Comments

5.4.1 Internal analysis

Strong points

The considered cities share the following characteristics that strengthen the project's credibility:

1. Acc*umulated experience and knowledge*: above all GLA and Barcelona.

2. *Smart Cities strategic commitment*: although different, it's a fact the clear commitment in carrying out Smart City policies.

3. *Communication Policies*: in any Smart City strategy, having the public opinion in favour, is a major issue. As long as the cities have been able to create a smart 'reasoning' of their own, accepted and appreciated by their citizenships, the project is founded on solid basements.

4. *Technological environment*

5. *New model of relationship with the Public Administration (PA):* The fast evolution of the new technologies; the development of applications and devices linked to the search of revenues; the knowledge required for their use...This global context highlights the real threat that some population segments (e.g. youth without or low purchasing power or aged people with few technological knowledge) are left aside of the advantages the new economy is offering: from medical solutions (e-health, m-health) to new relationship with the PA (telematic public services management, etc...).

In this situation, the free access to data generated and provided by the city (Open Data) along with the access to its infrastructures makes it possible the bolstering and appearance of new applications and services addressed not only to the bulk of the population but also to the rest of the generational segments.

On the other hand, by allowing the citizens to take part in the city infrastructures management, iCity fosters new collaborative relationship models where infrastructures and services intended for specific goals can find new applications in wider segments of population or markets.

This kind of citizen-city relationship not only brings the technological benefits closer to all the population sectors but also fosters new relationship models with the PA, where the citizens propose and directly pushes for initiatives of mutual benefits. Thus, a new relationship model, led from the basis, towards the institutions (bottom-up model) in contrast to the traditional models led from the institutions towards the citizenship (top-down model).

Weak points

1. *Different Smart City policies*: although the cities have their own strategies, it is clear that these strategies are diverging. Outcomes of these strategies are:

   - Barcelona: City Protocol Society; Smart City Congress; Urban Habitat; BCN Energy Self-sufficiency Plan.

   - Bologna: New Metropolitan Strategic plan; Digital Agenda for Bologna; The Iperbole 2020.

- Genoa: Genoa smart City Association; Co-founder City Protocol Society.

- GLA: Smart London Board; London Data Store; London Dashboard; London Master plan.

These facts highlight, in one hand, the respective leadership in the Smart City field but, on the other hand, the dispersion of the policies followed in this regard.

2. *Different Internal Organization*: clearly Barcelona -Urban Habitat- and London –Smart London Board- has oriented the organization of the municipality in a smart city view. It remains unclear in the cases of Genoa and (less) of Bologna.

3. *Different city typology*:

- From a demographic point of view:

     GLA: 8,5M; BCN: 1,5M; Genoa: 0,6M; Bologna: 0,3M

- Geography should also be considered from a territory compactness point of view, e.g. Barcelona or metropolitan area? Genoa appears to be a very disperse territory, etc...

5.4.2 External analysis

Opportunities

1. *Leadership in the sector*: Smart City Protocol, Smart Cities Congress, Smart City Association, Ipérbole...

2. *Vague Smart City concept*

Threats:

1. *Impact/mechanism for new cities*

2. *Low regulation, standardization and normalization*

Recommendations

- iCity allows the integration of different infrastructures in the same platform, but also different city topologies in socioeconomic and geographic terms should be taken into account. Assuring this aspect will make it easier for new cities to join the platform, thus turning this threat into an opportunity.

- Municipality internal organization: It must be clarified what the different organizations are -for each considered city- and how it will be affected by the adopted strategy. It is essential to make clear how iCity affects and how it gets integrated with regard to the different structures. This should allow adapting and strengthening the arguments in favor of a future integration of new administrations.

- To move forward in the direction of a future integration of the city, and with regard to the Smart City message, two essential aspects are to be taken into account:

  o The progresses due to the Smart City strategy - in each particular city - have to be highlighted. This issue seems to have been achieved in BCN and GLA,

it remains unknown if it is the case in Genoa or Bologna. It is clear that this strongly depends on internal conditions and the correspondent strategy but forward-looking common points in the communication policy should be established.

- o On the other hand, there is not a clear definition os the Smart Cities concept. The iCity project could take advantage of this and develop an own definition from the involved cities, by highlighting their relevant aspects, thus making new incorporations easier.

- As established further up in this document, each city defines its own strategy as per its own social, political and economical reality. It is not, therefore, a matter of making strategies to converge, but identify common points upon which focus common efforts. As a first stage, synergies can be found in the following areas:

  - o Community Creation

  - o Services or Apps brochure.

  - o Collaborative projects

- As long as iCity provides the user with a transparent framework with regard to the city infrastructures and a set of tools to interact, iCity turns into a powerful tool to move in this direction.

- As for the administrative mechanisms and relationships with service providers, there is a need of more information from the cities project leaders. This is why this document has not analyzed deep enough these essential points when it comes to understand the environment where iCity is to be located.

5.4.3 Final Remarks

At the end, Cities have the capability of providing services for everybody, only because, and only when, they are created by everybody, and iCity help it. So, in other words, cities are able to promote the understanding of citizens, facilitate the movement, activity, creativity, economic development of individuals and companies that are developing day by day in the cities.

Cities should have facilitators (infrastructure and services) that will achieve this goal by adapting their services and infrastructure movements and concerns of society. This means to combine the actual Push models, where the public administration have a predominant paper, with top down models where citizens and SME contribute with new services and combine the public initiatives, resulting new models of relationship, new payers and new opportunities. It is not a wholly top-down nor bottom up.

The new iCity ecosystem generate a critical mass of stakeholders with the capacity to share resources, skills and goals helping the implementation of self-sufficiency projects, reducing costs and strengthening the culture of autonomous social services generation. The companies that prosper in this ecosystem have the advantage of quick and low cost service creation, share skills, infrastructures and motivate the relationship with citizens and cities. That competitive edge increases the local demand and strengthens local markets. During the next year with the first visible iCity apps in the market we hope to attract new participants, raising the level of engagement and reshaping the sense of what is possible.

(This section will be developed and further analysed in following updates.)