

BUILDING DIGITAL CITIES FROM THE GROUND UP BASED AROUND DATA SOVEREIGNTY AND PARTICIPATORY DEMOCRACY: THE CASE OF BARCELONA

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Faced with the crisis of a system that has become unsustainable, with growing global challenges that range from widening inequalities, climate change, migration, geopolitical and financial instability to job stagnation and wage depression: what is the role of cities today? When looking at some of these trends and inequalities, we may talk about a crisis of the Western liberal world order that is essentially a crisis of the neoliberal imagination, and in particular of political representation. Political elites seem increasingly unable to represent a disenfranchised population, giving rise to right-wing nationalists gaining power across the world. Right-wing political extremism is one possible response to the systemic breakdown brought about by the failing politics and economics of the last decade, but not the only one.

Can cities reverse these trends and become a political laboratory for experimenting with democratic and sustainable alternatives? Can cities become places designed for those who live in them, for those who resist and try to provide collective and local answers to global challenges through solidarity and self-organisation? In this chapter I will argue that cities' proximity to citizens and their scale, which is well-suited to experimenting with radical policies based on people's real social needs and environmental concerns, has led them to form effective networks and coalitions for proposing alternative political programmes and solutions.

I will draw on the example of Barcelona city council's experiment with redefining the "smart city" to make sure that it serves its citizens as an example of a promising transformative project that can be scaled to other levels and locations. Barcelona can be seen as a laboratory for the implementation of a transformative, democratic innovation project, starting from real citizens' needs, and leveraging digital technology to devolve more power to citizens and residents. In 2015 Ada Colau, a right to housing activist with no previous experience in public institutions or government, became mayor of Barcelona. She called for a democratic revolution, and for the last four years I have been working in Barcelona City Council with civic-minded coders and cryptographers to design the technological tools to make this happen, and to align the technology agenda with our policy objectives.

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We started to rethink the smart city model. This means, on the one hand, critiquing the solutionist, technocratic smart city agenda previously promoted, which was top-down and technology first. That is, it thought first about connectivity, sensors and data and only afterwards about why technology is actually needed, what kind of urban problems we should solve, who manages them, who owns what, and, most importantly, how we govern technology to implement policies. It means critiquing the fact that digitalisation is used as a driving force to support neoliberal policies such as austerity and cuts and the outsourcing of public services. Barcelona's previous smart city model was essentially promoted by the big technology vendors, which sold an idea of a smart city where technology could be an easy solution to any kind of problem, from poverty to climate change, especially at a time of austerity and restrictive policies, when states found themselves with fewer resources. Behind the mantra of the smart city they were actually privatising the city's critical infrastructures.

The key issue is that in order to change the existing smart city model, technology must be aligned with the city's politics, and not the other way around. In the case of Barcelona our priorities are the right to housing, the energy and ecological transition, the creation of new public spaces for citizens, and participatory democracy. The key question is therefore how to align this public policy with technological policy, how to ensure that technology and the new industrial revolution can serve the collective interest of citizens and create public value, which also means that data is managed as a common good. The cities of the future, if they want to remain vibrant and democratic, will have to put their own citizens first. In the City of Barcelona we have tried to do just that in the past four years.

I. A new market power: How do we tame the tech giants and avoid privatised smart cities?

In the current unstable geopolitical and economic context, technological supremacy is one of the key issues redefining power struggles. The rise of digital capitalism concentrated in the hands of a few tech giants presents many challenges – from monopoly power to the need for a new tax on digital platforms, trade regulations, unemployment due to automation, and issues around civil liberties. The structural shift to the digital economy and the fourth industrial revolution should also trigger deep thinking and courageous policy measures. Artificial intelligence, massive computation, robotisation and automation are quickly transforming our industry and society with disruptive applications in key sectors of the economy: from precision agriculture to driverless cars, to the use of machine learning and artificial intelligence (AI) in healthcare.

Large US tech firms, including Amazon, Apple, Facebook and Google, with a combined market value of \$3 trillion, have offshored around \$1 trillion in the last decade, while at the same time issuing debt on the US public market at very low interest rates, and using it for share buybacks to boost their dividend payments (Wilhelm, 2017). This means that 80% of corporate wealth resides in 10% of firms, leading to an increase in corporate profit and wealth inequality.

As we know, this wealth does not trickle down and this concentration of social and economic power does not make the majority of people better off. The public sector is also increasingly dependent on the tech industry. Yet, we rarely ask where this power and dependence comes from. Why is it that the immense economic value this digital revolution represents accrues exclusively to technology firms – and not to ordinary citizens or public institutions? And what can we do to ensure that we return some of that value back to citizens, while empowering them to use technology to participate in politics (a process from which they justly feel excluded) as well as offering better and more affordable public services?

It is obvious that we need to re-politicise the question of technology and that the discussion should be about the redistribution of assets and power, in particular relating to the management of future welfare services and critical infrastructures. There is one way to do this: starting from cities. Cities cannot, of course, solve all our digital problems: many of them need urgent attention at the national and global levels, but cities can become laboratories for democracy and sustainability. They can run smart, data-intensive, algorithmic public transportation, housing, health and education – all based on a logic of solidarity, social cooperation, and collective rights. Cities can deliver on the promise to take back the city for the people, which also means democratising the ownership of and access to digital technologies. As I argue in *Rethinking the Smart City* (Morozov & Bria, 2018), cities can initiate a radical democratic process that puts people's digital sovereignty first.

To contest the new predatory high-tech capitalism, we need to build a broad alliance of all the movements mobilising to preserve the common good. We need to understand the question of technology within a broader framework of struggles that are opposing austerity and the corporatisation of everything. Efforts to establish or regain sovereignty in the domain of technology will inform similar ongoing efforts to reclaim sovereignty with regards to domains such as food, energy, housing and finance – all of which are increasingly dominated by digital technology and data platforms, especially as corporations like Monsanto are themselves rapidly moving into the field of big data, while firms like Google and Apple have become sizeable players in the energy field. Furthermore, so-called "sharing economy" companies like Airbnb are challenging affordable public housing policies, driving up rent prices and promoting the increasing financialisation of urban life; while companies like Uber are pushing to the extreme the frontier of precarisation of work, reducing social protections and collective bargaining for workers, whilst striving for super profits for their shareholders.

Barcelona is actively forging alternative municipal alliances of rebel cities, becoming a key site of struggles to fight climate change, build more liveable and just cities, and regain technological sovereignty. Nonetheless, every effort will be made to think at higher levels of scale and to explore common strategies and interventions on the national, European and international levels.

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II. Barcelona as a laboratory for democratic innovation

Instead of starting from the technology (sensors, big data, connectivity) and only later asking why we need a smart city at all, we focused on aligning the technology with the city's core policy objectives

Barcelona's digital city efforts have centred on opening up governance through participatory processes and greater transparency. At the core of Barcelona's model is a large scale participatory experiment powered by a digital participatory platform, Decidim ("We Decide", in Catalan),¹ which enables citizens to shape government policies by suggesting ideas, debating them, and voting on them. Decidim 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 do not. We are experimenting with a hybrid of online and offline participatory democracy. We used Decidim to create the government agenda — over 70% of the proposals came directly from citizens. Over 400,000 citizens proposed these policies, and were engaged in offline collective assemblies and consultations. These proposals highlighted what Barcelona's citizens care about and thus became the priorities for the government's roadmap. Now we are building the tools and the programmes to make these plans a reality.

This bottom-up democracy is a clear inversion of how the city used to be run: top-down and technology first, rather than people first. The Barcelona approach means redefining the smart city to ensure that it serves its citizens, rather than the other way around. 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, and set directions as well as deciding upon ethical uses of technological innovations with clear social impact and public return. Instead of starting from the technology (sensors, big data, connectivity) and only later asking why we need a smart city at all, we focused on aligning the technology with the city's core policy objectives selected through a large-scale participatory democracy process. In the case of Barcelona, affordable housing, healthcare for all, sustainable mobility, energy transition, increased public space and the fight against climate change are the top priorities.

Two interesting projects that demonstrate the new democratic and mission-oriented smart city approach experimented with by Barcelona are in the areas of energy sovereignty and sustainable mobility. In the field of energy sovereignty, Barcelona Energia is a municipal renewable energy company based on solar energy, created to lead the energy transition of Barcelona, providing clean energy for all municipal offices and launching a pilot with 20,000 private homes.² Now the renewable energy operator is experimenting with distributed energy grid technology and with applications that allow citizens to own their energy consumption data. Via the Decidim platform, the question of whether to open up its governance structure to citizens, unions, cooperatives and other stakeholders is also being debated. In the field of sustainable mobility, Barcelona has developed an ambitious plan to reduce traffic by 21%. Traffic management, changing road signs, the creation of new orthogonal bus networks and the introduction of 300km of new cycling lanes in order to increase mobility by foot, bikes and public transport are all underway. The use of an open sensors city infrastructure called Sentilo and big data analytics makes it possible to define and predict better public mobility policies, and measure the urban impact of evidence-based policymaking.³

1. <https://www.decidim.barcelona/>
2. <http://energia.barcelona/>
3. <https://connecta.bcn.cat/>

III. The right to the (digital) city

These new policies are based on a critical approach to the neoliberal smart city model run top-down by big tech corporations, in favour of generating a new vision in which the city begins to think and experiment with what technology that serves the people and is owned by the people could look like. The Bustia Etica project exemplifies this new culture of democratic accountability and transparency.⁴ This encrypted whistleblowing infrastructure, developed with the digital rights advocacy group Xnet, allows citizens to denounce cases of corruption anonymously to help put an end to corruption in public institutions. With projects like these, cities can also raise awareness of citizens' rights in the digital era, such as their right to privacy, encryption and information self-determination.

Moving in the direction of accountability and transparency, Barcelona has developed a digital transformation roadmap with clear guidelines and ethical digital standards that are now shared with hundreds of cities globally using a free software platform. The ethical digital standards include a technological code of conduct, guidelines for the migration to free software, a technological sovereignty policy that mandates for free software, open architectures, open standards and democratic control of digital infrastructure and data, as well as the adoption of agile methodologies to develop user centric digital services. Eighty percent of Barcelona's current IT budget is invested in free and open source technology, so we can open up procurement and the city budget to the growing ecosystem of local SMEs and startups, not just to an oligarchy of big tech providers.

The low-hanging fruit and key component is procurement: it now introduces these norms and principles into its contracts with tech companies. We are introducing clauses into contracts on data sovereignty and the public ownership of data. The city has also published a technology procurement handbook that specifies contractual clauses in procurement contracts mandating public ownership of data (data sovereignty) together with new data directives focussed on ethics, privacy and security by design. Now, for instance, the municipality has a large contract with Vodafone by which every month the company is obliged to give back machine-readable data to the city hall, while also making sure they encrypt the data to preserve citizens' privacy. That did not happen before. They just took all the data and used it for their own benefit.

A key battleground for our digital future is control over data: will it be controlled by big businesses and the state or by citizens? A crucial issue for the next decade is how to shift the underlying structures of power in the digital economy. We need a New Deal on data, where data should be seen as a public infrastructure, like electricity, water, roads and clean air. Data in the new vision of Barcelona should be considered a meta-utility that is critical to run future smart, AI-driven and data-intensive public services in transportation, healthcare and education. We also believe that data produced by the citizen belongs to the citizen. However, the old deals between the city hall and its private sector partners were breaching citizens' rights: when centralised governments and tech companies hoard data it is both a security risk and a great waste of the potential

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4. <https://ajuntament.barcelona.cat/bustiaetica/es>

to generate public value. The immense economic value such data represents should be returned back to citizens. We want to move from a model of surveillance capitalism in which data is opaque and not transparent, to a model of data commons, where citizens themselves can own the data.

To be able to manage this new data strategy, a Mayor's Office for Data Analytics was set up,⁵ supervised by a CDO (Chief Data Officer), with over 30 people with skills in advanced statistics, data science and machine learning helping the city to use data to solve the city's real problems and implement ethical standards around data and algorithmic accountability.

IV. A new ownership model for data: city data commons

Other initiatives are going even further, creating technological tools that enable citizens themselves to control the data they produce in the city and choose whom they want to share it with. Barcelona is the coordinator of the DECODE project, the biggest EU effort to establish a framework for data sovereignty, aiming to develop open source, decentralised, privacy-enhancing and rights-preserving technologies for citizens to decide what kind of data they want to keep private, what data they want to share, with whom, and on what terms. This proposes a new social pact — a New Deal on data that we hope will soon become a reality in many cities across the world.

DECODE seeks to invert the current situation in which people know little about the operators of the services they are registered with, while the services know everything about them. The tools are being tested through two pilots in Barcelona. The first focuses on the internet of things. In collaboration with the citizen science initiative started in the Barcelona FabLab called smart citizen,⁶ we are giving residents sensors to place in their neighbourhoods. These sensors are directly integrated into the city's sensor network, Sentilo,⁷ and gather data on air quality and noise pollution to influence city-level decisions. This pilot addresses the technical challenge of storing a stream of citizen-sourced data, while giving those citizens complete control over what information is shared. The idea is that citizens are able to go out of their way to collect useful data to improve public services — a modern form of volunteering. The second pilot relates to Decidim. When people use it, they see a dashboard of their data, aggregated and blended from a range of sources, from sensor noise levels to healthcare data and administrative open data. From the Barcelona Now dashboard,⁸ they can control the use of that information for specific purposes — such as informing policy proposals.

Ultimately, the vision is for citizens to manage their data flows through the Decode wallet, which manages people's decryption keys, with an interface that lets users choose to give their transport data to the city, because they know that they can improve public transport with it, while choosing not to give that kind of private data to an insurance company or to advertisers.

5. <https://www.barcelona.cat/digitals-standards/en/data-management/0.1/governance>

6. <https://smartcitizen.me/>

7. <http://www.sentilo.io/wordpress/>

8. <http://bcnnow.decodeproject.eu/login.html>

It is clear that the city is the right level of government for this experimentation with data as a public infrastructure and common good. There is a crisis of trust, and governments need to reshape their relationships with citizens. Cities are closer to the citizens, and run data-intensive services in fields such as transport, public housing, healthcare and education. So cities have the capacity to experiment with alternative democratic smart city strategies. All of the city's data, for example, could accrue to a municipal data fund that is co-owned by all citizens (and ideally be incorporated into a pan-European fund, co-owned by Europeans). Anyone building new services using that data would need to do so in a competitive, heavily regulated environment while paying a corresponding share of their profits for using it.

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Ultimately, this data can be opened up to the city innovation ecosystem of local entrepreneurs, cooperatives and citizens themselves to build new solutions to tackle the city's challenges. This transition process entails revitalising our economy and rethinking the future of work in an age of automation and robotisation, and democratising 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 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 SMEs. For this reason, a new Urban Innovation Lab (Barcelona i.lab)⁹ has been built to foster new methods of innovation with social and public return, such as open innovation challenges and prizes, and to encourage the city hall to create symbiotic ecosystems and partnerships with citizens' associations, research centres, startups, and corporates to make it happen. We also want to grow a real sharing economy that generates good, well-paid jobs, benefits local industry and not only predatory, hard-to-regulate digital on-demand platforms. Introducing fair regulation and algorithmic transparency to tame the on-demand economy, as many cities are currently doing, is necessary but insufficient.

Alternative models of service provision are being fostered via the creation of special funds for platform cooperatives and digital social innovation, supported by an EU initiative that has channelled €60m in the last few years towards experimenting with next-generation digital platforms that work for the public interest (European Commission, 2018). To support this kind of grassroots innovation we are developing different public policy instruments, such as new ways of funding digital social innovation, including innovative procurement schemes, and a regulatory review that also includes open standards, free software and distributed architecture requirements in public contracts. STEAM (Science, Technology, Engineering, the Arts and Mathematics) education is also being promoted with projects such as Ateneus de fabricació and FabLabs, which empower young people with 21st century skills by developing integrated education programmes to transfer knowledge about digital fabrication, design and robotics to schools adopting novel pedagogical techniques, and specific programmes to strengthen the links between science, technology and the arts (STARTS).¹⁰

9. <https://ajuntament.barcelona.cat/digital/en/digital-innovation/i-lab/home>

10. <https://www.starts.eu/>

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V. Towards a New Deal on data

Of course, cities cannot carry out this kind of transformation to a democratic digital society alone. We need alliances beyond the city level, with progressive states, movements and parties to change Europe from the bottom up and implement these new democratic policies. Barcelona leads a network of rebel cities, “Fearless Cities”, that is adopting tools and experiments in open democracy and data protection. The first conference was hosted in the city last year, bringing together more than 180 cities from 40 countries and five continents. Together with New York City and Amsterdam, the City Coalition for Digital Rights (2018) was also launched to make sure we integrate the rule of law, human rights and democracy into the development of future technology and artificial intelligence.

I think it is very important that Europe puts forward an alternative model for the digital society that is different to the *surveillance capitalism* (Zuboff, 2019) from Silicon Valley, and the dystopian Chinese model, with its *social credit system* that uses unlimited data collection from citizens to rank them according to their behaviour, granting or blocking access to public services. A New Deal, imagined for the digital society, which is based on a rights-based, people-centric framework, and does not exploit personal data to pay for critical infrastructure, is long overdue. The EU General Data Protection Regulation (GDPR) on data protection and privacy for all individuals within the European Union, which is based on worthwhile principles such as “privacy by design”, “data portability” and “the right to be forgotten”, coupled with new regulatory instruments in the areas of taxation, digital trade and anti-trust, are bold interventions that can create alternatives where citizens have greater power over their data and the artificial intelligence-powered future built with it.

As we ask how we can create a financial sector that serves the real economy, we should be asking how we can create a digital sector that serves the people. We need to make the most of new technologies, access to data and artificial intelligence, while guaranteeing citizens’ fundamental rights, workers’ rights, gender equality and environmental standards, pushing forward the needed energy transition to fight climate change. This is a new social pact that will require rethinking the economic model for the digital and zero carbon society, making sure it can create public value and not only private profits. This entails reconquering critical digital infrastructures – long surrendered to the likes of Facebook, Alphabet and Microsoft – and protecting citizens’ digital sovereignty.

This is a matter of democracy, and cities like Barcelona can show the way and open up a path for a network of digital sovereign cities to reclaim democratic governance of 21st century infrastructure, including data sovereignty and ethical AI for citizens. In this way we will shape a digital future for the many, not the few.

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