

(2015-2019)

# Barcelona digital city Putting technology at the service of people

BARCELONA DIGITAL CITY PLAN



Ajuntament de  
Barcelona



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# 1. BEYOND THE SMART CITY: THE PEOPLE'S ROADMAP TOWARDS TECHNOLOGICAL SOVEREIGNTY

**Francesca Bria**  
*Barcelona City Council  
Commissioner for Digital  
Technology and Innovation*



# “The digital revolution must serve the many and not just the few”

The creation of the Office for Technology and Digital Innovation by the Barcelona City Council arises from its strong belief in the importance of data and technology for transforming the city, from delivering better and more affordable public services to making the municipal government more open, agile and participatory.

cent of the proposals come directly from citizens. Those proposals highlighted what Barcelona’s citizens care about and thus became the priorities for the government’s Roadmap: issues such as access to affordable housing, climate change, energy transition and sustainability lie at its core.

**Barcelona wants to set the world’s standards in ethical, open, and responsible innovation, moving towards technological sovereignty.**

The **Barcelona Digital Plan**, co-created with the city’s innovation ecosystem for rethinking the smart city, aims to transcend its merely technological objectives, to rethink a smart city that serve its citizens. At the core of the Barcelona’s model there is a large scale participatory experiment powered by a digital participatory platform, Decidim that taps into the collective intelligence of citizens to create policies that better respond to their needs. It is built with free software and guarantees personal privacy and public transparency in a way commercial platforms don’t. We used Decidim to create the government agenda over 70 per

Our Digital Gov Plan outlines new directives that put citizens first; establish the use of agile methods for ICT projects and advocate for technological sovereignty. Such measures insist on re-establishing control over data and information generated by digital technologies as well as promoting public digital infrastructures based on free and open source software, open standards and adopting privacy-enhancing and rights-preserving technologies that protects citizen’s information-self-determination.

The Plan also includes an ethical data strategy, which recognizes data sovereignty, privacy, encryption, collective rights to



data and other fundamental citizens' rights as its core values. We believe that city data is a common good and a public infrastructure like water, electricity, roads, and clean air. Data should be openly accessible, helping the local tech companies and local production networks

robotization, and democratise production in the 4th industrial revolution with the goal of supporting more circular, inclusive, and collaborative economic models. This is what we are doing by creating an urban innovation lab, and supporting makers' communities, the Fab

**We want to move from a model of surveillance capitalism, where data is opaque and not transparent, to a model where citizens themselves can own and control the data.**

to build future data-driven and AI fuelled services and solutions that can create public value and social return.

That's why we are promoting practical alternatives, such as **the DECODE project**, an open source, decentralised, privacy-aware and rights-respecting data platform based on the blockchain that give back to citizens greater control and power over their data, and enable them to decide what kind of data they want to keep private, what data they want to share, with whom, on what basis. This is a New Deal on data, which does not exploit personal data to

City movement, and a real sharing economy. This includes making public procurement more transparent, and sustainable through an open digital marketplace that facilitates the participation of local startups and small and medium companies.

Cities of course cannot do this big transformation alone. Everything we develop is open source, and all the code is posted on Github, so that our ideas and practices can spread. **Barcelona's digital policies** are based on a free software platform so they can be shared, reused and adapted by other cities.

**That is why, together with NYC and Amsterdam we launched the City Coalition for Digital Rights, to make sure we bake rule of law, human rights and democracy into the development of future technology and artificial intelligence.**

pay for critical infrastructure. In this way, the immense economic value that such data represents should be returned back to citizens.

This is a decisive change that puts people first in the design of government services and reinforces their digital rights.

Barcelona aspires to evolve the smart city Agenda towards becoming a **digital sovereign city** – a city which empowers citizens to discuss and articulate their own priorities, set direction as well as decide upon ethical uses of technological innovations with clear social impact and public return. This transition process entails revitalising our economy and rethinking the future of work in an age of automation and

This will lay the foundations for a people centric digital future. Our broader goal - underpinned by our strong belief in democratic and sovereign cities that enhance rather than undermine common good – is to ensure that the digital revolution is serving the many, not just the few.

**Francesca Bria**  
Chief Technology and  
Digital Innovation Officer

# 2. BARCELONA DIGITAL CITY PLAN IN FIGURES

As Barcelona understands it, technology ought to be at the service of people and not people at the service of technology.

Cities have the power to become laboratories for democracy and sustainability through a smart model of public transport, housing, healthcare and education that uses large amounts of data while preserving privacy and information self-determination of individuals, and that is based on solidarity, social cooperation and collective rights.

## Work in the ICT sector

**54,000**  
workers

**5%**  
of jobs

**3,7%**  
of the business  
network

**2,800**  
enterprises

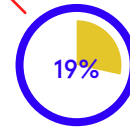
This is the sector with  
the most **STABILITY** in  
employment contracts

Source: *The ICT ecosystem from the gender  
perspective in Barcelona (2018)*

## Women in the ICT sector

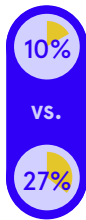


1 out of every  
3 are **women**



of responsible  
positions are  
held by women

The **gender wage gap** in this  
sector is **below** the Barcelona  
average



## A cross-cutting plan

**+ 500**  
collaborators

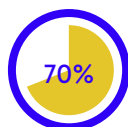
Number of enterprises, universities,  
research centres and bodies that  
the Barcelona Digital City  
Plan interacts with

**+ 140**  
cities

## Investments by the Barcelona Digital City Plan



**€75 million**  
Invested annually in the  
Digital Transformation Plan



Goal: **70% of the budget**  
allocated to digital development  
is **free software**

**€5 million**

Invested in the  
"we boost what you do",  
of which

**€500,000**

is assigned to **social digital  
innovation category** projects

# Urban Technology

## Digital infrastructure



**600km**

of fibre with free, public internet access



W

**+130,000**

users

**2,072**

Wi-Fi hotspots

**627,095**

access points



**16**

in the main metro stations

**1,003**

on public buses

## Sensorisation infrastructures

**15,000**

active sensors

**3,000,000**

daily recordings

**40,000**

connected containers



**25%**

water savings thanks to sensors

**36,492**

traffic lights digitally controlled

## Sentilo

network of sensors deployed in Barcelona transmitting real-time data. Developed with open-code software, it measures energy, noise, rubbish, weather, parking areas, air quality, water levels and flows of bicycles, people and vehicles

**80,000**

public parking places (68% of the total)

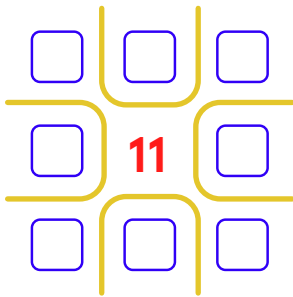


**15,000**

active spot lights

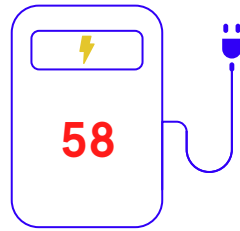
# Sustainable mobility

## Superblocks



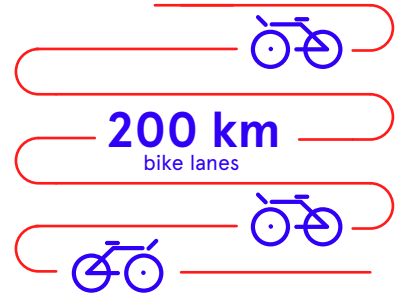
Spaces closed to traffic and distributed in nine districts, 60% of public space for public use

## Promoting electric vehicles



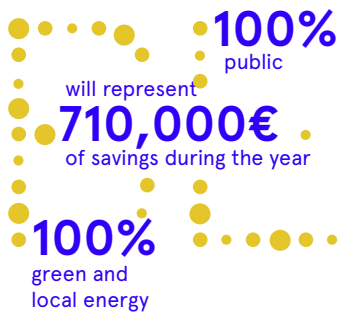
Charging points for electric vehicles

## Promoting bicycles



A nearly twofold increase since the start of the term of office (from 116 km to 200 km)

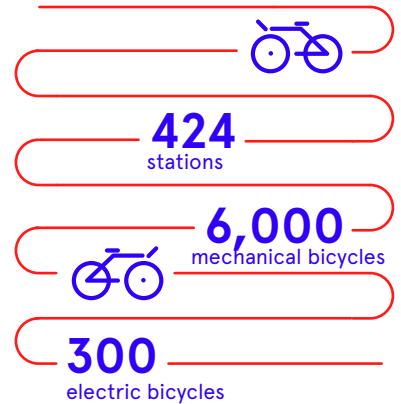
## Barcelona Energia



## Plan Clima 2018-2030



Barcelona City Council's strategy consists of 242 measures against climate change



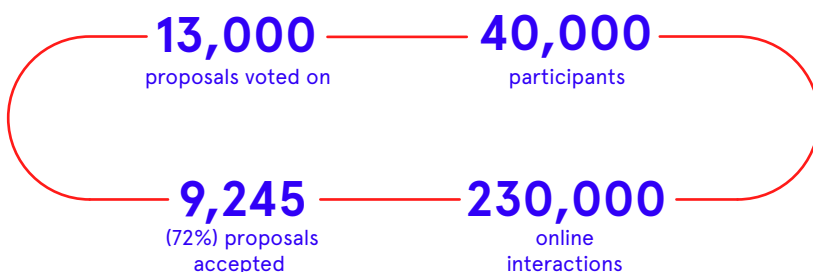
# Open Data



**Datasets** in the portal **Open Data BCN**

# democratic participation and transparency

## Decidim Barcelona



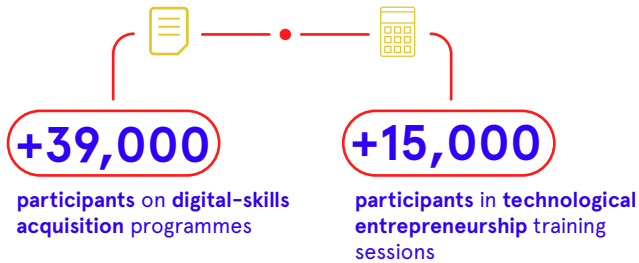
## Transparency mailbox



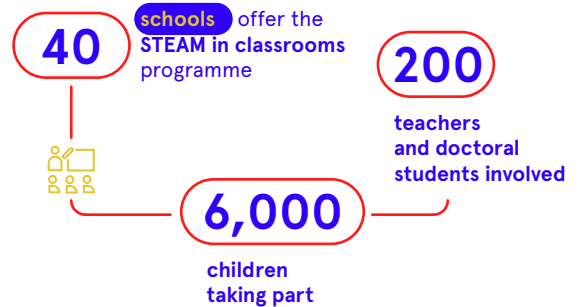
**communications** reporting **cases of corruption**, since 2017

# Digital skills and inclusion programme

## Cibernàrium



## Promoting scientific and technological vocations

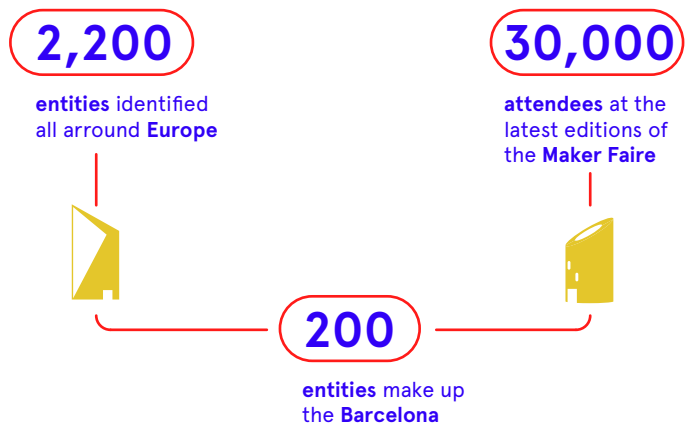


# Urban, sustainable and local innovation

## i.lab



## Digital Social Innovation



## Innovation centres

### Ca l'Alier

Creation of the urban-innovation laboratory

### Creation factories

Eleven centres for experimenting with arts, science, technology and culture.

### InnoBA

Creation of the social innovation centre

### Public owned Fab Labs

Five spaces for digital manufacturing (two new ones during this term of office)

### MediaTIC Incubator

Creation of the new high technological impact business incubator

# 3. A MULTITUDE OF PROJECTS FOR EVERYONE

At the Office of the Commissioner for Digital Technology and Innovation we believe that we must go beyond the concept of a smart city to move towards an open, innovative, inclusive and democratic city, where digital technology help us solving the big global challenges of our time: from climate change to sustainable mobility, energy transition and healthcare.

The **Barcelona Digital City Plan (2015-2019)** aims to improve public services, offering high quality services that are better suited to the needs of citizens. This may only be achieved through collective intelligence and citizens' participation. The **Decidim.Barcelona** participatory platform is a good example of how we are all together deciding what direction public policies should take. Thousands of people are already configuring the city's political agenda and the City Council's actions are based on these collective demands. Barcelona city's technology and innovation strategy are based on three things:



## What can cities do to promote the transition to a non-neoliberal smart city?

We can summarise the following main public policy actions:

- Establish itself as a global reference point as a city of commons and collaborative production
- End privatisation and transfer of public assets in private hands, while promoting re-municipalisation of critical urban infrastructures
- Massively reduce the cost of basic services like housing, transport, education and health, in order to assist those in the most precarious strata of the population
- Institute a citizens basic income focused on targeting poverty and social exclusion
- Build data-driven models of the economy, with real inputs (using real time data analytics) so that participatory democracy could model complex decisions
- Prefer and promote collaborative organisations over both the centralised state and the market solutions (start investing higher percentages of public budget in innovative SMEs and the cooperative sector)
- Build city data commons: decree that the networked data of the population generated in the context of using public services cannot be owned by services operators



## 1 TOP DOWN SMART CITIES

City planners and corporations use IT infrastructure to optimise the flows of people and goods and deliver public services more efficiently

### Barcelona

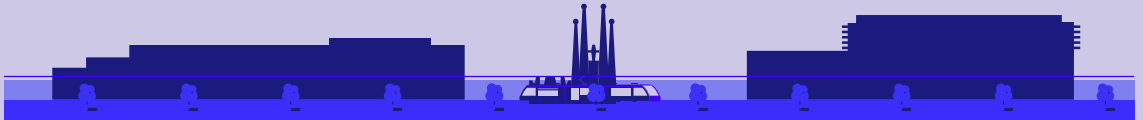
Has embedded sensors in the city's infrastructure to monitor and manage water use

### IBM

Has designed a centralised intelligent Operations Centre to coordinate and manage all of a city's services

### PlanIT's Urban Operating System

Is marketed as a way to manage the entire urban landscape



## 2 CONNECTING TOP AND BOTTOM

People use open data released by local authorities and companies to create services, and local authorities collect data from citizens to improve their services

### Smart Citizen kit

The Smart Citizen project uses low cost sensors and a web platform to enable citizens to capture, share and make sense of environmental data about their city

### Changebyus

A place for citizens to put ideas into action to make their city a better place to live

### Blindsquare

Uses crowdsourced information and GPS to help blind people navigate the city

### Peerby

Promotes collaborative consumption by allowing neighbours to share or rent to share or rent their possessions



## 3 BOTTOM UP SMART CITIES

Citizens generate and share data to improve the way their city works, they act collectively and connect with each other to share resources

### Fixmystreet

Allows citizens to map local issues from potholes to confusing signage and bring it to the attention of local authorities

### Streetbump

An app that identifies photoles by recording "bump" data, providing the city with real-time data on road conditions

### Betri Reykjavik

A platform which crowdsources opinions on city legislation, with the most popular ideas debated by the council



# 3.1 DIGITAL TRANSFORMATION

The objective of this plan is to use technology and data to serve the people, improve public services and take better decisions. We aim to achieve a more transparent, participatory and effective governance, and to establish a new social pact on data, so that we can use data to create public value, while preserving citizens' fundamental rights and their data sovereignty. This means guaranteeing ethics, security and privacy by design. We also believe that providing access to the internet for all is essential, since connectivity is not a luxury but a right held by all citizens, an absolute necessity for the 21st century economy and society.



# OPEN, COLLABORATIVE AND TRANSPARENT GOVERNMENT



For over two years, Barcelona has been working on its **Open Digitalisation Plan**, which defines a process of major and progressive change in order to modernise the city's administration and offer better and agile digital services to its citizens. One of the major outcomes of this has been the creation of **Ethical Digital Standards**, which include the use of open-source software, open standards, data sovereignty, agile development of digital services and guaranteed privacy, ethics and security by design. All with the aim of creating a government that is more open, transparent and collaborative. The council is a pioneer in this area and has committed to investing more than 70%

of the new software development budget into free and **open-source software** and services based on open standards, open formats, open interfaces and interoperability.

This will lay the foundation for a people-centred digital future: cities will be able to access a set of policy tools and standards that will allow them to develop technologies and platforms based on the rights of city residents, to develop long-term social innovation. These principles and rules are summarised in the **Manifesto in Favour of Technological Sovereignty** shared with thousands of cities around the world:

[barcelona.cat/digitalstandards/](https://barcelona.cat/digitalstandards/)

## Free & open-source software: FLOSS Barcelona

Barcelona City Council has joined the **free software movement** and supports the use of free and **open technology (software, hardware, computing, data)** with the aim of achieving full **technological sovereignty**. This choice allows the digital infrastructures and systems of City Council to be audited publicly in a transparent way. It also facilitates interaction between the local developers' communities and local entrepreneurs and

The FLOSSBCN platform is a Hub that connects the public administration and the local free and open-source tech ecosystem and strengthens the collaborative innovation economy, providing access to projects, job offers and events, and raising awareness about open source software in the local industry.

**70% of the budget allocated to digital development is free and open-source software, which allow cost saving, offer more security and independence and also allow the city to interact with and develop alongside the ICT sector.**

the public administration, which may lead to the development of more stable, secure, accountable and democratically governed digital infrastructures.

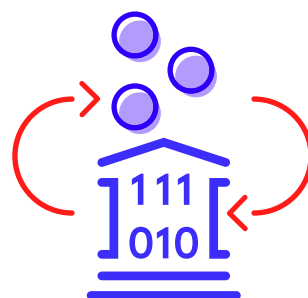
**How is open source software implemented in a city council?** The software is published in public repositories, such as **Git hub**, with free licences that allow third parties (councils, individuals or companies) to use it, expand on it or improve it. This new way of working also allows financial savings to be made, as it means no proprietary licences must be paid, avoiding vendors lockin and market capture. It means not having to depend on a technology multinational and it diversifies local procurement. Today in Barcelona the City Council works with over 3,000 companies and over 60% are small and medium sized. It also helps to create a network with other administrations for sharing technology and reusing solutions.

By far the biggest challenge of transitioning to free software and open technology, however, is the cultural change required within administrative bodies. The right way to do such a major transition is to create empowerment for the workers, invest in training, and build knowledge sharing processes inside and outside the organisations.

Barcelona is the first city to join the "Free Software Foundation, Public Money, Public Code" campaign, and is one of the top case studies:

<https://download.fsfe.org/campaigns/pmhc/PMPC-Modernising-with-Free-Software.pdf>

<https://github.com/AjuntamentdeBarcelona>



Public Money

Public Code

[fsfe.org](https://fsfe.org)

## Open Budget

Accountability and the right to know are essential conditions for an **open** policy. The current Catalan Law on Transparency (2014) has led to many changes within the administration, including having to publish expenses and revenue from public money. In 2016, Barcelona City Council created an **Open Budget** tool to make city budgets more transparent and understandable for citizens.

Via this online tool, users can browse budget information by department and by year, and find out invoicing information, public expenditures in all key areas, among other functionalities, which allows them to compare the budget forecast with what was spent. It also includes interactive infographics that help users understand where revenue comes from, where public money is being spent and why. All data is available in open format, may be downloaded and can be read in Catalan, Spanish and English.

**How much did the City Council spend on security in the city?**

**How much money was invested in guaranteeing housing for all?**

**How was the money brought in by tourism invested?**

**What are Barcelona City Council's main expenses?**

**You can find the answers to all these questions on Open Budget.**

## Transparency Mailbox

The **fight against corruption** is one of the main concerns of citizens today. Transparency is the best way to tackle corruption. Since January 2017, city residents have been able to contact the **Office for Transparency and Good Practice** through the **Transparency Mailbox** to report cases of corruption

council team receives all communications from city residents, forwards them to the relevant departments and investigations are opened. This control element is applicable to all areas of Barcelona City Council, autonomous bodies, local public business organisations, foundations, consortia and

### A secure and anonymous two-way channel promoting collaboration between the City Council and city residents in order to foster ethical values in public management through participation.

within the administration or conduct that is not in line with the rules. This is a tool for conflict prevention and resolution.

This platform is made using open-source software and the TOR encrypted network, for enabling anonymous communication and guaranteeing the anonymity of the person filing the report. A

other administrations in which the Catalan capital's council takes part.

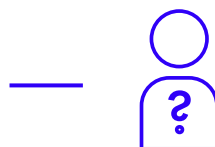
Anyone may access the mailbox to inform us of an event or any irregular conduct. You simply need to provide all the details, any documents or other objective evidence. Once your claim has been filed, you can also follow its progress.



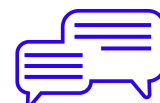
Have you detected a **bad practice** to the City Council of Barcelona and you can provide proof of this behavior?



The tool **guarantees confidentiality** and you can make the case being investigated to improve the public service



**Communication it totally anonymous**



You can **track the case** through one **safe channel** and talk with the manager of the mailbox, **independent** in the exercise of its functions.

## Progressive web applications

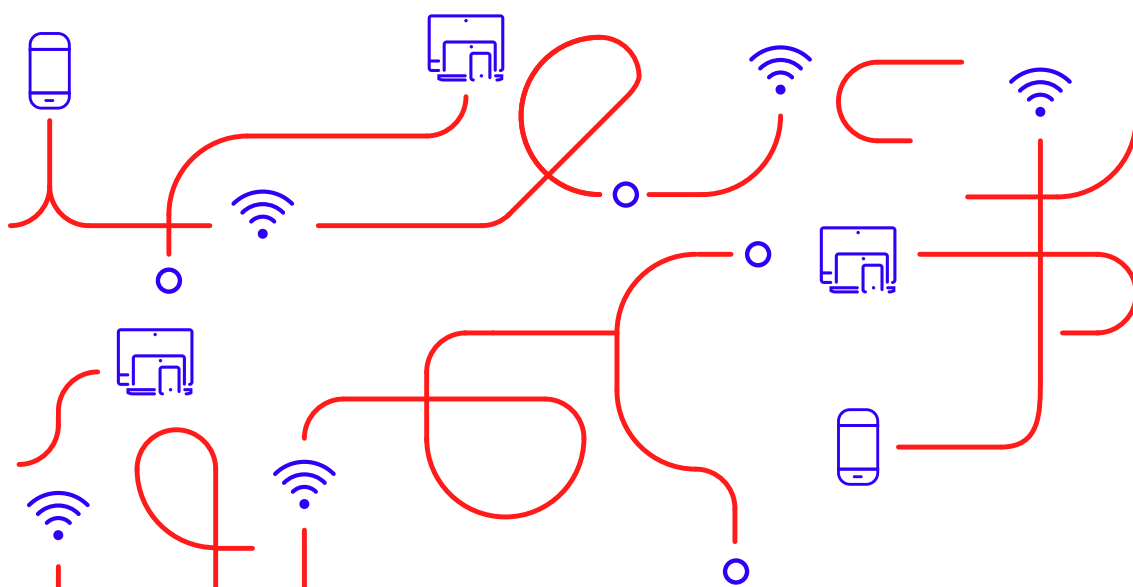
53% of people will leave a web page if it takes more than three seconds to open. A page's loading time and ease of access are essential in order to guarantee the success of an app or a website. Progressive web applications are applications that take advantage of the most advanced characteristics of current

Coinciding with the 2017 Mobile World Congress, Barcelona City Council set in motion its first progressive web app in order to publicise the city's points of interest, published under creative commons licence. This web app is part of Barcelona City Council's new digital communication strategy for

### A commitment to open standards and interoperable technologies.

web browsers and adapt to different screens and devices. They also allow secure connections to be established to send and recover data and link specific content. Progressive web applications follow the example of the most innovative digital journalism media.

mobile channels, included in the Barcelona Digital City Plan. This is a commitment to open standards, open-source software and the use of cross platform technologies.





# DEMOCRATISING URBAN TECHNOLOGY: BUILDING THE SMART CITY FROM THE GROUND UP



Barcelona wants to move beyond the smart city, making sure technology serves real needs of the people and is used to truly improve their quality of life, starting from tackling key social and environmental urban challenges such as affordable housing, climate change, energy transition or gentrification. Our goal is to use digitisation to benefit all citizens and transition towards a more sustainable, democratic, equitable and circular city.

Ethical and responsible management of data and technology will enable us to decide what we want the future of the city to look like, determine priorities and put into place a social pact for the use of data as a common infrastructure of the city: this is what we call **technological sovereignty**.



## City OS

The City Council has developed an open data infrastructure based on open-code, big data and analytics technology for machine learning, which uses single-window access and internal data management, known as a "Data Lake": City OS. This infrastructure provides better data governance, quality controls, more

make informed, data-driven decisions.

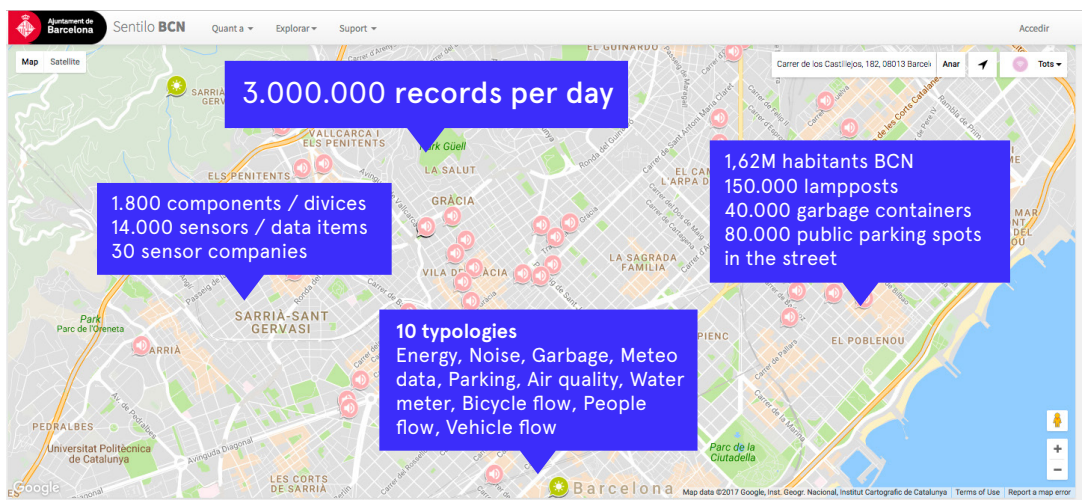
City OS works with both internal City Council data (adjudication of contracts, subsidies, Municipal Action Plan projects, districts, etc.) and with external agencies under municipal control which hold information on the city, although

**Using City OS, the City Council is able to distribute municipal resources more efficiently and offer new data-driven services suited to the needs of city residents, making better decisions based on real data.**

effective privacy and security and, above all, it gives the City Council a global overview of this area. The City Council has also created a new Municipal Data Office that uses City OS to

the City Council does not directly manage them (transport, energy, water, environment etc.).

### PLATFORM FOR ANALYSIS OF URBAN DATA CITY OS



## Sentilo

Is it possible to capture the state of the city in real time? Is it possible to find out how it breathes, how it moves, how it suffers or how it grows? If the answer to all of these questions was yes, it would require a lot of people constantly watching what happens every minute

The advantage of it being open-source software is that any city in the world can deploy it and do what Barcelona has done. Other administrations and businesses that want to process large amounts of urban information can also do it. When we say that "Barcelona

**With 19,000 active sensors spread across the city, it compiles and shares the data in real time.**

of every day in every district of Barcelona. Impossible, right? What if all of this information was provided by thousands of sensors? That is precisely what the open-source software Sentilo does (the term means 'sensor' in Esperanto). It won the 2016 Open Awards as the most innovative open-source IoT platform for cities.

wants to go beyond the smart city", it is precisely through this kind of projects, sharing solutions and infrastructures, that this can be achieved.

This network of sensors knows the flow of people and bicycles along the city's biggest roads and arteries, the decibel levels on each street, the temperature of each neighbourhood and the quality of the air we breathe.



## Bicing

Having a bicycle to move around the city is nothing new. It would almost seem strange if Barcelona did not have a service like this one, now that, as the years go on, almost all large cities have one.

We launched Bicing for the first time in March 2007, and immediately we

collecting so much data, but now we are. Data is collected through the service app, which also provides a list of stations, bike availability and the best routes to get to your destination.

What do we do with the usage data collected by the app? Data is analysed in

**This year, we have launched electric bikes and there are more than 200 km of special bicycle lanes for users.**

had more than 84,000 people that were using the service. Back then we were not

an ethical way in order to better share the bikes and optimise vehicle transit.





## Superblocks

Today, all cities are suffering from similar issues: air pollution, traffic congestion and lack of green spaces. As a member of the global smart city movement, Barcelona has become a leader in some of the most innovative urban changes. City regeneration comes about

The City Council is calling them *Superilles* (superblocks) - mini neighbourhoods around which traffic will flow, and in which spaces will be repurposed into green space for citizens, freeing up 60% of streets currently used by cars. They started to

**The aim of superblocks is to give streets back to residents, fight climate change, and transform public spaces into citizens' areas with much more greenery and turn them into spaces of leisure, exchange, recreation and culture. Barcelona has involved neighbourhood groups, planners, architects, designers and students in a large scale participatory urban planning process.**

first and foremost through more efficient management of resources and services, and through finding sustainable strategies. But how do we go about it?

be sketched onto the city horizon back in 2017, with an initial investment of 10 million euros. Now they are implemented in districts through gradual interventions that will repurpose existing infrastructure.



## KIC Urban Mobility

Urban mobility is one of the key challenges for all governments. The quality of life of citizens, co-existence and wellbeing all come into play. In order to find the answer together, since the end of 2018, Barcelona has been part of the Knowledge and Innovation

which to invest more efficiently in public resources in terms of mobility.

The KIC Urban Mobility is based in Ca l'Alíer, in the Sant Martí district. Superblocks, reconfiguration of the bus network, increased cycling infrastruc-

**Is there room for private cars on our streets? Does having a personal car make sense? Which means of public transport pollute the least? Can they connect all the areas of the city? Will ride sharing through apps become the norm?**

Community (KIC) in urban mobility, with an investment of 40 million euros from Europe.

In order to conduct this large-scale project, a the KIC Urban Mobility consortium was created, made up of 48 cities in 15 countries, 12 businesses and 18 universities, including the Polytechnic University of Catalonia and Seat. All the partners have worked together to propose ways in

re in the city, driverless and connected mobility, the regulation of personal mobility vehicles in the international arena, the management of vehicle loading and unloading, or the city's work to establish regulations on shared mobility (ride sharing) all added points to Barcelona's leadership in this European consortium to rethink the future of urban mobility.



# A NEW SOCIAL PACT ON DATA: BCN DATA COMMONS

Access to and control over data has become a strategic asset for cities. When we talk about technology and urban data, we often find ourselves faced with a sort of meta-utility, made up of data, sensors and algorithms driving the rest of the city. Today we are collecting around 90% more data than three years ago, but is the way it is managed more efficient, transparent and appropriate? In the fourth industrial revolution, data and artificial intelligence are essential pieces of digital infrastructure.

For citizens it is becoming increasingly difficult to understand what administrations do with the big data they collect. It is clear to us all that we need to make the most out of data to deliver better services and take public decisions,

while protecting citizens' privacy, and their right to information self-determination.

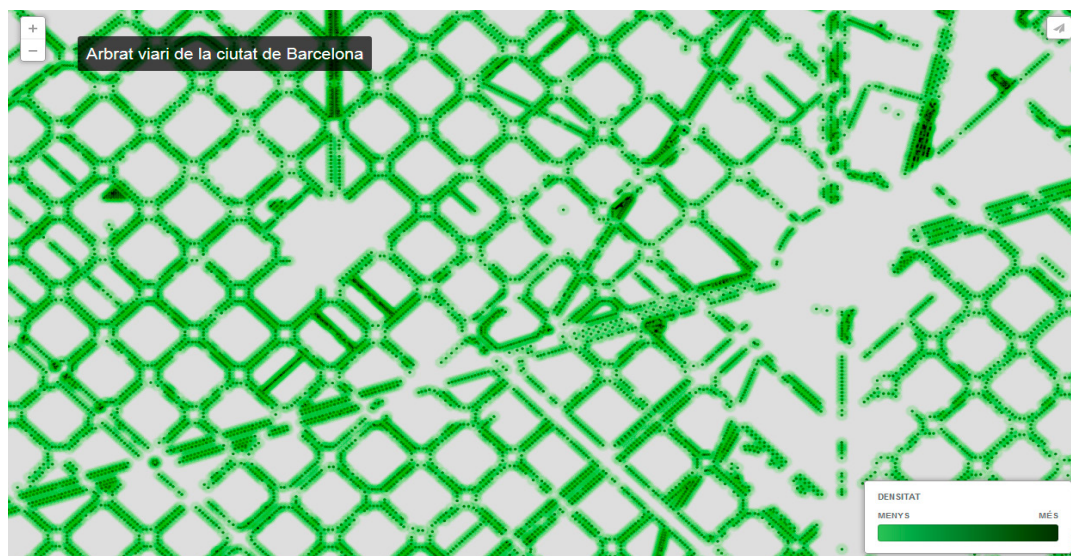
The concept of 'technological sovereignty' is hugely important for cities as it allows city residents to play an active role when it comes to deciding how the city's technological infrastructure works and for what purpose. Barcelona City Council believes that the control of data should be given back to the people. This is why it leads the City Data Commons programme, to define an ethical code, as well as rethinking the legal and economic model for a digital society, so that we can return the immense economic value that data represent back to citizens.

**"We cannot leave a small number of technology giants in control of our data. A New Deal on data, based on a rights-based, people-centric framework, which does not exploit personal data to pay for critical infrastructure, is long overdue."**

**Francesca Bria**  
*Barcelona City Council Commissioner for  
Digital Technology and Innovation*



## Municipal Data Office



Thanks to all the technological infrastructure and sensors spread across the city, we generate, collect, receive, catalogue, process or share lots of data that has high intrinsic value. Data becomes a public infrastructure; a shared resource for the common good. Data is the key to the city and can be used to take decisions more quickly and democratically, to promote innovation, to achieve improvements to public services and to empower people.

Based on this premise, the City Council thought it was a priority to create a Municipal Data Office and appoint a

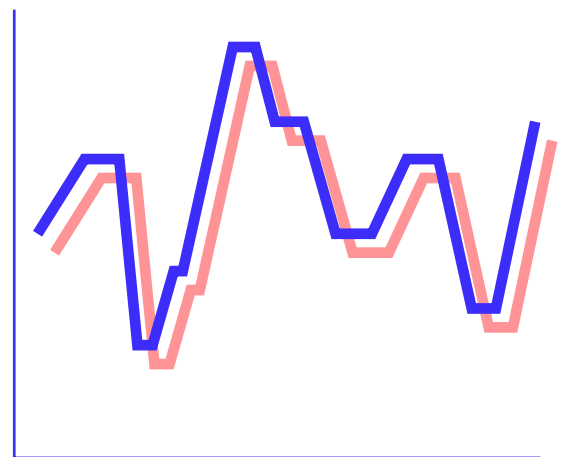
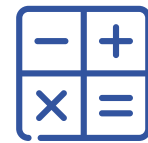
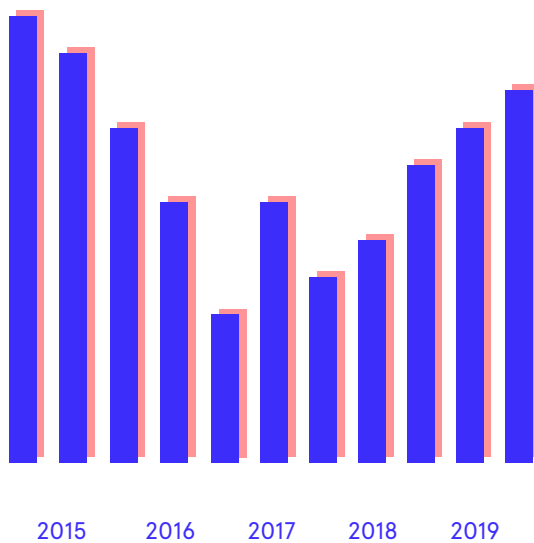
new Chief Data Officer, which is now responsible for the management, quality, governance and use of data controlled and/or stored by Barcelona City Council and all of its associated bodies (both public and private). The current volume of information generated by citizens and the City Council itself through its activities, combined with the existing technology and the science of data, allows us to make a leap forward and become more efficient at capturing, storing and analysing data, as well as drawing conclusions that help with decision-making for new public measures.

## Municipal Management Dashboard

The **Municipal Management Dashboard**: a data-visualisation tool developed by the Municipal Manager's Office that explains the state of the city in real time. It facilitates monitoring and follow-up of how public policies are being carried out in the city.

**What exactly does it show?** Information about what is happening in the city in terms of housing, employment or care, as

well as the people served at food banks or the number of passengers at El Prat airport. It also provides indicators of the City Council's internal work to make the city function; how council management is progressing in implementing public policies and how citizens receive these actions.





## Big data for public policies

The report by the United Nations Department of Economic and Social Affairs, *Revision of World Urbanization Prospects* (2018), forecasts that 68% of the global population will live in urban areas by 2050. A large concentration of population means the need to develop a sustainable city model. It is urgent that we use all

pollution or participation of residents in the city's political life.

Are high rental prices one of the key factors pushing residents and businesses out of the city? Anna Vergés, Technical Director of the Observatory, explains that a careful analysis of big data can help to pro-

### Big data serves, for example, to monitor the gentrification of the city, through the Barcelona Metropolitan Housing Observatory (OHB).

the technological resources available to tackle the challenges that cities face, such as housing, pollution, transport, etc.

It is currently possible to measure and obtain quantitative data on many aspects of Barcelona in order to complement existing views on the city, using a quantitative approach. Today, data represents a very valuable raw material for institutions. 90% more data is collected now than three years ago. Big data, which is a term we have heard a lot in recent years, if we understand it, helps us to understand the real issues when it comes to housing, mobility,

pose alternative solutions that help to stop these forced displacements.

The City Council is taking part in various European projects H2020 such as C-Mobile, in order to find innovative solutions to urban mobility. This programme aims to use artificial intelligence on our streets to ease transport, such as changing all traffic lights to green when an ambulance is going past or vehicles receiving signals about changes in speed depending on traffic or the weather. It could also be very useful in reducing pollution and traffic accidents.

## Open Data BCN

Since the Catalan Law on Transparency, Access to Public Information and Good Governance was passed towards the end of 2014, citizens have had the right to know and request public information. Barcelona City Council has a repository of open data that now includes more than 450 datasets on the population, health, economy and education, among many others, which can be found in formats that can be reused and downloaded.

The fact that citizens have access to open data is a form of empowerment. Anyone can actively find out more about any piece of data in order to decide what per-

sonal or professional decisions they want to make and how to go about it.

### Open Data Challenge

With the intention of making people aware of the information produced by the city, the City Council has launched open data challenges to incentivise the economy, engage small and medium scale companies, entrepreneurs, designers and developers through initiatives such as the World Data Viz Challenge 2018 Barcelona-Kobe or the Barcelona Open Data Challenge engaging education institutes and public schools.

Territory



Population



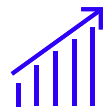
City  
and services



Administration



Economy  
and  
company



#### Datasets classification:

Territory , Population, City and services,  
Administration, Economy and company

## Blockchain for data sovereignty: DECODE

The aim of the European project DECODE (Decentralised Citizen Owned Data Ecosystem) is to develop decentralised technologies (such as blockchain and cryptography) to give people greater control over the data they produce in the city and choose whom they share it with. DECODE aims to develop and test an open source, decentralised, privacy-aware and rights-respecting technologies for citizens to decide what kind of data they want to keep private, what data they want to share, with whom, on what basis, and to do what terms. This is a new social pact – a new deal on data.

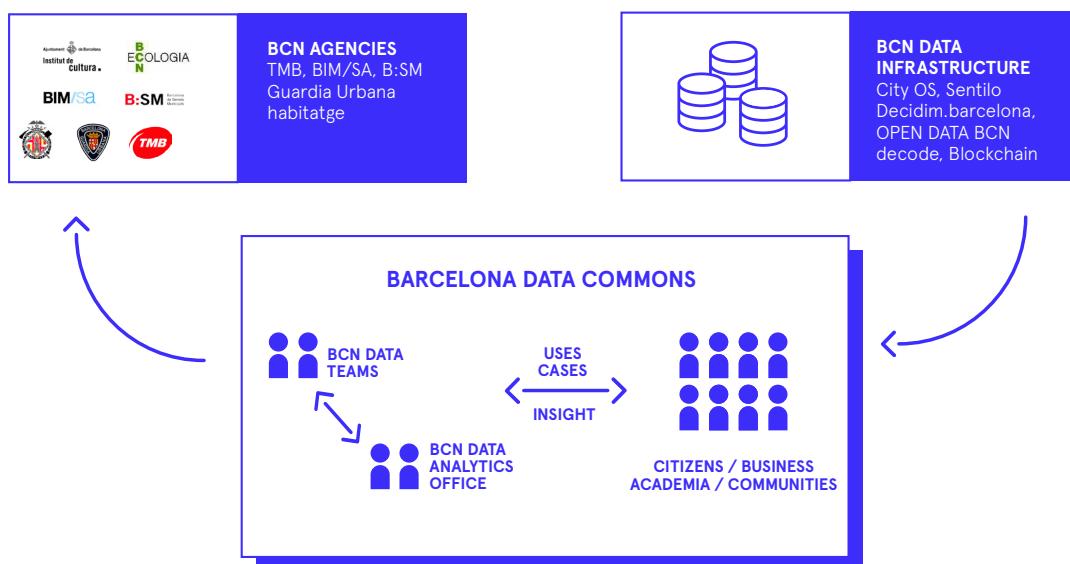
DECODE wants to invert the current situation where people know little about the operators of the services they are registered with, while the services know everything about them.

In the same line, Barcelona considers data to be part of the public infrastructure, alongside communication services, electricity, water and clean air. But city residents must also be active in this process

and establish the level of anonymity they would like, so that they cannot be identified without express consent having been given. This common data infrastructure will be open to local businesses, cooperatives and social organisations so that they can provide data-focused services and create long-term value for the public.

DECODE's pilot project, Digital Democracy and Data Commons, is designed to imagine more democratic forms of data governance that respect people's privacy. You can see the results on BCNNow, a viewer developed by the Eurocat team.

Another DECODE pilot is the Citizen Science Data Governance project, which uses IoT environmental sensors, located inside and outside the homes of participants, to detect noise and pollution levels. DECODE technology allows data to be coded and shared anonymously. Finally, Smart Citizen is a platform that connects data, people and knowledge, creating open indicators and shared tools.



This picture shows how the DECODE technology is integrated in the data architecture of the City of Barcelona, with the aim to create city data commons made up of data gathered from sensors, urban devices and personal data, while protecting people's rights to privacy and information self-determination.

# 3.2 DIGITAL INNOVATION

Barcelona is a laboratory for urban, sustainable and social innovation. We provide support to digital business and entrepreneurs, encouraging the use of open and inclusive technology that promotes alternative models of economy, such as shared or circular economy, platform cooperatives, makers, maximising the social impact that will help us to tackle the challenges we face as a city and as a society.



# DIGITAL ECONOMY AND THE INNOVATION ECOSYSTEM



Barcelona is committed to innovation and sees the city as an urban platform for establishing connections, as a huge laboratory to attract creative talent to contribute solving the city's pressing social and environmental problems. Public and private actors work together to create an inclusive innovation-led economy, with the capacity to share products and services globally or act as a model to other cities.

To stimulate the digital economy, the city has issued a specific government measure that aims to contribute to the development of the

tech economy and the city's digital ecosystem, including businesses of all sizes, putting Barcelona on the map of cities that wish to become a reference where digital is put at the service of solving city's missions and challenges. By boosting this digital economy, investing more public resources in science and innovation and co-creating markets with the city's entire innovation ecosystem, we also want to maximise the social impact that can help bring a digital transformation that is inclusive, equitable and sustainable.

## Growing the city's digital innovation ecosystem

Barcelona has established itself as an international digital hub with a powerful ecosystem of innovation and entrepreneurial spirit in the city and with renowned events, such as the Mobile World Congress or the Smart City Expo World Congress. The City Council incentivise relationships between all these public and private stakeholders and offers them support, with the aim of stimulating

the digital economy, helping local talent to flourish and attracting new talent to the city.

The Mobile World Capital, Barcelona Tech City, Barcelona SuperComputing Center, i2Cat and Big Data CoE are clear examples of this public and private collaboration and have become points of attraction for foreign investment, talent and new jobs.





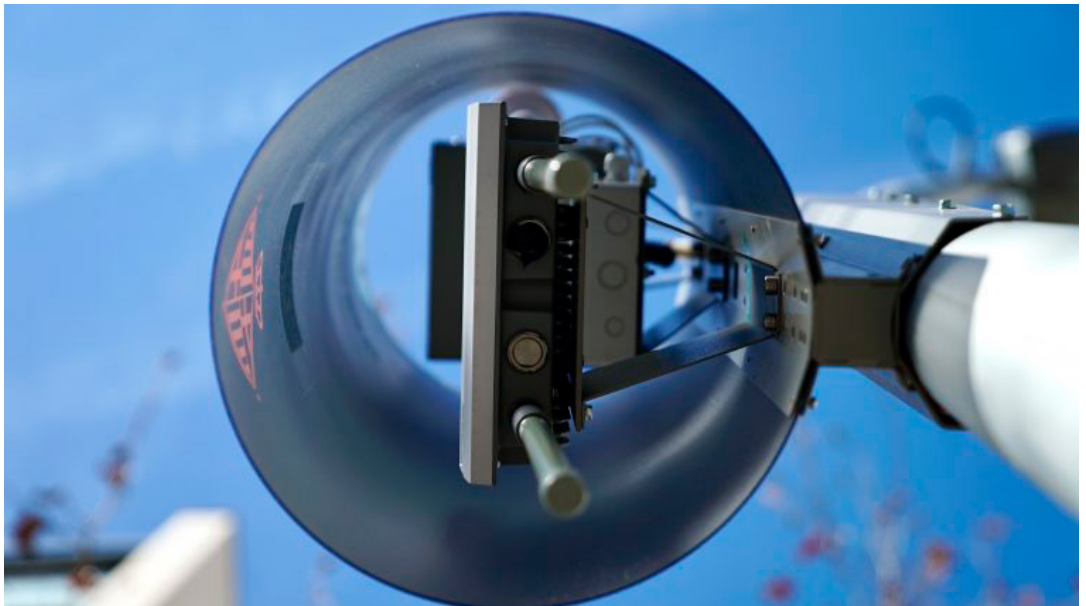
## 5G Barcelona

The Government of Catalonia, Barcelona City Council, Mobile World Capital Barcelona, the i2CAT Foundation, CTTC, Atos and the UPC have implemented the 5G Barcelona initiative to turn Catalonia into a European 5G digital hub. This pioneering project will create an experimental, open environment that promises to turn the city into a metropolitan laboratory of 5G technology.

5G Barcelona will also implement a 5G European digital hub based on an experimental infrastructure open to the me-

tropolitan area, which will act as an urban, citizen and technology laboratory to validate 5G technologies and services. This environment of open innovation will be based on collaboration between various stakeholders, both public and private, and a stimulus for the existing innovation ecosystem in Barcelona, helping to capture foreign investment, boost technology start-ups and develop an industry around 5G.

Various pilot projects have taken place in health, automotive industry, security, industry and entertainment.



## MediaTIC Incubator

Technology has changed the economic environment, and technological and digital entrepreneurship has become a new hub of activity. Barcelona City Council, with Barcelona Activa as its main ally, contributes to the development of the city's technological economy and digital ecosystem by offering services, programmes, activities and facilities that are part of its current portfolio and by creating new ad hoc projects that will put Barcelona on the map of cities that are major players in the technological and digital area.

### Incubation and advice space

Barcelona Activa's MediaTIC Incubator is a good example of public leadership in supporting digital entrepreneurship. This welcoming space specialised in businesses with high technological impact houses 20 businesses in 1,400 m<sup>2</sup>. These businesses work in artificial intelligence, the internet of things (IoT), robotics, space technology and nanotechnology. The main aim of implementing this new incubator, which complements Barcelona Activa's network of other incubators, is to promote and support the creation and growth of companies with high technological impact, that contribute to economic development and to generating qualified jobs.





# MAKE IN BCN: INNOVATION FOR THE COMMON GOOD



In the new economic paradigm created by technology, and favouring more collaborative economies with greater attention to social impact, Barcelona has been recognised as an example of the global maker movement, both for its citizen initiatives with a huge diversity of digital production and innovation spaces, and for its public network of Fab Labs.

The Maker movement, which arose as a social movement within the association and

citizen network, democratises technologies and pursues concepts like 'do-it-yourself', the circular economy, Kilometre Zero and open technology and democracy. Barcelona supports the use of digital technology to confront social challenges and promote models of circular and collaborative economy, with particular emphasis on supporting the maker movement and other processes of democratising technology (DSI4BCN) on a European scale (DSI4EU).

## Digital social innovation in Barcelona

### Poblenou Maker District

Based on a prototype of a productive and scalable city, which aims to contribute to the city's reindustrialisation through activities, services and projects that promote interaction between local communities and citizen initiatives, while also being linked to a global community. Digital social innovation is fostered through the use of open technologies to combat societal challenges, and aims to enable a community of workshops, maker spaces, Fab Labs, universities, research institutions, restaurants, businesses and active social movements in neighbourhoods that foster these new values for Barcelona: those of a city that is open, collaborative, democratic, inclusive, productive, circular, innovative and creative.

### Creating community

**Maker Mornings (Matins Maker)** are quarterly meetings between local producers that offer added value to digital social innovation projects and anyone interested in the maker culture of the city of Barcelona. This initiative is born out of a request for a co-creation session for public policies that took place in 2017, in which the community requested, among others, more spaces

for members to interact. **Five** sessions have taken place during the mandate, each of which was organised by the community with the council's support, in line with the maker spirit of collaboration, with more **than 200 people** taking part. The last Maker Morning, MM#5, was a dynamic session dedicated to co-defining the future needs and challenges of this community.

### How do we do this at a European scale?

All these local forces are exported, shared and complemented with experiences on a European scale as part of the DSI4EU community, created off the back of the European project **DSI4EU**, which is a support platform for social challenges, open code, open data, crowdsourcing and the internet of things. The European DSI (Digital Social Innovation) network currently includes more than 2,200 named organisations, which have collaborated in 1,438 projects.

The local project, DSI4BCN, organises conferences, round tables and events to interconnect the local community with European opportunities, making Barcelona internationally visible as a model of ethical and social technology.



## Digital Social Innovation fund

Barcelona is committed to the ethical and responsible use of technology to foster digital innovation with social impact. The **Impulsem el que fas** fund, organised by Barcelona Activa, offers a solution to Barcelona's high social impact needs, such

make the most of digital connectivity, distributed technology and protecting people's right to privacy, as well as robotics and artificial intelligence, open data, open knowledge and open machinery, those that work in the areas of social inclusion, education

**5 M€ invested in the Impulsem el que fas fun**  
**500.000 € dedicated to digital social innovation invested**  
**in 16 projects.**

as recycling, digital inclusion, bridging the digital gap - with emphasis on the gender perspective - or the fight against energy poverty, among others.

The Digital social innovation in the territories category supports projects that

for digital empowerment, and solutions for new, more sustainable lifestyles and the circular economy. Up to now, 16 projects have enjoyed the support of 500,000 euros in the areas of education, energy management and the circular economy.





## Maker Faire Barcelona

The Maker Faire is the major event of the year (and an international brand) for invention and digital creation that brings together hundreds of engineers, artists, designers, hackers, artisans, makers, digital artisans, programmers and scientists, who experiment, collaborate

and innovate based on open source software, open hardware, distributed digital manufacturing in order to present their most innovative projects within the framework of Society and Industry 4.0. The first Maker Faire was born in San Francisco in 2006. 12 years later, the 225 fairs organised around the world, with over 1,600,000 participants and a worldwide network with thousands of maker centres and initiatives, all reveal the initiative's social, economic and environmental scope and impact.

**Barcelona is a pioneer in the field of industry 4.0 and advanced manufacturing, as well as in the promotion of social and local economies. The Maker Faire wants to move from industrial chimneys to digital production and innovation.**

The 2019 Maker Faire will take place in Sant Andreu, one of the main maker districts in Barcelona. This new edition aims to focus on the capacity of this innovation context to create synergies and to stimulate the nascent model of social innovation, entrepreneurship, production and consumption in the city. In short, it aims to become a great celebration of digital production for the entire neighbourhood.

It is a Sonar+D initiative with FabLab Barcelona and SokoTech, co-organised by Make Magazine with the support of Barcelona City Council through the Commissioner for Digital Technology and Innovation.

Maker Faire Barcelona is the local version of the event, which has taken place in our city for several years now, with atten-

ance rising from 1,000 people to 10,000 in just five years. In 2017 and 2018, the years which saw the biggest number of attendees and greatest impact, the Maker Faire took place in the Pavelló Italià hall at the Fira de Barcelona, Barcelona Trade Fair.



# BARCELONA AS LABORATORY FOR URBAN INNOVATION



Barcelona is a hotbed of experimentation for the many and varied initiatives that have taken place in other parts of the city. Barcelona is a laboratory for urban, sustainable and social innovation. Hence the creation of the i.lab, located in the new 22@ Nord building, Ca l'Alíer.

It is a space in which to innovate collaboratively, in a confluence of new technologies (open data and big data, robotics, artificial intelligence, internet of things, etc.) to maximise sustainability and social and environmental impact. It responds to the city's challenges with regard to housing,

mobility or quality of life. It has also enabled innovation and SMEs to be brought to public procurement.

Through the Directorate for Digital Innovation the technology strategy is designed and implemented, focusing on the needs of the city and its residents. The City Council wants to solve the city's challenges through more democratic use of technology, boosting technological innovation and social and environmental transformation, as well as favouring citizen empowerment.

## i.lab and Ca l’Alier, laboratories of sustainable and social urban innovation

The i.lab wants to respond to the requests, needs and challenges of the city and citizens in an open and collaborative way between the public, private, academic and social sectors, and through open

### i.lab Days

Collaborative innovation requires interaction between the different stakeholders in the innovation ecosystem, which is why the i.lab Days were thought up. These periodic

**The i.lab wants to respond to challenges such as access to more affordable housing, the role of women in the technology industry or how to make mobility more sustainable through the use of data and in collaboration with universities, third sector companies, research institutes and entrepreneurs, and also with other cities.**

exchange with other cities. Through i.lab, challenges are identified and innovative solutions are sought through open competitions to improve public services, considering ethical and responsible use of data and technology, maximising sustainability, social impact and the scalability of the solutions proposed.

meetings offer opportunities for dialogue and reflection between both public and private innovation communities. Each themed session discusses and shares a topic, with the aim of promoting cross-cutting collaboration dynamics.

### Home of urban innovation

The laboratory is in Ca l’Alier, the new municipal home of urban innovation, managed by the BIT Habitat Foundation, yet another example of the recovery of the city’s industrial heritage and a new 22@ Barcelona Nord icon. The building also houses the BIT Habitat Foundation and a Cisco Systems centre for IoT innovation.





## i.lab challenges

### DataCity: data and mobility

**DataCity** is an international programme, adopted by Barcelona in 2018, which invites technology companies and corporations to resolve urban issues through the use of data. In order to do so, the programme adopts agile working methods and data science, highlighting the value of data as part of the city infrastructure. In the first edition, two challenges were launched within the framework of **improving city mobility**: how to reduce the impact of the distribution of goods in the city by optimising the last mile and how to optimise the management of mobility at the city's access points.

### Empowering women in the technology industry

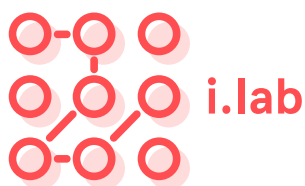
The gender gap that exists in the technology industry is a serious problem that must be tackled by both the public and private sectors. The speed of today's technological development and its effects on all aspects of our society only highlight how technology products and services should not be developed solely by half the population. The challenge sought solutions that would contribute to **bridging this gap** and that could be copied and scaled up or down. In collaboration with the Mobile World Capital Foundation and its d-lab programme, citizens were asked to present proposals that would make women more visible in the technology industry.

### BCN-NYC affordable housing

The scarcity of affordable housing has a negative impact on social inclusion, equality, health and sustainability. Both the cities of **Barcelona and New York** are committed to boosting initiatives that reduce this issue. This is indicated in the "Declaration of Local Governments for the Right to Housing and the Right to the City". During the Smart City Expo World Congress 2018, they launched a joint call to find innovative technologies and tools with the intention of reducing the cost of construction and renovation in dense urban areas. The **BCN-NYC Affordable Housing Challenge** proposes the use of alternative and sustainable materials, or new systems of cost management and planning to make housing affordable.

### Barcelona plays things right

Barcelona City Council aims to foster play and active leisure in public spaces. This is why it has unveiled a network of almost 900 spaces in which to play. These spaces must, however, be properly maintained and adapted to the changing needs of citizens. Through the "**Barcelona plays things right**" challenge, one more step is taken towards innovating public procurement processes, making the most of an invitation to tender for maintenance of children's play areas. The aim is to obtain reliable usage data, as well as data on the condition of the space and its play and leisure equipment, adjusting them to children's preferences.



## Innovative public procurement

Europe is promoting strategic public procurement, combining efficient public spending with the promotion of common social objectives. In 2017 Barcelona City Council approved a decree to boost sustainable public procurement, a circular local economy and the economic activity of small and medium-sized enterprises. The council has an annual procurement volume of 600 million euros on goods and services (almost a quarter of the municipal budget), which is why changing public procurement means a huge cultural change. It is about making purchases with public money more responsibly, with innovative sustainable solutions, and not just shopping using economic market criteria.

### How do we go about sustainable procurement?

Firstly, we need to detect current and future needs. Advice services and professionals with up-to-date knowledge of the market are involved in this process. Procurement cannot end when the contract is signed, but a monitoring and control system must instead be established during execution, complete with an evaluation of results. There are many benefits to working in this way: for

citizens, goods or services that were previously not available on the market may be incorporated; for industry, businesses and SMEs are given greater opportunities and internationalisation is promoted; and for the City Council it promotes a cultural change and ethical practices. Barcelona has prepared a guide to making the most of innovative public procurement.

### Some experiences:

→ Diagonal road renovation works: they innovate with the pavement using cobblestones, a unique and characteristic piece of Barcelona for the past one hundred years.

→ Barcelona Open Challenge: international invitation to tender for companies to propose innovative solutions to city challenges. Aiming to transform specific spaces and public services across the city.

→ Purchasing vehicles for the Guàrdia Urbana: Barcelona City Council has bought 45 diesel vehicles, with 1.6 TDI displacement and 103.5 HP of power, for city patrol services and duties. The new cars are equipped with acoustic systems, GPS, computers and other elements that facilitate the officers' work.

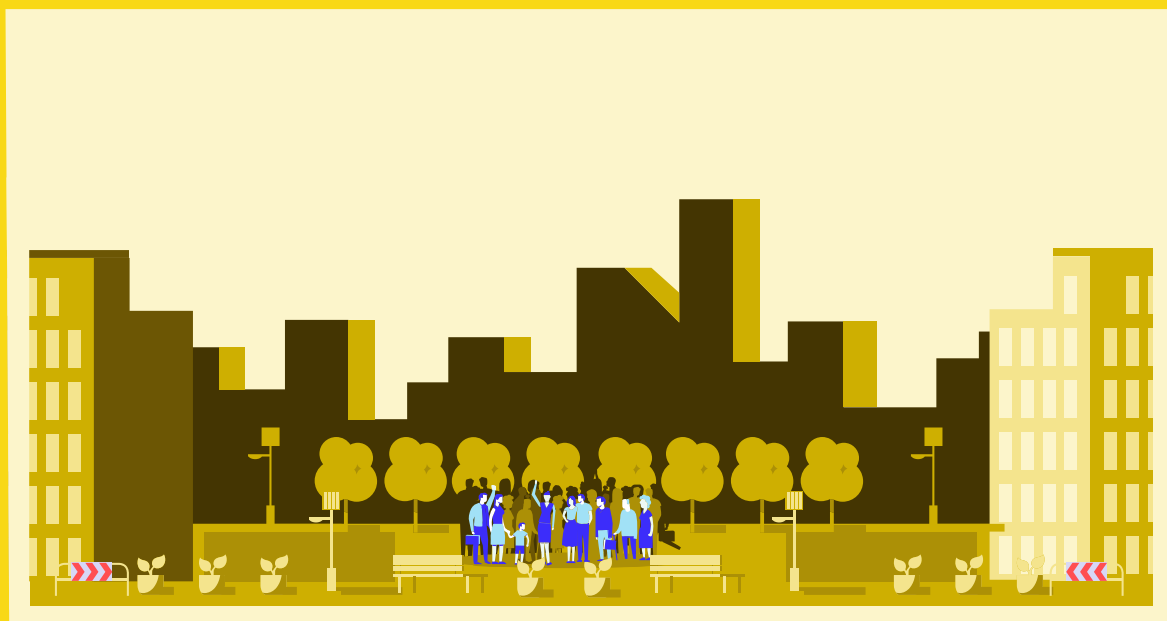


# 3.3

## DIGITAL EMPOWERMENT

When technology has transformed the way we live, work and interact, the digital divide is a risk that we cannot afford. Improving education, creativity, critical thinking and collective awareness is fundamental to the transition towards a digital future that is more democratic, equitable and sustainable. Barcelona City Council is committed to digital empowerment, to promote new skills, and create better jobs in the age of robots and automation.

With these programs Barcelona wants to harness digital technologies in order to create good jobs in communities across the city and fight inequality. We are doing this by ensuring that advances in digital technology preserve citizen's digital rights, gender equality and social inclusion. We are also promoting participatory democracy, integrating the collective intelligence of citizens in the political decision-making process. In this way we can build a more democratic digital society by empowering people and social innovation movements.



# COLLECTIVE INTELLIGENCE FOR DEMOCRACY



The digital society needs to be built with citizens. Barcelona fosters the use of technology to facilitate active democracy. This means developing infrastructures for participation in digital environments that are open, secure, privacy-enhancing and rights preserving and that can integrate the collective intelligence of citizens into the political decision-making process. The Decidim. Barcelona democratic platform, with more than 40,000 participants, helps us experiment with new ways and methods for a genuinely participatory democracy.

Barcelona City Council has at its disposal digital tools, open-source software and open code that are easy to use so that everyone can contribute their knowledge, suggest policy priorities aligned with their collective needs and debate with others about issues of concern to them.

Putting citizens at the centre, we also aim to increase their digital sovereignty, give them the opportunity to improve their skills to fully exercise digital rights and liberties, as well as the right to data protection, privacy, autonomy and information self-determination.

## Decidim.Barcelona

The digital participation and participatory democracy platform Decidim. Barcelona, used by more than 40.000 citizens in Barcelona and by over 60 cities and organizations globally, gives citizens a voice so that they can actively participate in the political life and co-design future policies. Decidim helps citizens, organizations and public institutions self-organize democratically at every scale. It takes deliberation, collaboration and decision to a massive dimension, with thousands of people participating in real time. It empowers communities through citizen initiatives, promotes relevant voting through consultations and it analyses the submitted proposals, promoting a new way of distributing common resources.

The tool is developed using open-source software, so that it can be reused and improved. It also integrates with decode technologies, thus providing security. Privacy and data sovereignty.

Thanks to Decidim, in Barcelona we have managed to co-produce a strategic

city plan together with the citizens. In 2016 we inaugurated the Municipal Action Plan in the form of a participatory process through Decidim Barcelona. Currently, this plan includes almost 7 thousand citizen proposals, and 70% of the citizens proposals were integrated into the municipal government action plan. One of the advantages of using this platform is that you can always monitor the state of implementation of the approved proposals.

### How do I take part in a city process that I'm interested in?

- Consult the open participatory processes.
- Take part in debates (make new proposals, comment on existing proposals, give arguments in favour or against, support or share through social media).
- Track proposals (those begun on the platform and those generated at face-to-face meetings, consult all debates, follow comments and final documents).



## Cities Coalition for Digital Rights

Digital rights are like human rights, but in the world of the internet and digital technology. Due to the acceleration in the adoption of new technologies (such as big data, 5G, and artificial intelligence) it is harder and harder to guarantee protection of individual's rights, such as privacy and data sovereignty. It is not unusual to hear that thousands of e-mail access passwords have been stolen, that social media companies are trading and selling personal information and data to other companies or that our personal communications are monitored and controlled.

In 2018, Barcelona initiated – together with New York and Amsterdam – a global alliance to protect the digital rights of individuals: the **Cities Coalition for Digital Rights**, born with the intention of proposing a common Roadmap, laws, tools, actions and resources to protect the digital rights of both residents and visitors.

**These founding cities have launched the "100 cities in 100 days" campaign, to expand this coalition, which prioritises five principles:**

1 → Equal and universal access to Internet and computer literacy

2 → Privacy, data protection and security

3 → Transparency, accountability and non-discrimination in data, content and algorithms

4 → Participatory democracy, diversity, and inclusion

5 → Open and ethical digital service standards

Each city involved in the coalition has put into practice measures to protect and promote the digital rights of their citizens and visitors. Barcelona has put forward very strong actions to protect the digital rights of its citizens: The creation of **Ethical Digital Standards**, an open source Policy Toolkit for cities to develop digital policies that put citizens at the center and make governments more open, transparent, and collaborative; the development of the citizens' participation platform **Decidim**; the **Barcelona Open Data portal**, enabling more transparency regarding city services, and takes part in the European DECODE project, which gives back data sovereignty to citizens. The City Council is also committed to working towards technology sovereignty and has launched a Manifesto in Favour of Technological Sovereignty for cities and citizens' digital rights.





# DIGITAL SKILLS, EDUCATION AND TRAINING



Permanent education and training in the most advanced technologies is the way to make the general public more familiar with emerging technologies. This empowers people and also helps to foster a general public that is aware, participate actively and is better prepared for the tasks of the 21st century. The priority areas are creativity and technology in the classroom in order to foster scientific and technological vocations in children (STEAM), digital technologies for inclusion and future employment in order to train young and active people in

digital skills, and to provide training as a tool for social, intergenerational, territorial and gender incision.

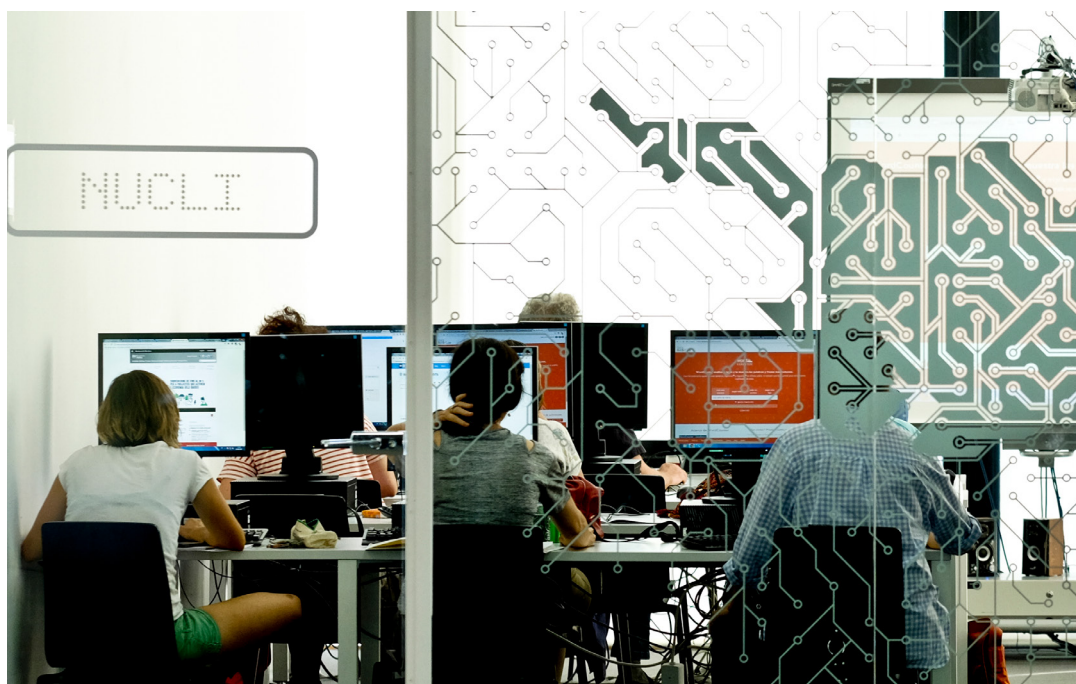
With technology as a tool to empower people, quality jobs may be created in all communities to fight against inequalities. Through the Cibernàrium, more than 12,000 courses and activities have been offered, helping more than 50,000 people to improve their digital skills and, above all, to reinvent themselves professionally. We are also planning for the jobs of the future through the STEAM BCN programme.

## Cibernàrium

Located in the MediaTIC 22@ building, the Cibernàrium is the Barcelona Activa programme that allows people to train in technology and prepare themselves professionally through digital skills. Short and medium duration activities, lots of practical exercises, and learning materials about the internet and technologies, aimed at professional sectors.

### What are the characteristics of these activities?

Trade and business, marketing and communication, web creation, digital image and design, programming, education and ICT, 3D and digital production. What would you like to learn? The Cibernàrium offers over 180 different activities, in small groups from basic up to advanced level. Barcelona Activa also helps you to find work, launch your project, prepare a business plan and look for funding for your professional idea.



## STEAM BCN

**Science and technology professionals** are increasingly sought after. A major gap between global supply and demand is predicted in the market for professionals with these profiles. This gap increases yet further in the case of women, as **there is an alarming gender inequality**. In Barcelona, girls represent just 13% of people on ICT courses and 26% in the science and technology sector.

Faced with this scenario, Barcelona Activa has created **STEAM BCN** (Science, Technology, Art, Engineering and Mathematics) to foster science, technology and the arts and integrate it in pre-school to secondary schools' curricula, offering tools and resources to both teaching staff and families. The project focuses on the gender pers-

pective, innovative pedagogical approaches for scientific learning, using technology, the arts and critical thinking. Workshops, training capsules, visits to research centres, ideathons, etc. have all been designed to be rolled out in schools, libraries, universities or Fab Labs, among others.

In collaboration with the GSMA and the Government of Catalonia, programmes such as MSchools and the YOMO Festival are promoted, attracting more than 10,000 children and 4,000 educators. Educational programmes are also delivered in Fab Labs: 4 public Fab Labs that train more than 5,000 students and teachers in digital production and IT literacy in schools.





## Ateneus de Fabricació: Network of public Fab Labs

Fab Labs are places to learn, collaborate in different projects and form part of the city's social development. They are a public service concerning technology and the science of digital production. Anyone and everyone can enjoy the spaces, tools and public resources and propose projects to improve their surroundings.

Fab Labs are open to everyone and the "price" paid to use them is known as *contra-prestació*, a system of social reinvestment for the support received in the lab in exchange

for the time, talent, involvement and participation of people to benefit the community. All without any money changing hands.

### Fab Labs in the Technology Park

The new Technology Park is a showcase of advanced industry in Barcelona. This space is aimed at the city's SMEs and companies that produce their own product in the field of technology and industry.



# DIGITAL INCLUSION



Access to new technologies defines a new type of social fracture in cities, which often correlates highly with economic and educational inequalities. We must work to reduce this digital gap and facilitate skills, abilities and access to new technologies, by means of educational programmes and coordinating the stakeholders that are working to enable these measures to reach the greatest number of city residents.

We must aim for a more democratic, fairer and more prosperous digital future, giving the same opportunities to all and thinking of future generations, and above all, of women. We have designed programmes such as Girls for Change, or the i.lab challenge Women & Tech to make women more visible in the world of technology.

## Barcelona Declaration for digital social inclusion

A collaboration agreement between Barcelona City Council and the Telefónica Foundation, the Vodafone Foundation, the Orange Foundation, Cisco Systems and Lenovo has led all these organisations to work together to bridge the digital gap. Their work offers social return within the framework of programmes aimed at reducing the digital divide and offering skills acquisition for groups who have greater difficulty fully accessing new technologies. Priority has been given to neighbourhoods and portions of the population that the Government has identified as being more vulnerable.

**Antenes Cibernàrium** also fight to bridge the digital gap, turning some libraries across the city into IT literacy training centres. In the year 2018, 10 districts were reached through 14 programmes.

### Activities conducted through 2018

- 14 capsules
- 3 tours and talks in interdisciplinary research spaces
- 6 interactive workshops
- Girls Hack Day sessions

### Participants:

- 723 teenagers > 50% of whom were girls
- 57 teachers and or doctoral students





## Empowering Women in tech

The European Commission report, "Women active in the ICT sector", reveals that across Europe only 29 out of every 1,000 female graduates gain a degree related to computer science (compared to 95 male students). This number reduces significantly to just 4 if we are talking about Information and Communication Techno-

The City Council drafted a study entitled The ICT Ecosystem from a Gender Perspective in Barcelona, which confirmed this data on the under-representation of women in this field, although it did highlight, among other things, that the gender pay gap in this sector (-10.7%) is clearly less than the Barcelona average (-21.8%).

**Barcelona City Council incorporates the gender perspective in everything it does. Seeking gender equality in participation in international events, such as the Mobile World Congress or the Smart City Expo, is an example of this.**

logies (ICT) alone. Females tend to abandon the sector during their careers, which means that only 9% of those who studied ICT still work in the field by the age of 45.

In Catalonia, according to the Agency for the Quality of the University System, during the 2015-2016 academic year, only 13% of students enrolled on ICT courses were female. Of every 1,000 women, only 4 work in the ICT sector. Barcelona City Council is working on empowering women in technology to enhance the equality of women. i.lab's Girls for Change, Data and Women Hackathons, and Empowering Women in Tech are some of the events promoted.

We are promoting the role of women in the technology industry in order to strive for equality in this sector. The gender divide, although smaller than in other industries, still exists. It must therefore be tackled through education, encouraging scientific and technological vocations among girls.



## Rec: Barcelona's digital social currency

This digital social currency acts as a complementary form of payment, to accelerate and support the local economy. It gives us the opportunity to measure the impact of

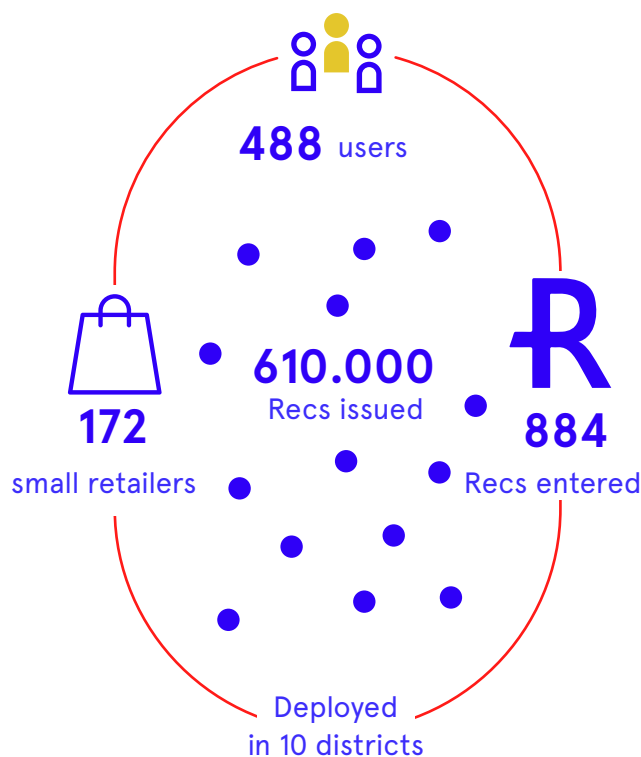
the council, in collaboration with NOVACT (International Institute for Nonviolent Action), it aims to create a citizen exchange system that is complementary or equal to

**The economic model in which we are living poses many challenges for the local economy, especially for small businesses. There is huge competition from digital platforms that are widespread around the globe, which leads to the issue of commercial desertification in many neighbourhoods.**

consumption in the city. It is estimated that 5,000 people are now using one of the 70 social currencies in Spain.

In Barcelona, the REC - citizens' economic resource has been introduced into ten neighbourhoods in an economic depressed area of Barcelona. Developed by

the euro, strengthening associative networks and the social and solidarity economy. Paying a business, charging a client, sending money to someone or checking transactions are just some of the things you can already do with recs.



An open source Policy Toolkit for cities to develop digital policies that put citizens at the center and make governments more open, transparent, and collaborative.



## Digital services standard

To create, manage and deliver agile and open digital services for citizens.



## Code of technological practices

Series of guidelines for implementing technological projects with free software technologies, open standards and agile methodologies.



## Guide on Agile Methodologies

To implement agile methodologies under Barcelona City Council's agile transformation strategy.



## Public procurement of technology

New model of relations with technology suppliers by including contractual clauses on data sovereignty, so that suppliers have to transfer data to the City Council in a machine-readable format.



## Technological sovereignty

For adopting free software and open standards so as to achieve technological sovereignty and recover democratic control of technology and data.



## Responsible and ethical data strategy

For the responsible and ethical management of the city's data. This establishes a common data roadmap for restoring the control of personal data to citizens.

## Government Directives

- Government Directive on open digitalisation  
[https://ajuntament.barcelona.cat/digital/sites/default/files/LE\\_MesuradeGovern\\_EN\\_9en.pdf](https://ajuntament.barcelona.cat/digital/sites/default/files/LE_MesuradeGovern_EN_9en.pdf)
- Government Directive on ethical and responsible data management  
[https://ajuntament.barcelona.cat/digital/sites/default/files/2018\\_mesuradego-vern\\_en.pdf](https://ajuntament.barcelona.cat/digital/sites/default/files/2018_mesuradego-vern_en.pdf)

## Barcelona Digital City video

- People & Power  
<https://www.youtube.com/watch?v=UEiL2UTXAYg>
- Makers & the City  
<https://www.youtube.com/watch?v=kbmeTCWztxQ>
- STEAM & the City  
[https://www.youtube.com/watch?v=-G\\_OQHmcKEE](https://www.youtube.com/watch?v=-G_OQHmcKEE)
- Mission Innovation & the City  
<https://www.youtube.com/watch?v=vXDOXdcwrGI>

## 3.1. Digital Transformation:

### Open, collaborative and transparent governance

- Open-source software  
<https://ajuntament.barcelona.cat/digital/ca/transformacio-digital/tecnologia-per-a-un-millor-govern/programari-lliure>  
<https://flossbcn.org>
- Free Software Foundation Campaign Public Money, Public Code  
<https://download.fsfe.org/campaigns/pmpc/PMPC-Modernising-with-Free-Software.pdf>
- Open Budget  
<https://ajuntament.barcelona.cat/estrategiaifinances/pressupostobert>
- Transparency Mailbox  
<https://ajuntament.barcelona.cat/bustiaetica>
- Progressive web applications  
<https://webapp.barcelona.cat/pics>
- Ethical Digital Standards  
<https://www.barcelona.cat/digitalstandards>

### Democratising Urban Technology

- City OS  
<https://ajuntament.barcelona.cat/digital/ca/transformacio-digital/tecnologia-urbana/cityos>
- Sentilo  
<https://connecta.bcn.cat/>
- Bicing  
<https://www.bicing.cat>



- Superblocks

<https://ajuntament.barcelona.cat/digital/ca/transformacio-digital/tecnologia-urbana/superilles>

- KIC Urban Mobility

<https://eit.europa.eu/eit-community/eit-urban-mobility>

### A new social pact with data: BCN Data Commons

- Municipal Data Office

<https://ajuntament.barcelona.cat/digital/ca/transformacio-digital/city-data-commons/oficina-municipal-de-dades>

- Municipal Management Dashboard

<https://ajuntament.barcelona.cat/digital/ca/transformacio-digital/city-data-commons/quadre-de-comandament-municipal>

- Big data for public policies

<https://ajuntament.barcelona.cat/digital/ca/transformacio-digital/city-data-commons/big-data-per-a-politiques-publicues>

- Open Data BCN

<https://opendata-ajuntament.barcelona.cat>

- BCN Open Data Challenge

<https://ajuntament.barcelona.cat/digital/ca/transformacio-digital/city-data-commons/repte-de-dades-obertes-open-data-challenge>

- Blockchain for data sovereignty DECODE

<https://decodeproject.eu>

## 3.2. Digital innovation:

### Digital economy and the innovation ecosystem

- 5G Barcelona

<https://5gbarcelona.org>

- MediaTIC Incubator

<https://ajuntament.barcelona.cat/digital/ca/innovacio-digital/economia-digital/incubadora-mediatic>

### Make in BCN: innovation for the common good

- Digital social innovation in Barcelona

<https://ajuntament.barcelona.cat/digital/en/digital-innovation/make-in-bcn/digital-social-innovation-programme-dsi4bcn>

<https://ajuntament.barcelona.cat/digital/en/digital-innovation/make-in-bcn/poblenou-maker-district>

<https://ajuntament.barcelona.cat/digital/ca/innovacio-digital/make-in-bcn/martins-maker>

- *Impulsem el que fas* (We promote what you do)

<https://empreses.barcelonactiva.cat/ca/web/es/impulsem-el-que-fas>

- Maker Faire Barcelona

<https://barcelona.makerfaire.com/>

## Barcelona as laboratory for urban innovation

- i.lab and Ca l'Alíer  
<https://ajuntament.barcelona.cat/digital/ca/innovacio-digital/i-lab/inici>
- Innovative public procurement  
<https://ajuntament.barcelona.cat/digital/en/digital-innovation/i-lab/innovation-in-public-procurement>

## 3.3. Digital empowerment:

### Collective intelligence for democracy and digital rights

- Decidim Barcelona  
<https://www.decidim.barcelona>
- Cities Coalition for Digital Rights  
<https://citiesfordigitalrights.org>
- Participation of Barcelona City Council's Municipal Institute of Information Technology in European projects  
[https://ajuntament.barcelona.cat/imi/sites/default/files/infografia/index\\_ca.html](https://ajuntament.barcelona.cat/imi/sites/default/files/infografia/index_ca.html)

### Digital skills education and training

- Cibernàrium  
<https://cibernarium.barcelonactiva.cat/>
- STEAM BCN  
<https://ajuntament.barcelona.cat/digital/ca/apoderament-digital/educacio-i-capacitacio-digital/esdeveniments-educatius>
- Fab Labs  
<https://ajuntament.barcelona.cat/digital/ca/apoderament-digital/educacio-i-capacitacio-digital/ateneus-de-fabricacio>

### Digital Inclusion

- Barcelona Declaration for digital social inclusion  
<https://ajuntament.barcelona.cat/digital/ca/apoderament-digital/inclusio-digital/declaracio-de-barcelona-per-la-inclusio-social-digital>
- Empower women on technology  
<https://ajuntament.barcelona.cat/digital/en/digital-empowerment/digital-inclusion/technology-and-gender>
- Rec, Barcelona's social currency (link to Area of Social Rights)  
<https://www.rec.barcelona>

