

TITLE: “Zaragoza's Open Urban Lab”. The city as a platform for innovation

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ABSTRACT:

From the beginning of urbanization to the end of the 20th century, the historical ability of cities to adapt its form and function to the changing needs of people have been founded on a close relationship between urban planning and infrastructures. Traditionally servicing the purposes of urban planners, the role of infrastructures in cities is changing in this digital era. Digital infrastructures have contributed to the intentions of urban planners to revitalize city downtowns, recovering them as centers of production. Paradoxically, some of those digital entrepreneurs run today Internet giants like Google, Über, AirBnB or Amazon, and are launching innovative services at a much quicker pace than city authorities can regulate them. They are shaping, for good or bad, urban life.

Planning and operation of cities can no longer ignore this reality. It is essential that more agile practices be adopted so city policies become more responsive to changes. Participation has also to be reinforced, not only to strength democracy, but because the quest for solutions to these new challenges can not afford to lose grass-root ideas. After decades of top-down planning too heavily influenced by the short-term financial needs of cities and market logics, urban sprawl has left scars in the form of mono-functional districts, no-places, voids and vacant plots. In the last years, a new civic activism is rising and giving, through open place-making, a new life to some of those urban holes.

This paper argues that, in order for urbanism to cope with digital technologies and participation, a different kind of institutions are needed. According to the renowned Smart City guru Anthony Townsend *Zaragoza's (Spain) 'Etopia Center for Arts and Technology', named after William J. Mitchell's book 'E-topia', is one of a kind [...]: an open agora that is wired, through its Open Urban Lab, to the design and operation of the open source 'smart city' that Zaragoza intends to be.*

In an attempt to explore a step further beyond oGov, the Open Urban Lab borrows concepts from open source, agile methodologies and lean startup thinking to construct a distinctive innovation cycle that benefits from 'Etopia's mix of uses and diverse communities, and that takes advantage of cooperation between stakeholders to maximize results and minimize frustrations. Open Urban Lab's open innovation cycle identifies urban challenges and funds the construction of quick, simple Minimum Viable Products to address them. The paper addresses the difficulties to build strong business models in the smart city sector, and gives hints about where to look to find them: energy and (big) data. It finishes stressing the importance of empowering local communities (specially children) in the creation of the new digital products and services, as the only way to turn the threats of

technification and globalization into unexpected opportunities.

CONTENT:

Introduction. About how urbanism copes with technology

Since, undeniably, cities have been powerful magnets since the beginning of mankind, there must be very good reasons for that and, in fact, many advocate that cities are our most brilliant invention. In fact, cities have adapted its form and functions to the different purposes that each civilization in history demanded. They provided security in the middle age, housing for workers during the industrial revolution and endless opportunities today for culture, as well as for social and economic activities.

Urbanism, the urban practice that mostly deals (but not limited to), city form, has followed function in a very close relationship with engineering. The role of technology and infrastructures in this context has been fundamental, allowing cities to host increasingly quantities of population and citizens to overcome the problems related from concentration. Roman aqueducts and network of sewers were a significant technology jump, taking water in and out from cities. In the middle ages, city walls were built in times of insecurity, giving way to compactness and density. It took time to find solutions for decently sheltering the thousands of families dwelling in slums. With the arrival of the automobile and the vacation time, futuristic urbanists planned the garden cities and civil engineers jointly planned and built the big communication arteries, shaping cities to meet the increasing needs for leisure of the growing middle class.

In the second half of the XX century, it was that very same middle class that strove for cities with higher quality of life, far from noisy and polluting factories, a process that will also likely appear very soon in China. In parallel to the growing environmental concern, real-estate prices pushed for a shift in the uses of former urban industrial sites. Both factors, environmentalism and real-estate logic, progressively evicted traditional industries from cities, liberating urban soil for other high revenue uses. Residential neighborhoods spread city limits, adopting different forms and densities as a function of socio-cultural factors and fuel prices.

GDP boomed over the last decades of the last century in the Western world, and our consumption power (the sum of money and time) boomed with it. Not surprisingly, many industrial sites were thus replaced by malls and commercial centers linked in and out by new communication infrastructures, re-balancing the commercial activity between downtowns and outskirts. In turn, downtown neighborhoods, once vibrant and populated by new families, were being abandoned by white collar workers, its population aging and being replaced by low income migrants.

Although many argue that this unprecedented wealth creation was generated at the expense of inequalities and that phenomena such as globalization and technification anticipate the progressive death of the middle class, the fact is that, inequalities aside, this unprecedented growth in GDP has led to more talented people, more market opportunities for new ideas and more capital to fund them. In the digital era, a new type of industry is born, silent and non-pollutant, with low surface needs, and whose workers are in the ranks of the so-called 'creative classes'.

To host those new 'urban species' of digital creators many downtowns were revitalized, sparking quick gentrification processes. Beginning at the end of the 90's, and impelled by the liberalization process of the telecommunication markets, new digital infrastructures such as fiber and wireless networks were deployed to fit the needs of this digital class.

Few could have figured out by that time, at the end of the nineties, that these new digital inventions would not stop at the digital side of things but would instead challenge the most physical parts of our cities. Few could have anticipated, that in 2015, a bunch of those new digital downtown dwellers would found some of the companies that threaten to run and operate the digital, economic and physical levers of our cities of today.

City officers losing ground. How did it happen?

In the year 2010, at the midst of the Western European struggles to face the crisis derived from the financial

markets crash in September 2008, many cities embarked in their first widespread traffic sensor deployments. Internet of Things and the smart city talk was just blossoming, and the fiscal stimulus packages from states were used by cities to implement their first smart city projects. Since mobility has always been an issue, traffic sensors and centralized, vertical traffic management platforms were installed and upgraded, allowing advanced and real time information to traffic operation centers and, to some extent, to users. Lately, open data and smart phone platforms used these projects to develop useful apps for car users.

Zaragoza (Spain) built one of those IoT traffic networks with Spanish government funds. Thousand of sensors measure traffic affluence and transit times gathering thousands of data records per day and allowing traffic signs to deliver real time counsels to drivers, as well as optimum routing for multimodal transport, all of it through several mobility apps, some of them funded by the municipality, others simply made by the growing community of apps developers. Several years later the city has a centralized, modern and comprehensive solution for smart traffic management. However, at the same time Google giant has developed and fine-tuned Google Traffic, a Google toy that displays traffic condition in real time along main car routes in many countries, the list of roads and countries growing every day.

Today, there is no evidence that the traffic information provided by the city is more accurate than that found on Google service, or the contrary. Both have pros and cons. But what it is true is that nobody imagined in 2010 that in 2015 comparable services to city drivers could be offered by Google without the need of public expenditure. Would the city have decided to go for its own IoT network if somebody could have anticipated this? Difficult to know, but of course, it would have been a factor into the discussion.

Now the fact is that both solutions, Google's and the city's, coexist in Zaragoza. The traffic flows steadily (in part due to a hard policy of taking cars out of the city center with a pack of measures including a new tramway line that runs through the city's main longitudinal axis and an advanced policy of bike promotion) and the city has no major mobility problems according to independent sources as TomTom, who claims that Zaragoza is one of the least congested cities in Europe year after year.

TomTom's report on mobility is taken from TomTom's big data bases. Similarly to Google, the company instantly receives and records huge amount of data as drivers use their products. Both companies have significant information about how traffic flows in cities, just as cities do. But the difference is that those companies make very good use of big data. In some sense, Google invented it and holds some of the patents that support the idea of big data itself. Furthermore, their company business and operations model is founded on the analysis of this big data. On the contrary, cities are far from there. Only now they are starting to think and deploy horizontal platforms which can later feed business intelligence tools. In this sense, as in many others, cities are not still run as companies, probably because there was not an urge to do so because of lack of competition. In the pre-globalization era, cities were, in some ways, monopolistic market providers of socio-economic services. But since capital, information, goods and, ultimately, people are moving with increasing easiness, cities are starting to face competition.

To sum up, the case for cities to look at how successful businesses are being launched nowadays is there. Lean start-up thinking is one of those concepts that cities can import from the world of start-ups. Some of the digital creators that populated those creative districts (in San Francisco, for instance), have used lean startup thinking in the past to launch Internet based companies like Über, Amazon or AirBNB, which are gigantic now and which challenge traditional urban activities like transportation, shopping or accommodation at the extent of making city officials question about who really operates the city. Über is not only jumping over regulatory barriers in one city after another, but they even recently dared to 'offer' their help to the municipality of Boston to, through their data, improve Boston's traffic operation.

Urban planning can no longer ignore the effect of Internet based services to perform its function, but this is not the only thing that urban planners need to change to cope with technification and globalization.

Agile, participatory urbanism

Urban planning activities deserve a separate analysis. As we explained before, the rapid changes that our society faces nowadays are the sign of our times and, due to globalization and technification, it is reasonable to expect that those changes will not but accelerate in the future. Urban planning, on the contrary, is a public activity slow by nature. Cycles in urbanism vary from 10 to 20 or even 30 years, and this is not the only characteristic that makes urbanism special. Urban planning is about setting the appropriate conditions for all activities in the urban soil to take place: dwelling, moving, working, enjoying... in other words, living. Although this paper is not intended to enter deeply into the urban planning arena, the analysis of urban planning activities in the context of how government and governance has to change to cope with a different world, raises a number of unavoidable questions:

- is there any margin for introducing participatory processes into urban planning?
- What can be done to make urban plans more responsive and adaptable to the changing contour conditions of our cities: budget constraints, real-estate peaks and valleys,...?
- how can urban planning, a long term task, cope with uncertainty?

Urban planners have been in the last decades perhaps too heavily influenced by the financial needs of cities. This perverse influence is at the root of the urban sprawl process that many cities have experienced, especially in Southern Europe, being citizens the indirect and acquiescent victims of this situation. While urban sprawl has funded the short term financial needs of cities, it has weakened their budgetary possibilities in the long term. With many citizens moving towards the city outskirts, the need to deploy expensively public services can not and must not be ignored, and therefore budgets had to be fed with more real-estate operations. Once the subprime crisis began and this spiral was broken, not only city financial muscles quickly became exhausted, but many projects were as well left uncompleted. Empty plots and empty areas that metaphorically remind us about the sudden turns of fate.

And, meanwhile, and as a result of the urban sprawl, city downtowns are also filling up with holes, since the number of new dwellings far exceeded the number of new families, and the quantity of new tertiary land outscored the rate in which new business are created or its growth rate. The picture is that middle class families left the consolidated city and companies or banks headquarters emptied out when their occupants fled to the industrial parks or, worse, to the so called city-of-so-and-so (city of Telefónica, city of banking, etc.) In many cases, huge amounts of public resources were even compromised in building ad-hoc transportation infrastructures to move workers in and out of those quasi-monopolistic business parks.

Urban planners should consider how other urban disciplines are incorporating participation into their praxis. Budgeting, place making, culture, politics, technology or innovation are fields where participation is, not only providing legitimacy, but also leading to better outcomes. Participation would have the additional benefit of shielding the urban planners from an excessive influence of the previously depicted “dark forces” of the city. As Andrés Walliser [1] demonstrates with the case of Madrid, a new urban activism is appearing, giving birth to collaborative, participatory, open-place making initiatives that, more or less tolerated by institutions, are filling up the aforementioned urban holes.

In his third proposition about governance, Stoker [2] mentions that “governance implies a greater willingness to cope with uncertainty an open-endedness on the part of policy framers”, and that is why we think that agility is another interesting concept that urban planning should maybe look at. As opposed to traditional waterfall methodologies, agile development processes have dramatically changed the way technology is being implemented nowadays, especially in the software industry. Short development cycles, or sprints, allow developers to constantly adapt to changes in user requirements or new contour conditions. Although software industries and urbanism are completely different fields, we foresee an increasing interest about agile urbanism in the forthcoming years.

Building Etopias: open, connected agoras.

Smart city pioneer William J. Mitchell, former dean of the M.I.T.'s School of Architecture, in early as in 1999, opened his book “E-topia. Smart, green and lean cities” [3] with a visionary sentence: 'Urban life, Jim – but not as we know it'. We will increasingly continue to live in cities, since cities are the most successful generators of

opportunities for people, but our life, although powered by the same human and social principles deeply rooted in our genetics, will be slightly different.

“Etopia” updates the microscopic description about how cities work that Jane Jacobs painted in her renowned book “Death and life of great American cities”, adding what Jacobs could not have guessed in 1959: the irruption of Internet and telematics. Mitchell colors the overall picture of cities by understanding the effects of technology over our neighborhoods, our houses, our workplaces. Over us.

Him, who was the Dean of the M.I.T. School of Architecture and Planning from 1992 until his death in 2010, analyzes the changes that sensors, software, mobile devices, computing and telecommunications bring to our daily life, social behavior and economics. Transformations that we are already seeing in cities all over the world. As an example, Mitchell’s vision predicts as early as 1999 the explosion of today’s widespread phenomena such as co-working, Internet of Things (IoT), telepresence and RFID cards.

“E-topia” is, above all, a book about people and places: “the 21st century will still need agoras – maybe more than ever. But these will not always be physical places [...] If these places are to serve its purpose effectively they must allow freedom of access and freedom of expression”. Thus, openness and freedom not merely as a principle, but as a design guideline for efficiency.

Mitchell envisions new “e-topias: lean, green cities that work smarter, not harder.” They are based of five principles: dematerialization (electronic goods and services), demobilization through virtual selves and connections, mass customization or the ability to tailor services and goods to every unique user, intelligent operation (the traditional, narrow “smart city” approach) and soft transformation, meaning that for the first time in recent history, the physical changes produced in old cities by this new economy are regenerative instead of destructive.

In which is probably one of the most powerful messages of the book, Mitchell states that, by following those principles we can, for the first time in history “aspire to meet our own needs without compromising the ability of future generations to meet theirs”. Sustainable development is, therefore, not beyond reach. Not surprisingly then, different people are trying to apply those principles to a whole range of disciplines from product or service design, architecture, business strategy, policy making and urban design. Green cities are a common subject nowadays and greenness has become part of the core strategy of every major city.

And what about places? The power of places, Mitchell says, will still prevail. Physical settles and virtual venues will function interdependently and will mostly complement each other, as the virtual debate in twitter during a congress or meeting enriches the physical experience of the event. Sometimes “we will use networks to avoid going to places but most of the times we will go to places to network” or, yet more often, we will use networks to share what we experienced by going to places.

William J. Mitchell was, until his death, president of the Committee of Experts that designed the innovation district of the 'Digital Mile' in Zaragoza, Spain. The concept of openness that Mitchell advocated for the new 'agoras' watered the 'Digital Mile' thanks to his work. Three years after his death, in 2013, the city of Zaragoza launched a new innovation hub at the very heart of the 'Digital Mile' innovation district. The new facility, named 'Etopia Center for Arts and Technology’ after Mitchell's memory, counted on his opening conference with the participation of urban thinkers such as Saskia Sassen, Manuel Castells, Dennis Frenchman, Michael Joroff or sir Peter Hall (amongst others) who conform its Scientific Committee, to speak about the challenges that the new digital economy poses on cities and about how cities, in the words of former Curitiba's mayor Jaime Lerner, can effectively be “the solutions, and not the problem”. It was powerfully symbolic that the opening conference took place in the “William J. Mitchell Auditorium” of the center.

Open, agile and lean cities

“Etopia Center for Arts and Technology” is a project planned con-jointedly by a team composed of M.I.T. Fellows and a small bunch of city officials very close to mayor Juan Alberto Belloch. M.I.T. Team were mainly composed

of architects and planners, while the people from the city had mostly a telecom and IT background, very concerned and devoted to how open source can help foster innovation. This strange 'mélange', along with the tons of hard work involved, had an unexpected effect. It allowed planners to incorporate the open source concept into the design of the center, and made IT staff understand up to what extent "place mattered" over the virtual world.

Originally the design team envisioned "Etopia" as 'a global center for innovation, entrepreneurship and creativity in the digital city', according to its mission. Conceived in 2007, it was supposed to mix tekkies, entrepreneurs, artists and innovative citizens in a sort of 'digital bauhaus' connected to the world and the city but not necessarily connected to the planning and operations departments of the city council. But that changed when the city decided to create its own 'Smart City Department' and appoint it to run both Etopia and the Smart City policy of the city. All of a sudden the same team running 'Etopia' and its innovation programs was also responsible for operating the city's large WiFi network, the citizen card (a widely used all-in-one digital key to most of the public urban services), three start-up incubators and Carlo Ratti's Digital Water Pavillion (a visionary example of open source architecture).

One of the workshops running in parallel to Etopia's international opening was about 'Open, agile and lean startup urban design'. In it, Michael Joroff from M.I.T. and Daniel Sarasa from the city team running Etopia experimented on how urban design processes, traditionally slow and top-down oriented, can be enriched by new ideas coming from the innovation millieu. We had a double objective. First, to test how urban design practice (in this case, the particular field of place-making) could incorporate the concepts of open source, agililty and lean startup thinking. We also wished to make attendants visualize the project of 'Etopia' as a collaborative project, open to people wishing to embark in rich personal and professional growth adventures.

As the Etopia management team we were interested in developing the careers of those individuals wishing to contribute to the city's business and civic life. The city's open source approach does not end in promoting Linux, Arduino, open data or even operating Carlo Ratti's Digital Water Pavillion. In this sense, projects are conceived from day one as platforms for other actors to innovate upon, and Etopia is not an exception. Thus we counted on Patrizia di Monti, architect and promoter of the successful "Esto no es un solar" ("This is not a plot") program and Teresa Oliver, expert in agile methodologies.

The workshop gathered people from very different backgrounds: plain citizens, global urban thinkers as the members of Etopia's Scientific Committee, maintenance staff, public managers, programmers, engineers and local architects, and the attendance was divided into four groups, which sought to reconfigure four different spaces of the city:

- Carlo Ratti's Digital Water Pavillion, designed on the occasion of Zaragoza's International Exhibition on Water and Sustainable Development in 2008
- San Pedro Nolasco Plaza, at the heart of the city, where public space has been invaded by outdoor bars evicting neighbours and children)
- the tower of the old exhibition center
- and Etopia's main vestibule

Although all the groups presented interesting ideas to improve the places subject to analysis, the most valuable outcome of the day was in the process, not in the product. Engaging people from that variety of backgrounds was, in itself, extremely inspiring. Although very few of the attendants were aware of open source, agile methodologies or lean startup thinking, we were able to work on those principles during the group dynamics in the following manners:

- On open source principles. We stopped at explaining, as part of the introduction, the positioning of the workshop in the strategy of developing an active and engaged community with the transformation of the city towards innovation. In this context, openness means the ability to understand a project, the possibility to easily participate and, finally, the knowledge, tools and permissions to reconfigure it for the benefit of the community,
- On agile methodologies. A facilitator was in charge, in every group, of collecting the requirements for the

redesign of the various projects. This was done in the form of user stories, a common trait of agile methodologies such as Scrum or Xtreme Programming. We assigned to every user in the group the artificial role of representative of a different user community. For instance, in the example of the plaza's redesign, we had a representative of the bars and cafés, city council, elderly people and families with children. This prevented endless discussions, and the conversation quickly converged into a reasonable set of requirements. This proved to be enlightening for everybody and mutual understanding took place during the dialogue. Due to obvious time constraints, it was not possible to proceed to the iterative cycles (or sprints) that are characteristic of agile implementations.

- On lean start-up thinking. As in the previous case, we centered on a single concept: the Minimum Valuable Product (MVP). After all, the user requirements are nothing but hypothesis of success formulated from a user perspective. Lean startup thinking recommends that every hypothesis must be tested through the simplest and cheapest possible means. The definition of the four MVPs was extremely inspiring. As an example, citizens very critical with the Expo 2008 in Zaragoza suggested that the best possible reconfiguration for the Digital Water Pavillion was its complete demolishing. After studying the cost scenario, they conceded the possibility of installing a bar inside the Pavillion as a last chance prior to its demolition. After all, the cost of a simple beer tap is not so expensive compared to the cost of a full demolition and it has the significant advantage that the project can still pivot if, still, success metrics are not favorable.

As a conclusion, we tested that highly innovative concepts such as agility, open place making and lean start-up thinking can be introduced to heterogeneous, non-technical groups, provided that adequate pedagogy and group dynamics are rolled-out. We were ready then to go to the next stage.

Open Urban Lab. Beyond oGov.

On the fall 2013, three companies responded to the city's first public tender to work in Etopia on "collaborative smart city projects". Etopia's staff needed to prove if there was a business case for the hypothesis that the city could offer itself as a real laboratory in which companies could test new products and services at no expense for both parties other than the inherent expenses of developing the product. In this arrangement, Etopia would organize open innovation sessions conducted by experts in civic participation and open to the general citizen. The participation of city officials in the business areas of the specific projects were also something that Etopia had to provide. Companies were allowed to use Etopia facilities for establishing their development teams and perform business development conferences, but in turn had to commit to disseminate their work to the children that visit the center daily as part of their school programs. The last part of the deal was that both parties agreed to look together for funding opportunities, especially in the broad European program Horizon 2020, intended to develop smart cities to its full potential.

In the subsequent months, another three projects were added to the Open Urban Lab, totaling 6 projects working on subjects such as digital inventory of the city, smart mobility, innovative shopping, energy optimization in buildings, the design of the business model and layout of Etopia's cafeteria and the design of a participatory app to help on the regeneration process of working class Delicias district, the city's most populated neighborhood. The project of the digital inventory of the city, led by an important Spanish engineering company, is no longer present in the Lab. After failing to get European funds in a call by September 2014, the company just withdrew. The other four projects are led by medium or small companies, which find this open innovation deal interesting in itself without the addition of extra funding. The project of the design of the cafeteria is an in-house project, in which Etopia's open urban lab is servicing Etopia itself.

Right after the companies had landed in Etopia's Open Urban Lab, in winter and spring 2014, a set of open innovation sessions started. The program, under the "ZGZ Open City" motto, intended to engage citizens and its representatives, public servants, developers and companies in collaborative city making. Each workshop addressed a particular challenge, identified the actors interested in engaging in the solution and started to work in a set of user requirements, in much the same way as in the opening workshop from July 2013, but limiting its scope to sketching viable solutions to the aforementioned challenges from an agile point of view. No particular technological skills are needed to attend the workshops, because only boards, pens and postits are used. In this

manner, the workshops are a sort of tech-less hackathons in which tekkies, city officials and plain citizens are all at the same level. Either the city hall technicians or the technological SMEs present in the workshops would commit to turning these designs into functioning prototypes.

A common characteristic of the projects is that all of them used the infrastructures of the city not just as a test bed but as a platform to innovate upon. Although Zaragoza has no formal API (Application Programming Interface) for smart projects to connect to the city's "operating system", the smart city department was able to build a sort of informal way to interact with the city, mostly through human relations and conversations. This informal protocol has led so far to some interesting outcomes.

'Want it!'

'Want it!' is a shopping service led by SME Neodoo Microsystems and one of the first products out of the Open Urban Lab's oven. In some senses it is similar to Groupon, but has a singular novelty. It uses Zaragoza's citizen card as a platform to help small shops compete with the new shopping malls. Shops use a web interface to create offers, while users access them remotely through an app that uses the Zaragoza's citizen card as a shopping loyalty card. The advantage of the system is that it is quite cost effective both for shops and customers, since the citizen card is already used by 50% of adult population in the city and the addition of this service does not imply any additional cost.

Neodoo Microsystems used the participatory workshops at Open Urban Lab to tune the system and introduce new functionalities. Local shop representatives, shop owners attended the workshop and expressed their concerns and requirements. City officials, also present, committed to promote the system once it was released. The citizen card technical staff assisted the people of Neodoo during the testing phase, after all they only work a few floors away from each other, in the same "Etopia" building.

Three models of building the smart city

As we explained at the beginning of this paper, traditionally urban planners and civil engineers have worked together in the implementation of new urban projects. With the digitalization of our cities, local IT and software engineers are taking a more important role in city planning, although this is not openly acknowledged. With globalization, and behind the back of urban planners, Internet companies (many of which are foreigners unless you live in the United States) are taking an increasingly important knowledge of what is going on in our cities, mainly with the help of the Big Data that we all produce with our consumption, social or moving patterns.

It is commonly accepted that there are several models when building the smart city. First, the traditional top-down approach. This model is nowadays being humanized with the new coat of paint of the "citizen in the center." However, it still is, in the best of cases, an updated version of the eighteenth century claim "all for the people but without the people". In this model, big companies partner with city councils to decide what projects to develop and how, projects that are marketed as significant moves towards the "smart city" ideal. The best we can say of this model is that, in such cities, participation is not optimal. It is the model most of the industry longs for: the model of efficiency.

The usual story tells that, in other places, institutionally and economically weakened, the most interesting projects are often being built bottom-up, product of grass-root efforts, in parallel or directly out of the scope of the institutions ruling the city. In those places civic participation is poor, and people's creativity overflows institutional norms. Carlo Ratti [4] explains the case of technology leapfrogging in Africa, and how it introduces urban intelligence in a citizen-centric way.

The accepted narrative about the building models of the smart city finishes here, but authors as Charles Landry [5] and Richard Sennett [6] point towards a third possible model: the cooperative city making. In such a model, institutions, citizens and companies adopt collaboration dynamics, and agree on reasonable deals to satisfy everyone's legitimate interests. It is a model that combines utopia and pragmatism, that satisfies and frustrates in equal proportions. Its main advantage is sustainability, its main drawback being the difficulty of putting it into

practice, specially in big projects. With many people involved in the conversation, this becomes too simplistic and the nuances of deliberation are lost in the midst of bitter political debates.

In our experience, however, this commonly accepted narrative is not entirely real. The three models sketched here are true, but they do not take place in different cities. They all coexist in the very same city. The cameras we all see in the streets have been probably installed following direct orders from the police superintendent and record our steps in some central database, while the reorganization of the city bus system has been accomplished through a traditional participatory process involving neighborhood representatives. At the same time, civic hackers might be pushing the city authorities to release more accurate, real time, open data sets. The same department of urbanism might, at the same time, working in the development of new housing projects in the city outskirts and authorizing a project of tactical urbanism to revitalize a plaza in the city downtown.

Cities, like individuals, live under multiple and permanent contradictions, product of complex interactions between forces pulling in all directions. The city hall, in the middle of the battlefield, as Anthony Townsend says [7], is reinventing itself to find ways of ensuring that the outcome of these opposed forces, as William J. Mitchell writes in “E-topia [...]” is, for the first time in history, regenerative and not destructive.”

In a city hall that is reinventing itself, in an era where the cities are solution providers for the most acute challenges of our societies, in a time where globalization and technification accelerates insanely the speed at which innovation occurs, Etopia's Open Urban Lab is intended to act as the R+D+i department of the city.

Open Urban Lab's innovation cycle. A new operating system for R+D+i

When we define the “Open Urban Lab” as the R+D+i department of the city we mean the city and not the City Hall. If former Curitiba's Mayor Jaime Lerner was right and cities were the solution and not the problem, and if it true that smart city is about using technology to help in this process of solving urban challenges, then there must be a place where the city should experiment and outline what these technological solutions could look like. The proof that city halls are reinventing themselves is that reading 'innovation' and 'City Hall' in the same sentence is not surprising anymore.

Before looking at Open Urban Lab's innovation cycle it can be enlightening to describe the environment into which the lab lays. Open Urban Lab occupies 400 m² of “Etopia Center for Arts and Technology”, a facility of 16.000 m² where one can find a maker space, a start-up incubator, classrooms, multimedia labs, exhibition rooms, a cafeteria, a 600m² digital LED façade, and a residence for entrepreneurs, digital creators, musicians. Carlo Ratti's Digital Water Pavilion plus two other start up incubators are just across the street, totaling more than 60 startups blossoming in a radius of less than 500 m. The main bank of the region has focused in Etopia its main program for fostering entrepreneurship. Finally, the two universities of the region of Aragon (whom Zaragoza is the capital city) are present in the project through the Zaragoza City of Knowledge Foundation, who runs some of the most innovative programs in the center and, in particular, the jewel of the center: “Etopia Kids” summer camp, a program with 7 different itineraries developed by Arduino's founder David Cuartielles that gathers hundreds of kids every summer around technology and creativity.

Infrastructures, capital, talent, services and people are components of the Digital Mile ecosystem. In this context, the Open Urban Lab provides a two way link with the smart city, offering the city as a platform to service the community of innovators, and challenging the innovators to service the city and its citizens. It is in this context of mutual agreement where the innovation cycle of Etopia's Open Urban Lab is framed. An innovation cycle that has the following major stages:

1. Challenge identification
2. Stakeholders engagement
3. User requirements
4. Construction of prototypes or minimum viable products (MVPs)

5. Business incubation / acceleration
6. Citizen empowering in the use of the new products and/or services.

If we do a parallelism with computers, Etopia building is the hardware upon which an operating system composed of different functional blocks is running, being the Open Urban Lab one of those blocks. On top of that, different programs allow the users to interact with the project. Although the hardware (building) is there from July 2013, the operating system of Etopia is being coded gradually, and the Open Urban Lab benefits from every new piece of this software that the kernel developers (Etopia's staff) release.

Identifying challenges. Don't try to fix the world

One of the fundamental flaws in the debate around smart cities is that, too often, technology is presented as the response to every urban problem. Critics of the Smart City hype, such as Adam Greenfield or Manu Fernández have formulated this objection in the following terms: "if technology is the answer, what was the question?"

Identifying relevant questions is the first phase of the innovation cycle, doubtless the most difficult, and probably the most important. Challenges need to be meaningful and specific enough so people can feel compelled to participate and help. Business interests are legitimate problems to solve, but it can be tough to engage citizens in problem solving exercises unless we were able to frame them in clear collective wins. On the other hand, challenges too broad or generic can engage many people but can be hard to land on productive results. An example of this might be celebrating, for example, a set of workshops on, generically, "The energy problem". Expect a high attendance, but, if the goal is to build something intended to improve the many energy issues that we as a society face today, the task can be overwhelming and will probably lead to frustration.

A good advice would be to find challenges or problems that can be location or community specific. The Open Urban Lab held an extremely inspiring workshop on "Improving the mobility of schoolchildren in the city", School representatives, public servants from the Department of Mobility, the municipal technicians that were working on the city-wide program of "Safe routes to schools" and people from the city Smart City Department discussed and worked in groups on innovative solutions for promoting a healthier and greener mobility around schools. A new type of traffic light was designed, a traffic light that could extend its duration when a line of schoolchildren was about to cross, provided that it was led by an authorized adult. The leading adult had a special permission on its citizen card that granted her/him the possibility to modify the traffic light times on certain tranches of the day, usually around the hours of the beginning or end of classes.

The presence of the city technicians was key. The technicians of the Smart City Department opened up the possibility of using the citizen card as an authorization and authentication mechanism. The technicians of the Mobility Department explained the consequences of changing a traffic light duration in traffic flows over the city and how this effects propagates, imposing conditions to identifying the best suitable crossings where this system could be implemented at.

Engagement of stakeholders. A question of incentives

"Citizen engagement" is another of the buzzwords of the late Smart City dictionary. Although still at a low scale, cities and companies are starting to perceive the value that citizen or user engagement, making open innovation a two way process. As Ronan Paddison [8] puts it when describing civic processes of urban renewal projects, community participation, not only proves to be mutually beneficial to the community and the city council in terms of legitimacy, but as a bonus, it leads to a better product. The same holds true for open innovation, where openness is a key characteristic, meaning lowering access barriers and allowing citizens, institutions and companies to actually engage in cooperative and innovative dynamics.

Being openness necessary for engagement, it is not sufficient. When planning open innovation sessions, it is essential to understand and depict possible scenarios for win-win situation. By thinking on the potential wins

derived from a successful result, one can identify the communities or stakeholders that can be engaged, and thus targeting the workshop communication campaigns. In the case of the open innovation process that led to the 'Want it!' app for local shops, the municipal department dealing with shops was an obvious target. The main (traditional and new) shops associations and neighborhood associations were also clear targets. They all had legitimate interests in promoting innovative solutions that can stop or mitigate the languishing of commercial activity in city streets and plazas under the combined pressure of the financial crisis and the new shopping centers.

Finally, the company Neodoo Microsystems understood the opportunity to early meet potential clients for their idea of developing a sort of local Groupon at the very beginning of the development process.

Requirements phase. Write user stories

Around 2004 and 2005, agile development methodologies changed the way software was produced in many development teams around the world. Techniques as Scrum or Xtreme Programming were based on identifying and prioritizing user stories and on the quick release of partially functioning products in very short development cycles or 'sprints'. Before every cycle, a meeting with users is held where everybody agrees on the requirements to develop in the subsequent sprint. After the sprint the user is given a product implementing the agreed functionalities. Developers and users discuss openly about efforts and priorities, and agree on the expected results of each sprint.

Originally IT people, the staff working in the Open Urban Lab quickly realized that agile methodologies was the equivalent in city making to the citizen-centric approaches. In this sense, we should be able to redesign cities in terms of users stories and short sprints or, at least, we should try to. Agile methodologies place the user at the very core of the development process and do not demand any specific technological skills. And this is important, because the so-called "new technologies" still frighten a good number of citizens whose brilliant ideas we simply can not afford to miss.

In April 2015 a user requirements workshop was held with neighborhood representatives, professors and students of geography, plain citizens and the municipality's technicians dealing with the corporate web page and open data catalog. The groups settled the requirements and name of a new participatory app that the city is developing under the 'IES_CITIES' [9] European project.

The app is intended to help in the process of urban regeneration that Delicias neighborhood, the most populated district of the city, a working class neighborhood with problems of integration of migrants communities and lack of public services. The neighborhood associations of Delicias district came to the Open Urban Lab with the challenge of igniting a participatory process called Delicias 2.0 to rethink the district and that could, through the use of digital tools, engage the population layers (youngsters, mainly) that do not participate in civic life through the traditional civic participation channels.

Instead of designing a complex, long term participatory process, the Open Urban Lab decided to work on immediate actions. What could be more engaging and short-term rewarding than a collaborative design of the app that could be used for this future on-line participatory process? On April, 8th 2015, the final of several sessions with citizen representatives and city technicians took place. A group of 40 people: students, university professors, citizens, citizen representatives, the staff of Ebropolis (a local strategic think tank), workers from the Zaragoza Housing Authority worked for several hours and a set of user requirements in the form of user stories was finally agreed. One month later, the first mockups of the app are already available. A first prototype of the app will be ready for testing by the end of June, after the first development sprint. Hopefully, and that is the difficult part, the same user group will be engaged in beta testing. Keeping engagement spirits up over time is a tricky issue. We feel that it will heavily depend on our capacity to deliver visible results quickly.

Prototyping. Crowdfunding Minimum Viable Products

Urban sociologist Richard Sennett recognizes craftsmanship as one of the most rewarding activities, and

theorizes that is a path that leads to an enhanced citizenship. Building or making prototypes in 2015 is not limited to manual activities. The craftsmen of the digital era are also the makers, engineers and developers that lock themselves in and endlessly print, wire or code our new physical and digital artifacts.

The smart city can not afford to lose those craftsmanship skills, and that is why in many places municipalities are launching makers or DIY (Do It Yourself) spaces and start-up incubators, in a quest to bring back manufacturing activities to the city. New York is the city that, anchored in a supra-national strategy, is leading this global wave of urban manufacturing and turning it into tangible local benefits. It is extending the arena of local production to services and goods in areas such as food, energy, entertainment, arts, crafts and technology, involving in this process universities, startups incubators, big corporations, banks and public and private innovation hubs, such as the Pratt Center. In Spain, we have to mention the project of Barcelona to build a Fab Lab (Laboratory of Digital Fabrication) in every district.

'Etopia Center for Arts and Technology' is one of the few places that intertwines a maker space (called Open Art) and a startup incubator (its name being La Terminal) in the same facility, only some 50 meters away. The Open Urban Lab sits in the broad corridor that takes the creator from the Open Art maker space to La Terminal incubation facility. Metaphorically and physically linking the stage of prototyping new ideas with that of making of them a business success.

In order to fund these prototypes, the Open Urban Lab launched in the beginning of 2015 the program "CrowdfundingZGZ". The program uses the Goteo.org platform, a well recognized organization whose motto, "crowdfunding the commons", perfectly matches Zaragoza's strategy towards open source. "CrowdfundingZGZ" addresses those civic makers with proposals to improve the city through innovative ideas and offers institutional support, training and communication campaigns to collect funds for their prototypes through crowdfunding. Moreover, it offers to double every collected cent with another coming from the city hall, up to a limit of 3.600 EUR per project.

The program is inspired by how lean startup thinking can be applied in the public sector. In our rationale, a publicly backed crowdfunding campaign is not a financial but a governance tool. The city is not so interested in collecting funds for projects (citizens already fund public projects through taxes after all), but to get a more accurate feedback about the projects that citizens consider valuable and to engage those citizens on the prototype building phase.

"CrowdfundingZGZ" has already received 5 proposals, its deadline being May, 25th. From the informal conversations with the different communities of innovators and entrepreneurs of the city, we know positively that some more proposals are yet to come. By mid June, a jury composed of city officials and Goteo.org experts will select the four ideas that, beginning in September, 1st, will start a crowdfunding phase that will last 40 days.

The incubation phase. It's hard to build machines of sustainable growth in 'Smart Cities'

If the program "CrowdfundingZGZ" succeeds, at the end of 2015 a bunch of prototypes in smart city projects will be up and running, so it is time to plan for the next stage in this new approach to lean startup thinking applied to the construction of future smart cities. Lean startup methodology is, basically, about applying common sense (i.e. the scientific method) to businesses. The goal of prototyping is the early validation of initial business assumptions, but no business can grow on a prototype. For a business to effectively create wealth the engine of sustainable growth must be sparked. The tools that the city has for such an effort are the municipal business incubators.

Zaragoza began actively supporting a change in the economic model in 2005, when new mayor Juan Alberto Belloch and business mentor Chris Siplely agreed on the celebration of the international startup program 'Innovate! Europe' in the city. Two companies from Zaragoza, the Internet of Things (IoT) leader Libelium, and Zentyal, a company that claims to have forged at least a long lasting peace between Microsoft and Linux, were highlighted by 'Innovate! Europe' as one of the most promising European start-ups in 2009 and 2010.

But in terms of the use that both companies could make of the city of Zaragoza as a testbed there are some lights and some shadows. Although by 2011, Libelium had installed a pilot of 30 sensors in the city and Zentyal was providing connectivity and services to 24 startups hosted in CIEM Zaragoza's incubator, in both cases, the city failed to provide to Libelium and Zentyal's engineers the value of a real testbed in which they could experiment and prototype new developments. This misalignment is not an exception: up to now the level of integration between the start-up programs and the smart city activities has been low.

In 2007 the city started to plan for specific facilities devoted to fostering entrepreneurship. In 2010, Zaragoza Activa, located in an old sugar mill turned into a multipurpose public facility, was the first incubation center that the city launched. Devoted to social innovation start-ups, it offers 18 small incubation spaces and a free coworking service called "La Colaboradora" ("The Collaborator") that works pretty much as a bank of time, in which coworkers pay by devoting their time and skills to cooperative projects. Zaragoza Activa is managed by the Civic Participation Department of the city, which is different from the Smart City Department, lying each other on opposite banks of the Ebro river and considerably far away. This lack of organizational and physical proximity has inhibited a better integration of the incubated companies within the city operations.

In 2011, CIEM Zaragoza was launched, an incubation facility that occupied the city's first zero-emissions building and was dedicated mainly to energy projects. 24 incubation modules and coworking were its flagship services but, for the first time, the incubator offered open innovation services to external customers, signaling the potential of community thinking in real problem solving exercises. In 2013, CIEM Delicias incubator opened in a nearby location. Inserted into a wider civic hub that includes other public services for the neighborhood (elderly, children, associations,...), it is aimed at hosting innovative educational projects. One of its most successful startups, Crom Developer, is providing Arduino, 3D printing and scratch learning programs directly to some schools in the city and its surroundings. A shorter physical and organizational distance has led to a higher degree of integration between the companies incubated in the two CIEMs and the city, who has helped some of those companies to further develop their businesses via common events or by purchasing services at small scales. However, the vast majority of those companies still do not see the potential of the city as a testbed or platform for for developing their products.

In June 2014, La Terminal accelerator opened up in 'Etopia Center for Arts and Technology', right between CIEM Zaragoza and CIEM Delicias buildings. Backed up by the region's main bank (Ibercaja) and managed by the region's first ICT company, Hiberus Technology, La Terminal offers space for coworking, another 24 incubation offices and acceleration services. Business mentors work daily and share space with local entrepreneurs, providing instantaneous access to guidance and advice. La Terminal was launched a year after the city created its Smart City Department, which now also manages the two CIEMs, and was intended to be the first national incubator devoted to smart city businesses. However, the reality is that having thematic incubators is more easily written than done, at least in a medium city such as Zaragoza (700.000 inhabitants). The fact is that startups in La Terminal, although they have technology as a common trait, work in many different fields and, apparently, do not require the services of the city to act as a development platform, other than providing the adequate support in terms of incubation services and acceleration programs.

So, basically, the city has created a Smart City Department that manages, amongst other projects, 3 business incubators, generates 50 new companies per year and, Libelium aside, has not been able yet to identify the right path to create sustainable businesses out of the smart city hype. And now, the question is... why?

Sustainable smart city businesses. When giants cry.

In the spring of 2015 a group formed by candidates to the Universidad Politécnica de Madrid's Master of City Sciences met a team of Telefonica employees in their Distrito C headquarters, somewhere around the northern outskirts of Madrid. The Telefonica team held a key position in the organization, being responsible of the long sight view of the company regarding new businesses. The purpose was to jointly explore future trends related to Smart Cities and, specifically, identify possible scenarios in which smart cities could represent unexpected revenue sources to the telco giant. After a sparkling debate between both parties and an inspiring work group dynamics, most of the services that cities and companies have been up to now presenting as 'smart' were

discarded: 'FixMyStreet', 'WhereToPark', 'WhatToDo', etc, etc... all were falling into pieces behind a close examination through the lenses of sustainability and added value. Until it all finally converged to energy and, oh surprise, big data and... urban planning!

We will return to energy and big data later in this section, and will leave the urban planning part for the closing section of this paper. For now, let's just state that we want smart cities, not only to provide efficiency and quality of life, but also to create sustainable wealth. And by this we mean good quality jobs 'in the city', and not only somewhere else abroad. And, because we are in this part of the world where civic rights are still important (or, at least, we want to believe so), we need smart cities also to be participatory. Participation, efficiency, citizen-trism, sustainability, growth, all those ingredients are indeed needed to build smart cities, but the cooking is a collaborative one. Companies (big and small), citizens and institutions have the spotlight over their heads to start finding these collaborative scenarios. The problem is that citizens look at the smart city debate with increasing discomfort, small companies (like those in Zaragoza's entrepreneurial ecosystem) live in a parallel world and giants like Telefonica are still trying to figure out how to make smart cities products add up to their income's bottom line.

Astonishingly, only institutions (city halls, universities, governments and European Union) seem to truly believe in smart cities potential, according to the growing allotted budgets, being those budgets the main source of revenues for smart city projects nowadays. Consequently, cities are competing to get public funding for smart city projects that cast some light on the general confusion, with universities and companies as privileged allies of city halls on this quest for sustainable engines of growth. Metaphorically, the European Union just launched in 2014 an important and specific call for "Lighthouse projects" (inside the broad Horizon2020 program) that could illuminate this sombre sea of hidden businesses around smart cities.

Zaragoza's has presented its own proposal to be a 'lighthouse' city. In it, energy, big data and participation play a prominent role. The proposal reflects an understanding between different actors interested in moving things forward on the common grounds that the city must be a platform for innovation and that legitimate business interests can coexist with strong public policies and with an enhanced citizen participation. Acciona, a construction giant, Endesa, one of the Spanish biggest utilities, CIRCE and Tecnalia, both widely recognized research institutions, and Atos, one of the main IT companies behind EU's initiative 'Future Internet' are accompanying the cities of Zaragoza, Ankara (Turkey) and Budapest (Hungary) in this adventure.

The two engines of sustainable growth in this 'lighthouse' proposal are energy and big data. Energy, as the workshop with Telefonica highlighted, is a sure bet whose prices will likely increase in the future, thus justifying present investments. Retrofitting, central heating and cooling and electrical vehicles are some of the actions that will power up future savings in the energy bill for the city and its most economically deprived citizens. On the contrary, the bet for a decisive public action on big data targets the creation of value in the form of jobs and scientific research.

If the proposal is accepted, Zaragoza's Open Urban Lab will consolidate its role as the R+D+i lab of the smart city, supplying innovation services in the areas of energy and big data. Maybe for the first time, this will be done applying together the principles of lean startup thinking and agile methodologies to the development of an open source, smarter city.

Empowering the communities. Closing the circle.

The last phase of the innovation cycle that we propose is citizen empowerment. And by citizen empowerment we do not mean enlarging the user base of the new digital technologies, or even placing citizen needs as the center of the innovation policies. By citizen empowerment we mean reversing the innovation pyramid, placing citizens on its top and not at the bottom. In our view, we need to enlarge as much as possible the number of citizens that turn into creators and, ultimately, into city makers. Let's see why.

Considering citizens as mere users or consumers does not significantly fix any problem, and might create others. Evgeny Mozorov [10] shows that the efforts for digital inclusion led by many countries may have produced

unexpected results:

[...] In fact, we are getting shortchanged twice: first, when we surrender our data – eventually, it ends up on Google's balance sheet – in exchange for relatively trivial services, and, second, when that data is then later used to customise and structure our world in a way that is neither transparent nor desirable. [...]

While government agencies were actively working in fighting the digital divide, the Internet giants were digging a deeper divide between those that produce data and those who own it. The gigantic transfers of data from 'user countries' towards those places where the data is exploited for commercial purposes, only precedes a second transfer, this time a transfer of money. Users will pay twice: first with their data, second with their money in exchange for goods or services. This is what a digital 'user-based' economy leads to. In this context, empowerment means nurturing home grown talent to produce creators, manufacturers and innovative entrepreneurs to strengthen local economies.

If we are serious about making of innovation a cultural change for good, then it's a good idea to focus primarily on children. On an inspiring experience, last Christmas, 12 kids ranging from 9 to 13 years from the 'Zagales Hacklab' local community of young geeks, organized an event on Minecraft. During one month they held physical and hangout meetings, negotiated logistics with 'Etopia's staff, planned the program, built their on-line Minecraft environment (including ad-hoc games), created the registration web, designed the "T-shirts" of the crew and, finally, produced and presented the event, which was sold out with the participation of more than 50 other kids and their families. Even if those kids had a long track record of attending technological workshops, the experience showed that, with little help, it is possible to empower self organizing communities of kids to, on a fully startup-like spirit, accomplish blow minding projects.

'Etopia kids' is a summer camp that Arduino co-founder David Cuartielles, who is originally from Zaragoza, started in 2013 with 100 kids on three possible itineraries dealing with scratch, arduino or film making. In the summer of 2014 the attendance was extended to 300 kids who were able to build their own robots. During the year, those kids and their families were offered to meet every month on different workshops dealing with creativity and technology. The success overwhelmed the organization: the workshops sold out systematically in a few minutes and as a novelty, parents and grandparents were expressly required to join their kids in their activities, which turned out to be as challenging as rewarding. This next summer, the attendance to the third edition of 'Etopia Kids' summer camp has been once more extended, this time to 600 kids that will be able to choose from 7 different itineraries, all using open source technologies, so the little creators can understand, tweak, recode and build their own digital gadgets.

Pekka Himanen wrote "The hacker ethic. An the spirit of the information age" in 2001, four years before joining the Scientific Committee that inspired the conception and design of 'Etopia'. The second normative principle of hacker's ethics states "*The belief that system-cracking for fun and exploration is ethically OK as long as the cracker commits no theft, vandalism, or breach of confidentiality.*" One of the first technological activities with children was the celebration of the "Scratch day" in 2011. The event gathered no more than 25 kids and took place in a classroom built in the cellar of Carlo Ratti's Digital Water Pavilion (DWP), an hybrid between a building and a machine that the celebrated guru of the smart cities built for the city in 2008. At the end of the workshop, a 7 year old girl raised her hand to suggest that 'it would be so cool to connect scratch to the DWP'. 3 years later, David Cuartielles and local artist Carlos Tricas managed to connect Arduino to the DWP and, from there (thanks to the module S4A) to Scratch. As a result of this, the 2014 edition of 'Etopia kids' summer camp included hacking Carlo Ratti's invention and having lots of fun out of the patterns and messages that the kids were able to send to the 3,600 valves pumping the water that forms the DWP's liquid curtains.

CONCLUSIONS

Hacking events, as in the Minecraft example, or buildings, as in the case of the DWP, is just a first step in the path to a new way of re-thinking cities. A path that is paved with collaborative cobblestones in which companies, citizens and institutions cooperate in equal terms to ensure sustainability, participation and preservation of the public interest. A path that must be walked openly, with agility and leaning on local strengths if we do not want

our cities to limp behind the new Internet-based service providers. A path, finally, that will lead our cities to fulfill (again in history) the role that our time needs from them: providing new opportunities for its people.

As we saw at the beginning of this paper, urban planners and engineers always ended up finding ways to cooperate in order to make cities and infrastructures serve the interests and functions that the socio-economic context demanded. In our technified and globalised world, innovation hubs like 'Etopia Center for Arts and Technology' provide some hints on how the terms of such renewed alliance could look like. Terms such as openness, agility, participation, lean startup thinking are core features of the Open Urban Lab, a minimum viable product in itself about how future cities can develop into a innovation platforms for innovation and new opportunities for their empowered communities.

In the belief that William J. Mitchell's opening sentence '*Urban Life, Jim – but not as we know it*' was not meant for fear, but for hope.

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