



Linked Urban

Placing citizens in the center of the city. Enabling entrepreneurs to develop IoT businesses

*“If it can be thought, it can be done,
a problem can be overcome”*

E.A. Bucchianeri

Introduction

We believe that all citizens have the right to more convenient access to city services. The way cities are configured these days is focused on silos (i.e. transportation, health, labor, etc.). By contrast, citizens' lives and the problems they face tend to be transversal.

Many Smart Cities forums are mostly focused on implementing technology and not on citizens lives. We want to go beyond that traditional Smart City approach of providing technology to governments that translate into city dashboards for efficiency, but don't necessarily translate into cities becoming more liveable.

We at Product Innovation (Telefonica I+D) are exploring a different approach on Smart Cities aiming at providing "smart" to relevant players and we consider those are citizens and entrepreneurs. In fact, we believe that a city is smart, as long as their citizens are smarter and have more livable spaces and lives.

Developing the Linked Urban programme, we aim at:

- *Working with cities to identify and face their main challenges, and be part of real change around New Digitally Enabled Services*
- *Enabling entrepreneurs to develop those new services, providing them with usable data for businesses through sensors infrastructure (IoT), identity infrastructure and data integration*
- *Fostering an ecosystem where both public (governments) and private sectors truly contribute with their key assets to make the local economy to grow*

This is an ongoing exploration. We have run various workshops, interviews with citizens and with experts in city planning, economics, urbanism and technology (qualitative research). Moreover, we've analysed over 500 smart city/IoT related startups to understand the citizen problems that entrepreneurs have identified and are betting on (quantitative research).

Based on our research this document provides:

- Key insights on the main city actors and their interactions
- A description/analysis of why cities are a huge opportunity related to new digitally enabled services for citizens
- The way forward, what we propose under a collaboration model

Key Messages

- **None of the city actors, by their own, can provide a sustainable solution to address citizen's problems. Cities are complex systems and innovation in cities must be faced as systemic innovation.** We can empower different actors to promote city livability. City governments are not always in sync with the real needs of their citizens. Communities and entrepreneurs have a better position to understand and connect with citizens.
- **The opportunity is on new digitally enabled services for citizens** and the strongest IoT players will have a huge opportunity to capture value from new citizen services.
- **Different kinds of Innovation need to be developed in order to reframe the smart city:** a. Technology innovation will come from an enhanced connectivity enabling IoT in the city: IoT designed networks complementing cellular ones, new mobile sensors and data fusion from different sources; b. Business model innovation will focus on multi-sided platform economic models and how to create value and capture externalities enabling citizen-centric ecosystems; lastly, c. Policy innovation will give city actors' better access to different city assets that can be the base of both tech and business innovations. This will impact on enabling better relationships among them and a better identification of opportunities and solutions.
- The areas that have more impact in city life and have the most potential for growth, will allow us to validate in real scenarios our hypotheses and principles. The areas that, as of today, we have assessed as more relevant because of their focus on clear citizen needs are: **Connected and Integrated Mobility, Urban Well-Being, On-Demand Food Delivery.**

Citizens have helped us come up with some initial beliefs

- Citizen goals are not directly related to the typical Smart City goal of efficiency. The way city administrations are configured is based on verticals (i.e. transportation, health, labor, etc). Contrarily, citizens' lives and problems tend to be transversal. That's why the solutions should aim at cutting across typically siloed city institutions.
- Intentionally or not, citizens belong to different communities (professionals, sports, buildings, etc). As a big influencer of citizen behaviors, communities are a critical actor to engage with when solving big city problems.
- We need to promote a balance between top-down and bottom-up solutions. We need to consider that sometimes, citizen-created solutions, and a combination of different levels in decision-making (not every initiative needs to be approved by the city government), lead to better quality and broad adoption.
- To spark entrepreneurship and growth, citizens require systems that embrace openness and unpredictability.
- The current indicators of progress and wealth (GDP, inflation, etc.) do not reflect how living in cities is. Therefore, actions taken to attend these indicators, are counter-productive with life in the city. Progress indicators and metrics should be sensitive to the reality on the street; that is how people are experiencing the city.

There are different roles and actors that have to be part of this programme

Contemporary movements as Intelligent Urbanism see the city is an organic part of a larger environmental, socio-economic and cultural-geographic system, essential for its sustainability.

What we call a city is the sum of the interactions between its structural part (buildings, streets, parks, etc.) and the different people that generate it and interact with it and with each other.

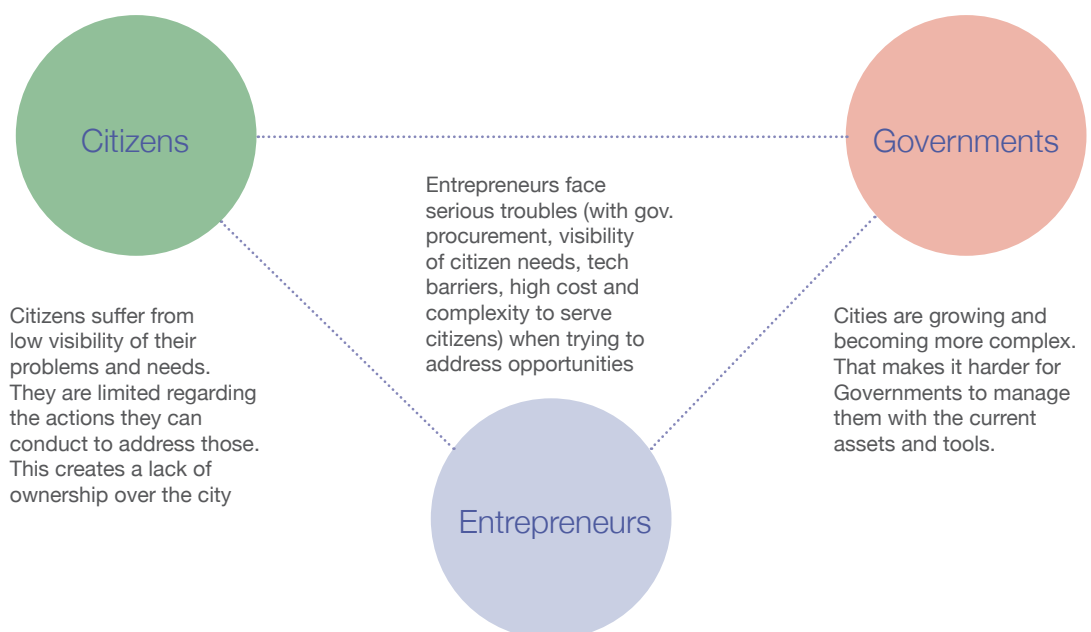
Three main groups of actors can be mapped on any of this interactions: Citizens, Government and Entrepreneurs.

Traditionally citizens have been limited by the degree they can affect their immediate surroundings or solve some of their problems by their own.

On the other hand, governments struggle with being more aware of citizens problems and administering and making the most of the resources the city has to fulfill them. Open data is mainly an exercise of “transparency”, the data is not usable for businesses and the real support for businesses is quite limited. Our research shows that no government will allow a big IT giant to control the entire city. Some corporations have been naïve to the political reality of the government for whom a monolithic, one-stop-shop is not appealing. The most likely scenario to success would have several platforms (several sources of data sets) serving the city.

In addition to that, entrepreneurs face serious trouble with government procurement, visibility of citizen needs, tech barriers, high cost and complexity to serve citizens when trying to address opportunities that they identify.

In fact, none of the city actors can independently provide a real solution to address citizen’s problems. The following graphic portrays why this players need to work together.



City disruption by citizens is already happening

Restaurant Day in Helsinki is a real case of how civic initiatives can lead to change. A citizen-led action that improved the lives of people through food, made the government change the law regarding restaurants and blossomed a new set of street-food businesses (<http://www.restaurantday.org/>)



“Restaurant Day is exactly the sort of project that will define our future. Restaurant Day has inspired the city’s population to question how things are run and to experiment and put forward new ideas of how daily life might be improved in the future.” — Jussi Pajunen, Mayor of Helsinki (Monocle’s city survey on Helsinki in the May 2012 issue)

Cities will create a huge opportunity on new digitally enabled services for citizens

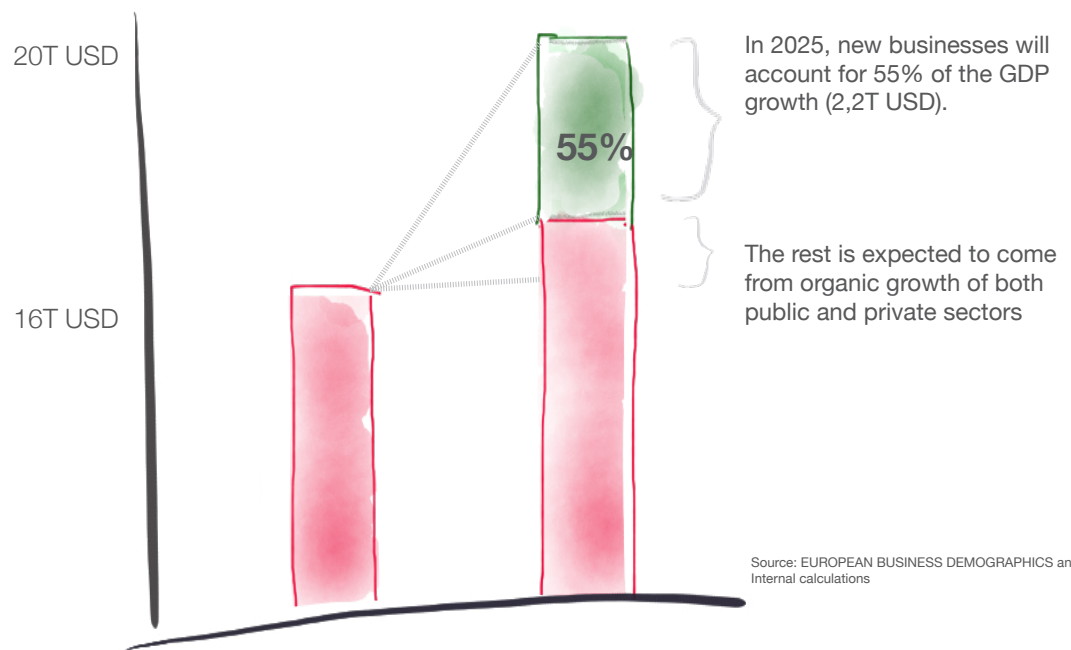
The disruption of the city is already happening and we expect not only economic growth but also a big shift on the way cities work these days.

Entrepreneurs that challenged the status quo are growing and capturing value from the city. The most renowned examples are Airbnb, Uber, Instacart but we foresee more and more success cases in the near future, most of them led by citizens needs and enabled by IoT technology.

According to a McKinsey report 600 cities will generate 60% of global GDP growth in the next 10 years (2025). Our internal analysis shows that near 30% of that growth will come from new disruptive businesses (as Uber is today).

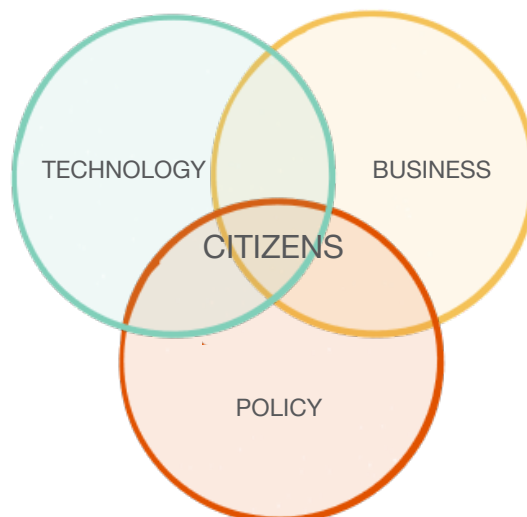
In the future, new businesses will use IoT solutions that go beyond the smartphone. Hence, IoT players are the ones to seize the opportunity to capture the value from new citizen services.

For illustrative purposes this is how growth could look like in the future:



Reframing the Smart City will imply innovating in technology, business and policy

Cities are the factories of innovation and social prosperity. They are wired like brains or innovation hubs. Statistically, ideas and patents accelerate faster than population. Leading edge Policy, Technology and Business helps the creation of these hubs and to overcome the different challenges that cities face.



Technology Innovation will become a business enabler for entrepreneurs to reach and serve citizens

Technology innovation will come from a new connectivity. An enhanced connectivity enabling IoT in the city. This will go beyond a SIM, providing shared data that will allow to actuate millions of unconnected objects and devices. IoT designed networks, mobile sensors and data fusion appear as key factors.

Telefonica is working proactively in new **sensor infrastructure**: IoT designed networks, LPWA (Low Power Wide Area) networks as Sigfox, that can open new markets in addition to existing cellular solutions. The characteristics of LPWA technology (low cost, low energy consumption, wide area coverage, low throughput) make it ideal for those new business use-cases. The low cost of modules (modems) and service TCOs will enable entrepreneurs to reduce the cost of the development of the solution.

Telefonica is able to be highly competitive and disruptive in the smart city arena with mobile sensors rather than traditional smart city approaches based on static sensors.

To complement the network development we have a compelling vision of an **identity infrastructure** where people could use their own identity as a key to open and unlock city accesses and services.

In addition to the above, as we believe that the most likely scenario to happen is that several data platforms will coexist, we'll act as a **data integrator** that guarantees the quality of data, integrating different sources in a common data model and providing usable data for businesses.

Multi-Sided Platforms (MSP) will allow value creation for citizen services capturing externalities (cross-side network effects)

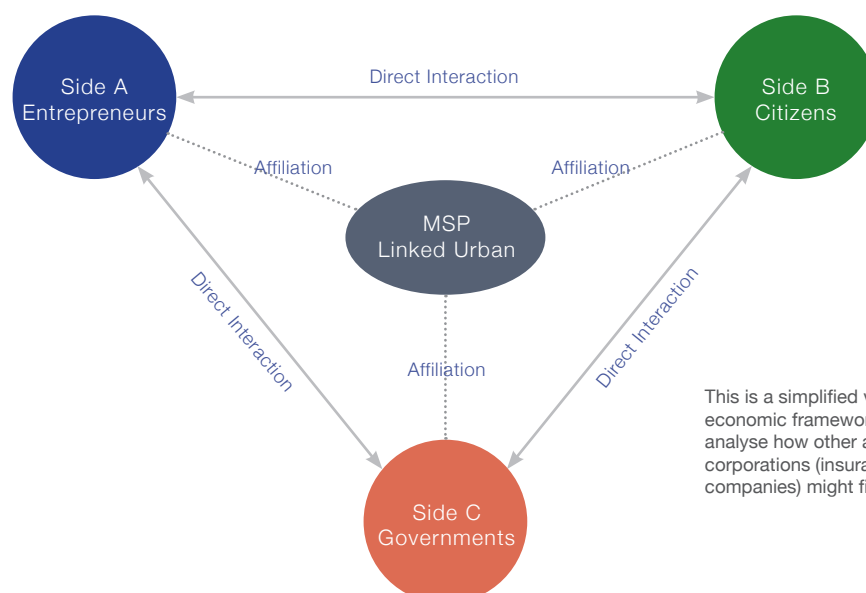
Tom Sawyer launched an innovative business model connecting three actors with different needs in a common activity: His aunt Polly needed her fence to be painted; his friends wanted to have a hobby and he needed to fulfill a punishment. Tom Sawyer was probably unaware that he launched a multi-sided business model

MSPs are technologies, products or services that create value primarily by enabling direct interactions between two or more customers or participant groups. MSP businesses are popular now; the most prominent examples are Sony's PlayStation gaming consoles (game developers and users); Uber (drivers and passengers); Facebook (users, advertisers, third-party game or content developers and affiliated third-party sites), among others. In that sense, for our Linked Urban programme we want to put in place MSPs business models with affiliations with our key actors (government, citizens, entrepreneurs and corporations).

MSPs have key features beyond any other requirements (such as indirect network effects or non neutrality of fees):

- They enable direct interactions between two or more distinct sides, so the government, citizens and entrepreneurs retain control over the key terms of interaction (such as pricing between A and B, or regulation between C with A and B)
- Each side is affiliated with the platform, so users from each side consciously make platform specific investments that are necessary in order for them to be able to interact with each others (such as share data, an access fee or expend time on learning how to use existing APIs)

Tom Sawyer realized of indirect "network effects" (aka externalities) in multisided platforms (e.g. to finish before the punishment) and the non-neutrality of fees; aunt Polly was subsidized with a fence painted while his friends paid a fixed fee. We really think that Linked Urban MSP will have externalities that leverage existing models in smart cities that are now pure vertically integrated where government is directly responsible for and has residual control rights over the provision of services to citizens.



Policy Innovation will spur positive change in business models and technology

The evolution of green energies policies in the United States led to the leasing model, which unlocked the solar market in the EE.UU. (150x reduction in cost of solar power since 1977) and boosted the creation of new solar cell panels technology. Examples like these can be found on the different cities that show a more leading behavior regarding policies and regulations keeping the pace with citizens and entrepreneurs needs (i.e. Finland's "Restaurant day" example).

The most promising growth areas clearly relate to problems that are relevant to citizens

Urban Well-Being has been an issue for quite some time already. Only in the past year 8M people were killed by air pollution. This also implies healthcare problems that have an estimated value of \$550B for the United States and \$600B for Europe. The market that addresses these problems is expected to reach \$78B by 2019 and is growing at a CAGR of 5,8%.

Environment, and specially air quality, is one of the three areas that concerns the most to citizens. There exists a desire to prevent being exposed to polluted environments and to follow advice on healthy behaviors and living. The common goal for citizens in this area are awareness, and capability and knowledge to react.

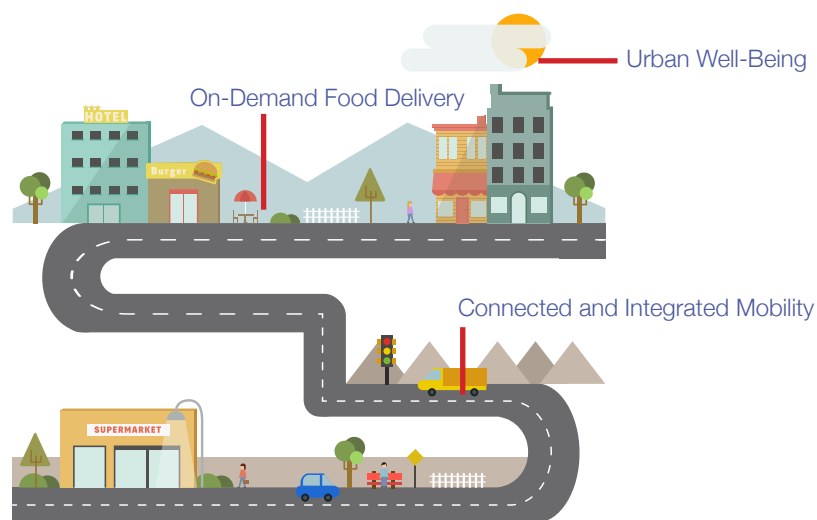
Another important topic is **Connected and Integrated Mobility** for citizens. 71,9% of transport greenhouse gas comes from vehicles. An average of 13% of household income in the EU is spent on transportation (including gas, vehicles, etc). And the cost of road congestion is estimated to be €110B in Europe and \$124B in the US. A clear need for alternative means of transport exists and some cities are already taking action on it by banning vehicles from their city centers. Pollution dropped as much as 30% in some areas in Paris after banning vehicles. Global revenues from bicycle sharing are expected to reach €5.2 billion by 2020.

When analysing how people understand and live their city, transport is the most commented dimension. It represents one of the main ways to experience the city and its services. Citizens mention as main topics a. Being able to go beyond traditional models and means of transport (bus/train/car); b. A better understanding and knowledge of every possible way of accessing

places; c. A preference for access over possession and d. Enjoying the rides as much as possible. Adaptability of transports and routes to specific needs so that people can feel more connected to places is a common aspiration.

The third main area is **On-Demand Food Delivery**. As e-commerce keeps gaining market share over traditional retail, delivery is at proportional growth. The necessity to track packages, vehicles, and the upcoming lockers generates a great sensor network. On top of this, the number of vending machines keeps increasing and so does the number of sensors and data they contain. It is also a good chance to include a future market where Telefónica has the chance to become a relevant player: the button or instant delivery, a great example of potential app-less IoT.

We found out that citizens' relationship with delivery also has a high impact on different urban domains being leisure and residential the most direct ones. Reducing friction and effort when getting food, or any other product allows citizens to focus on enjoying everyday things. Getting things done takes too much time and energy from people, there is a need to feel more connected and brisk when demanding services or products delivered in the city.



We are working to set the basis of a pilot following a collaboration model

Four principles, applied as guidelines, will model our hypotheses testing through a pilot:

- **B2BX model is the best approach to create and capture value:**
This is no either B2B or B2G. Ecosystem (B2B2X) work well with user needs that are poorly understood/addressed and it's difficult or costly for entrepreneurs to reach and serve customers. Business models (tbd) goes beyond selling basic sets of data (valued added e.g. security, granularity..)
- Basic city data is **public, shared, mobile and real-time.**
- **Citizen's interactions with services go beyond screen/smartphone:**
Redefining citizen's interaction with cities by providing intelligence to everyday objects that a. Create more visibility of citizen problems and b. Give ownership over these problems to citizens, government and business.
- **Fragmentation and diversification of systems is good for cities:** The most likely scenario to success would have several platforms serving the city. The challenge is to integrate different data sets with sense. This fragmentation and diversification will foster innovation in the city, enabling that either platforms and services could coexist. In the short term we're considering the option to give the IoT platform for free to speed up the development of services for citizens.

The prior are our guiding principles and we are leaning towards the areas that are focusing on addressing specific citizen needs and that have a potential in business model innovation through IoT.

Our first stage will consist on developing a mini-ecosystem (neighborhood, district, or part of a town) focused on one/some of the growth areas described above. Our main criteria to define and choose city challenges are: a) Solves a citizen problem b) Creates new Digitally Enabled Services c) Creates and captures economic value. Outcomes would validate: meeting user needs, new services generation, economics, business models and scalability.

We plan on partnering with private and public key companies already working in these domains to build an on going network of players that can complement each other, progressively including the forementioned areas.

We are looking for partners to join us in this endeavour.

About Linked Urban and Product Innovation (Telefonica I+D)

Programme Lead: Paula Valverde

Design Strategy & Marketing: Luis Eduardo Dejo

Design Research: Javier Sierra Merino

Programme Management: Agustin Martin Gonzalez

Main Advisor and Supporter: Paco Jariego

Follow us on Twitter: [@linkedurban](https://twitter.com/linkedurban)

Sources, links and credits

Images

- Cover by Luis Eduardo Dejo
- Image on page 12 designed by Freepik.com

On Transportation:

- <http://www.mobility-trends.com/index.php/2014/10/bike-sharing-market-could-reach-eur-5-3-billion-by-2020>
- http://ec.europa.eu/transport/_static/pdf/connect-to-compete-innovation-v2_en.pdf
- Paper: Bikesharing in Europe, the Americas, and Asia: Past, Present, and Future by Susan A. Shaheen, Stacey Guzman, and Hua Zhang

On Public Safety:

- <http://www.prnewswire.com/news-releases/global-homeland-security--public-safety-market--2015-2022-300027141.html>
- <http://fast-fwd.org/public-safety/>

On Air Quality and Environment:

- <http://www.marketsandmarkets.com/PressReleases/air-quality-control-systems.asp>

On cities:

- Paper: McKinsey Global Institute: Urban world: Mapping the economic power of cities - Dobbs, Smit, Remes, Restrepo, Manyika and Roxburgh. March 2011

Telefonica
