The „Barcelona Ciutat Digital" Plan: Transition to technological sovereignty[1]

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Introduction

Technology and the Internet are transforming practically all sectors of our society and our economy, from manufacturing and transport to energy and healthcare. Following Tom Goodwin (2015), these changes happen very quickly and are radical to such an extent that we can find examples as surprising as:

- The world's largest taxi company has no taxis (Uber).
- The world's largest housing provider has no property (Airbnb).
- The world's largest retailer has no inventories (Alibaba).

We are at a historical intersection of two major trends: the growth of urbanization and the rapid evolution of information technologies. Cities such as Barcelona face the urgent need to create new strategies for urban innovation that promote the development of new forms of economy and, in turn, bring great social benefits.

In this new global environment, Barcelona's priority is to go beyond the construction of a Smart City. Barcelona has been a leading proponent since the concept of a Smart City has been popularized. And it developed an important technical material base drawing of the expertise on private sector actors, including Cisco, Schneider Electric, Suez or Endesa. This development was also furthered through regular engagements at the annual Smart City Expo World Congress taking place in Barcelona since 2011. Over the last years and – by the new city government from 2015 onwards – the initially strong technology focus was abandoned. First the term Smart City was replaced by Smart Citizen – indicating a more "citizen-centric" version – and subsequently the agenda was broadened and altered to encompass other policy aims (Ribera-Fumaz 2019). Hence, Barcelona aims to become an open, equitable, circular and democratic city, which takes advantage of the opportunities of innovation based on data to improve the city and the life of the citizen.

Unlike the proprietary markets that some leading private platforms aim to cultivate for future monopolies Barcelona is leading a transition to sovereign technology. This will allow the city administration to act on the priorities regarding the use of technology in the city. It allows citizens to decide how the city develops, which allows citizens to recover the knowledge of the management of the city with technological tools and, finally, which allows citizens to leave this knowledge as a legacy for the city itself. In addition, this sovereign technology, promoted by open standards, is a tool for the common good, which generates a new economy and facilitates, in turn, knowledge sharing between cities. The "Barcelona Ciutat Digital" Plan sets out how this ambitious agenda will be rolled out in the next years.

The Barcelona Digital City Plan: Vision and Mission

The "Barcelona Ciutat Digital" Plan ensures that technology and digital innovation act as enablers of efficient and equitable public policies aimed at better meeting the needs of citizens and enhance their capabilities to offer public services of higher quality, with an optimal allocation of resources and public talent. It was formally launched in October 2016 and is still ongoing.

Vision: Beyond Smart City: Barcelona becomes an equitable, open, circular and democratic city and a benchmark in technology policy with a clear leadership of the public and the citizen.

Mission: Solve the challenges of the city and its citizens by means of a more democratic use of technology, promoting technological and digital innovation for a more open government, as a tool for the development of a plural economy that promotes social and environmental transformation and favors the empowerment of the citizen.

The plan will be approached in three axes:
- *Digital transformation of government and city:* To guide the transformation and digital innovation of the public sector, establishing open service standards and improving existing ones in areas where Barcelona exercises its regulatory powers (e.g., housing, health, energy, mobility). Ensure that the city has a public and open data infrastructure, involving the citizen, companies and communities to develop applications and policies based on data.
- *Digital Innovation for companies and social entities:* Promote and strengthen the ecosystem and digital and innovative fabric, ensuring a plural economy, a social transformation and return, facilitating access of SMEs to public purchase through resolving urban challenges and promoting the creation of quality employment.
- *Digital empowerment of the citizen:* To have a wide range of personalized digital training and capacity for different groups, to facilitate an active and participatory democracy, promote quality occupations and allow the digital sovereignity of the citizens of Barcelona.

Some Success Stories emerging from the new Plan

Here are some of the most notable success stories that have been developed in Barcelona because of the implementation of the "Barcelona Ciutat Digital" Plan for each of the axes highlighted in the previous section.

Digital Transformation

As previously established, one of the main objectives of the "Barcelona Ciutat Digital" Plan is the achievement of more efficient and contrastable public policies that respond clearly to the needs of the citizens. To achieve these objectives, it is essential to base the

creation of public policies and their subsequent monitoring and accountability on quantitative data and objectives. That is why there is a need to create a network of sensors that take the pulse of the city and a series of mechanisms to process the data obtained to highlight the needs of the city and the citizen. This same network of sensors will allow to verify the effectiveness of the policies implemented from local government and optimize them in the future. These generated data is also put at the service of the citizens and of the companies, entities and communities from the open data portal. This makes it possible to create a new economy based on the same data.

Sentilo and CityOS

With nearly 19,000 active sensors spread across the city, Sentilo Barcelona[2] collects and shares data in real time. This network of sensors makes it possible, for example, to quantify the number of people and bicycles crossing large avenues, their noise levels or air quality, among other variables. Sentilo has been developed entirely in open code and is a clear example of the transition to open standards and open code that Barcelona advocates, which has allowed its replication in other cities (currently more than 10 cities use Sentilo) and the creation of a community associated with the project that improves and audits it[3]. On the other hand, CityOS[4] is the project in charge of using the generated data to offer better services to citizens and improve their internal processes. CityOS combines the data obtained from Sentilo with other internal data of the City Council itself (e.g. contracts, subsidies, projects of the municipal action plan) thus allowing the enrichment and harmonization of the work of the different areas of the City Council to achieve a structure where city decisions are based on data.

Open Data BCN and Municipal Data Office

With more than 450 sets of data in catalog, the portal Open Data BCN[5] is part of the movement driven by public administrations with the aim of maximizing the available public resources, exposing the information generated or guarded by public agencies, allowing access and reuse for the common good and for the benefit of interested persons and entities. Open Data BCN, which was launched as a project in 2010 and implemented as a portal in 2011, has evolved and is now framed within the plan "Barcelona Ciutat Digital", promoting a plural digital economy and developing a new model of urban innovation based on the transformation and digital innovation of the public sector and the involvement between companies, administrations, academia, organizations, communities and people, with a clear public and citizen leadership. The project Open Data BCN, transversal to several of the pillars of the city's strategy, is based on the main international standards and recommendations, adopting certain characteristics that summarize the principles of this movement: Open data by default, quality and quantity, universality, improvement of governance and promotion of innovation. On the other hand, in 2018, Barcelona City Council created the Municipal Data Office (Oficina Municipal de Datos)[6], responsible for managing the quality, governance and use of data. One of the first results of the newly established Office was the realization of a gentrification index to detect causes and concentrations of the same in the city (Bes 2018). The Municipal Data Offie is the first office of these cha-

racteristics that is implemented in a Spanish city, following the example of New York, Boston and London.

Digital Innovation

Another main objective of the "Barcelona Ciutat Digital" plan is to support entrepreneurship and foster inclusion in the digital economy by promoting the use of digital technology to address urban and social challenges and promote models of circular economy and use the city as an urban laboratory. Moreover, important investment in research and development is foreseen, in addition to promoting other alternatives of collaborative economies such as platform cooperativism or digital social innovation.

i.lab

The i.lab[7] urban innovation laboratory is Barcelona's answer to accelerate sustainable and social urban innovation. It aims to respond to the needs and demands of the city and the citizens in an open and collaborative way. From the i.lab, city challenges are identified and launched through open competitions. The winning proposals will be applied in a real context. Those that are successfully tested can be integrated into innovative public purchasing processes and deployed in the marketplace. i.lab was launched in 2018 and currently five challenges have been launched with diverse topics such as public spaces, women's digital empowerment, sustainable urban architecture, or the optimization of mobility, among others. In addition, i.lab fosters alliances between cities to attack common challenges. An emblematic example of this type of collaboration is the "BCN-NYC Affordable Housing Challenge" launched jointly with New York City (Europapress 2019). i.lab has developed its own methodology that ensures the success of the entire process, from the definition of the challenges, the laboratory phase to the subsequent deployment and integration of the winning solution.

Digital Social Innovation

Over the last few years there has been an exponential growth of communities, entities and even companies that use digital technologies to solve challenges that society currently faces. This phenomenon, called Digital Social Innovation, has as its main objective, although it is not the only one, to reorient the application of digital technology towards social issues and take advantage of it to improve life and benefit the many rather than just the few. This objective is clearly aligned with the strategic priorities of Barcelona City Council and, therefore, promotes them in different ways, mainly: (1) Economic impulse through a specific subsidy line (La Vanguardia 2018) where more than 700,000 euros are being allocated between 2017 and 2019; (2) mapping and creation of a network of communities and entities to increase networking[8] and to act as a collective voice as well as a channel of communication with the Barcelona City Council. (3) dissemination to the rest of the population through major events such as the Barcelona Maker Faire that has already taken place twice (Argemi 2019).

Digital Empowerment

Barcelona does not understand the digital revolution without the inclusion of all citizens and their due empowerment. Nobody should be left behind. It is for this reason that a series of actions have been carried out that promote digital education, active democracy and participation in the decisions of the council, the promotion of digital rights, as well as the reduction of the gender digital divide that currently exists in the ICT environment.

Digital rights and active democracy

The digital society must be built with the citizenry. Barcelona encourages the use of technology to facilitate active democracy. This means developing models of interaction in digital environments (open, secure and free) that are capable of incorporating the collective intelligence of the citizens into new forms of policy making. The democratic platform Decidim.Barcelona[9] experiments with new forms and methods for a truly participatory democracy. Putting the citizens at center stage is also intended to increase its digital sovereignity and enable it to fully exercise freedom and digital rights, as well as the right to data protection, privacy and information self-determination. Currently Decidim.Barcelona has more than 30.000 active users, nine open processes and more than 13.000 proposals (9,800 of which accepted). On the other hand, the Decidim platform on which Decidim.Barcelona is based and which has been promoted by the City Council itself is another example of Barcelona's commitment to free software allowing its reuse in other cities and entities. It is used in more than 25 cities, 6 regions and 15 organizations.

The Internet has become inseparable from our daily lives. As cities, the democratic institutions closest to the citizens, there must be a commitment to remove impediments to taking advantage of technological opportunities that improve the lives of our constituents, and to provide safe, ethical, and reliable digital infrastructure and services that support our communities. Human rights principles, such as privacy, freedom of expression and democracy, must be incorporated by design into digital platforms, starting with locally controlled digital infrastructures and services. For this reason, Barcelona together with the cities of New York and Amsterdam has promoted a coalition for the preservation of the digital rights of citizens called Cities Coalition for Digital Rights[10]. As a coalition, and with the support of the United Nations Human Settlements Programme (UN-Habitat), United Cities and Local Governments (UCLG) and EUROCITIES, this coalition will share best practices, learn from each other's challenges and successes, and coordinate common initiatives and actions. Specifically, the following topics will be analyzed: (1) universal and equitable access and digital literacy; (2) privacy, data protection and security; (3) transparency, accountability, non-discrimination in data, content and algorithms; (4) participatory democracy, diversity and inclusion; and (5) ethical and open digital service standards.

Digital education and gender gap

Permanent training and capacity building is the way to bring emerging technologies closer to the citizenry to help empower it and to contribute to a more aware and prepared citizenry for the tasks of the twenty-first century. The report on the digital divide in Barcelona (Mobile World Capital 2016) argues that, in Barcelona, with respect to access or frequency of use there is no gender division in the Internet but there are still different digital gaps, including by age, level of education and income and, in particular, by gender. The priority axes are creativity and technology in the classrooms to awaken in the smallest scientific-technological vocations (STEAM); digital technologies for inclusion and future employment and to train young people and active people in digital skills; and capacity building as a tool for social, intragenerational, territorial and gender inclusion. In this regard, Barcelona City Council promotes a set of actions to alleviate this gap. The most noteworthy are: (1) the promotion of scientific-technological professions (STEM, Science, Technology, Engineering and Maths) through the introduction of the arts (hence, the acronym STEAM) in the learning process. This is the aim of the STEAM program in the classrooms. During the previous academic year more than 30 secondary schools were reached with the participation of more than 400 students and more than 70 doctoral students; (2) the development of digital training programs at all levels with the aim of including technology in our daily life and thus ensuring that we are more prepared for social challenges, with an impact on more than 39,000 people. It has also helped more than 2,500 people in their retraining in the world of ICT; (3) the creation of the largest public network of space for makers, the "*Ateneus de Fabricació*[11]", which aims to empower the citizens in digital manufacturing, with three centers in operation and two others to be opened soon, and; (4) the creation of events that make the gender digital divide visible and that empower Barcelona's girls and young women supported amongst others by the STEAMConf conference cycle or the Technovation Challenge (Buesa 2018).

Conclusions and future work

The "Barcelona Ciutat Digital" plan promoted by the Barcelona City Council is a clear turning point when considering the relationship that a local government should have with technology. This plan goes far beyond the internal digital transformation of the City Council and the Smart City concept itself, putting the citizens at the center and technology at its service. It's not about sensing the whole city; it's about making public policy based on data. It's not about having an innovation department, it's about getting innovation to all the processes of the city council and using it to respond to the real needs of the citizens. It's not about using technology to serve experts in it; it's about training the entire citizenry so that no one is left behind in this digital revolution. It's about turning Barcelona into an open, inclusive, collaborative and equitable city.

Along the road there will be obstacles, as with every major strategic shift. Internally, enhanced cross-departemental work within the admistration will need to be strenghtened further. An important external challenge comes from EU regulations and how this will limit or enhance the policy space that cities like Barcelona will need to realise their vision of a Smart City for all.

Notes

1   This is a translated and updated version of a working paper entitled „Plan Barcelona Ciutat Digital :Transicion hacia la soberania tecnologica"
2   https://connecta.bcn.cat/
3   http://www.sentilo.io/wordpress/
4   http://ajuntament.barcelona.cat/imi/es/proyectos/cityos
5   https://opendata-ajuntament.barcelona.cat/en/
6   https://ajuntament.barcelona.cat/digital/es/transformacion-digital/city-data-commons/oficina-municipal-de-datos
7   https://ajuntament.barcelona.cat/digital/es/innovacion-digital/i-lab/inicio
8   https://ajuntament.barcelona.cat/digital/es/blog/la-manana-maker-5-confirma-el-largo-recorrido-del-movimiento-maker-en-barcelon
9   https://www.decidim.barcelona/
10 https://citiesfordigitalrights.org/
11 http://ajuntament.barcelona.cat/ateneusdefabricacio/

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