

# Digital technologies and community developments in post-automated cities

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## 1: Introduction

The aim in this draft paper is to use a case study of neighbourhood politics to explore relations between digital technologies and community developments. In so doing, the analysis contributes some 'post-automation' insights to Smart City research. Specifically, the case investigates how residents of Plaza del Sol in Barcelona made use of digital technologies to press for action on noise nuisance associated with social activities in the square.<sup>1</sup> Negotiating the convivial use of public space is a perpetual challenge in urban life. The paper argues the automation of urban processes through Smart City techniques does not reduce the need for older-fashioned, human-centred community development; rather, it actually increases its salience.

The case has been chosen because it has features consistent with ideas sketched for post-automation:

- Citizens are appropriating and subverting technologies associated with automation logics;
- They insert the technologies into non-industrial, neighbourhood settings;
- The technologies are put to creative work with people, and rather than displacing human activity, people are central to the operation;
- Rather than creating an automating machine-system of greater efficiency and material productivity, such as the Smart City, technologies are used to empower a group politically within a social system;
- Whilst the technological affordances enable people to find new ways of working on an issue, the technological possibilities also underscore the enduring need for older-fashioned community-development.

## 2: Automating the city? Smart urbanism and technology politics

In opening a series of public lectures on the Age of Automation for the British Broadcasting Corporation in 1964, the UK's 'leading automation engineer' Leon Bagrit defined his field as:

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<sup>1</sup> The study report here reproduces text written in April 2018 for a Guardian newspaper article about the case, called 'Smart cities need thick data not Big Data' (<https://www.theguardian.com/science/political-science/2018/apr/18/smart-cities-need-thick-data-not-big-data>)

“[Automation] is a concept through which a machine-system is caused to operate with maximum efficiency by means of adequate measurement, observation, and control of its behaviour. It involves a detailed and continuous knowledge of the functioning of the system, so that the best corrective actions can be applied immediately they become necessary. Automation in this true sense is brought to full fruition only through a thorough exploitation of its three major elements, communication, computation, and control – the three ‘C’s.” (Bagrit, 1966)(p. 14)

Urban development was not amongst the applications given by Bagrit, even though automation logics for city systems were already conceived and being developed back then (Marvin and Luque-Ayala, 2017). More recently, imagining the city as an operating system has found its fullest expression in the Smart City discourse; which has come to dominate research, policy and practice in urban governance, assisted by powerful advances in digital network technologies and their corporate promotion (Marvin, Luque-Ayala and McFarlane, 2015). What began as an agenda driven by technology corporations for developing markets and promoting products and services, has expanded into an encompassing vision for automated urbanism.

Communication, computation and control remain central to the Smart City logic. By inserting sensors across city infrastructures and creating digital platforms that interlink these data sources - including citizens via their mobile devices - Smart City managers can use analytical techniques like Big Data to monitor and visualise urban phenomena in new ways and in real time and, so the argument goes, efficiently intervene in urban activity for the benefit of responsive, connected Smart Citizens. Governance is presented largely as a technical and managerial matter, justifying digital interventions in terms of apparently universal, calculable and legitimate measures of efficiency for healthy, sustainable, and competitive cities. The Smart City challenge is to articulate messy urban practices with city operating systems and platform functionality: things have to become legible to the monitors; urban activity, flows and states have to be amenable to data analysis; idiosyncratic neighbourhoods have to adapt to the categories and visualisations that characterise them; and social groups must become responsive to automated interventions and cues – effectively becoming part of the automatic system (Tironi and Sánchez Criado, 2015).

A recurring thread in debates about automation turns on arguments about the political nature of technology systems. Some argue automation technologies are simply neutral tools for application: they expand human capabilities in ways beyond debate, whilst it is in the (ethical) application of the new capabilities that public deliberation is merited. Others argue tools are never neutral: they have a politics built into their affordances. According to this view, social assumptions and values are designed into tools, creating affordances and path-dependencies through use, which mean technological developments are inherently political. In practice, it is difficult to separate and abstract a tool from its context of development, use and disposal/rejection. Technologies always come as a sociotechnical configuration replete with assumptions and values about the social world, and loaded with social consequences. Politics is never far below the surface with tools.

Critics of the Smart City vision raise a number of concerns over its sociotechnical configuration of digital technologies: the way plural and situated urban knowledge is reduced to codified,

inter-operable (and tradeable) data; whose processing through calculation and inference produces ostensibly authoritative knowledge about complex cities; and whose proprietary characteristics cedes power to 'smart city' service providers (Greenfield, 2013). At the same time, however, wider access in society to sensors, data handling, internet platforms, ubiquitous computation, and ever more imaginative visualisation, and the capacity to prototype and experiment with these tools, permits wider access to information about cities, and the production of tailored knowledge, which opens up the possibility for unprecedented citizen involvement in urban processes. Though perhaps, still within a digital, computational logic?

There remains relatively little consideration for the way in which digital technology developments may take plural shapes in specific socio-material urban settings. Grassroots digital initiatives have been developing alongside off-the-shelf packages for smart city services, for instance in the area of sensors and environmental information; a development which potentially opens uses of ICT for citizen-led urban governance (Gabrys, 2014; Tironi and Sánchez Criado, 2015). Arguably, more democratic control of smart city technologies, including the utilization of free and open software protocols, permits pluralistic values and assumptions to continually enter debates and deliberations (Kurban, Peña-Lopez and Haberer, 2016).

So, whilst powerful market and ideological dynamics shape ICT developments into forms that try to automate urban systems in forms convenient to corporate and urban elites, other groups are appropriating the elements of these systems and developing alternative, human-centred arrangements for their own purposes. What we might call post-automation? Even the implementation of off-the-shelf Smart City packages requires adaptation to a particular city's characteristics (Kahn and Kellner, 2007). Global social forces are therefore always confronted with local dynamics. Municipalities developing digital expertise in-house, can choose to work with grassroots groups, local businesses or larger providers, and they can choose to adopt open protocols to develop bespoke services. Aspirations for automated urbanism might in practice involve a much more hybrid, less monolithic smart urbanism that actually has post-automation characteristics?

### 3: Making Sense

Under Mayor Trias (2011-15), Barcelona's city government intensified and expanded its prior work in digital technologies for urban governance, and worked hard to promote Barcelona as a world-leading smart city, and with considerable success (Continente *et al.*, 2016). A wide variety of smart city installations had been implemented; international smart city service providers were locating their business operations into a test-bed district; and an ecosystem of smaller developers and start-ups were innovating smart Apps and other tools.<sup>2</sup> Work was underway to integrate this patchwork of smart city elements into what was called an "Operating System" (OS) for the city: the "essential hardware, software and data components that quietly sit in the background directing urban flows, providing shared languages towards interoperability across multiple infrastructures" (Marvin and Luque-Ayala, 2017: 1).

Then, in 2015, city elections provided a moment for recent shifts in the urban political landscape. The new Mayor, Ada Colau, took office with a vision rooted in citizen mobilisations,

commons and collaborative approaches to urban experimentation, and prototypes for direct democracy. Her new party, Barcelona en Comú [Catalan for Barcelona in Common] emerged from a kaleidoscope of democracy activism bursting out of the 15-M movement over the period 2011-15. In coalition with other left parties, the smart city was no longer a priority for Colau's city council. Technological sovereignty has taken its place within a broader agenda for more democratic urban developments.<sup>2</sup>

Elected Mayor on a mandate to democratise the city and put citizens centre-stage, digital policy has sought to go 'beyond the Smart City'. Chief Technology Officer Francesca Bria was appointed to open digital platforms to greater citizen participation and oversight. Worried that the city's knowledge was being ceded to tech vendors, the Council began to promote technological sovereignty instead.

On the surface, the noise project in Plaça del Sol is an example of such sovereignty. It even features in Council presentations. Citizens using digital technologies to address noise issues and better govern their square is emblematic for these broader, 'technopolitical' imaginaries for democratic urban technology. Look more deeply, however, and it becomes apparent that neighbourhood activists are really appropriating new technologies into the old-fashioned politics of community development.

Plaça de Sol has always been a meeting place. But as the neighbourhood of Gràcia has changed, so the intensity and character of socialising in the square has altered. More bars, restaurants, hotels, tourists and youngsters have arrived, and Plaça del Sol's long-standing position as venue for large, noisy groups drinking late into the night has become more entrenched. For years, complaints from individual residents to the Council fell on deaf ears. For the Council, the neighbourhood of Gràcia symbolised a desirable image for the city that they were actively promoting, which was open, welcoming, and with a vibrant leisure and knowledge economies. Residents interviewed for this case study research were proud of their vibrant neighbourhood. But they also recalled a more convivial square, with kids playing games and families and friends socialising, and where there was a variety of activities. Visitors attracted by Gràcia's atmosphere also contributed to life there, but residents felt this had tipped too far into groups drinking, and what was known as the *botellón* had become a nuisance. It is a story familiar to many cities. Much urban politics turns on the negotiation of convivial uses of space.

What made Plaça del Sol stand out can be traced to a group of technology activists who got in touch with residents early in 2017. The activists were seeking participants in their project called Making Sense which sought to resurrect a struggling 'Smart Citizen Kit' for environmental monitoring. The idea was to provide residents with the tools to measure noise levels, compare them with officially permissible levels, and reduce noise in the square. More than 40 neighbours signed up and installed 25 sensors on balconies and inside apartments.

The neighbours had what project coordinator Mara Balestrini from Ideas for Change calls 'a matter of concern'. The earlier Smart Citizen Kit had begun as a technological solution looking

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<sup>2</sup> Elections in May 2019 cast doubt over the future direction of the digital urbanism in Barcelona. Ada Colau remains mayor, but her party lost seats. It has been necessary to make pacts with other parties who do not share the democratising vision nor roots in community activism.

for a problem: a crowd-funded open hardware device for measuring pollution, whose data users could upload to a web-platform for comparison with information from other users. The Kit made use of Arduino and other open hardware and software components for computing and communicating noise levels automatically. Designs and instructions were shared on GitHub for open adaptation and use. In practice, early adopters found the technology trickier to install than developers had presumed. Even successful users stopped monitoring because there was little community purpose. A new approach was needed. Noise in Plaça del Sol provided a problem for this technology fix.

Through meetings and workshops residents learnt about noise monitoring, and, importantly, activists learnt how to make technology matter for residents. The noise data they generated, unsurprisingly, exceeded norms recommended by both the World Health Organisation and municipal guidelines. Residents were codifying something already known: their square is very noisy. However, in rendering their experience into data, these citizen scientists could also compare their experience with official noise levels, refer to scientific studies about health impacts, and correlate levels to different activities in the square during the day and night.

The project decided to compare their square with other places in the city. It was only at this point that they discovered the Council's Sentilo Smart City [platform](#) already included a noise monitor in their square! As part of the earlier Smart City strategy, and continuing under the new technological sovereignty policy, the council had been installing sensors across the city for different functions, and communicating the data produced to a platform called Sentilo. The idea was that eventually this open data would form part of a city-wide Operating System. So, officials had been monitoring noise but not publicising the open data. Presented with citizen data, officials initially challenged the competence of resident monitoring, even though official data confirmed a noise problem. But as Rosa, one of the residents, said to me, "This is my data. They cannot deny it".

Attention turned to solutions. A citizen assembly convened in the square one weekend publicised the campaign and sought and discussed ideas with passers-by. Some people wanted the local police to impose fines on noisy drinkers, whereas others were wary of heavy-handed approaches. Some suggested installing a children's playground. Architects helped locals examine material changes that could dampen sound.

The Council response has been cautious. New flowerbeds along one side of the square remove steps where groups used to sit and drink. Banners and community police officers remind people to respect the neighbourhood. The Council recently announced [plans](#) for a movable playground (whose occupation of the centre of the square can be removed for events, like the Festa Major de Gràcia).

The measures taken to reduce noise in the square do not appear to have solved the problem. People still gather, drink and make noise, including gathering in the playground, which has a soft, more comfortable surface. According to local news reports,<sup>3</sup> people disperse when the community police come to the square, and when the square is cleaned after the bars have closed. In August 2018, Barcelona City Council arranged its own noise monitoring programme

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<sup>3</sup> See, for example, Metropóli Abierta Barcelona, Saturday 1<sup>st</sup> September 2018. [https://www.metropoliabierta.com/el-pulso-de-la-ciudad/en-la-calle/gracia-monta-parque-infantil-botellon-masivo\\_9818\\_102.html](https://www.metropoliabierta.com/el-pulso-de-la-ciudad/en-la-calle/gracia-monta-parque-infantil-botellon-masivo_9818_102.html)

in the square. According to participants in Making Sense, residents were not consulted about the installation of sensors and gathering of data, and felt side-lined by such an approach. Some reductions in noise are claimed, but residents still consider it a nuisance. It is interesting that knowledge production activity remains dedicated to noise in its technical aspects, and not to exploring the longstanding botellón phenomena with participants, and conflict management methods that promote conviviality. Residents continue to press for changes ...

Residents could monitor the noise after these interventions. But they sense also that their demands confront an established leisure economy. As local councillor Robert Soro explained to me, convivial uses have also to address the interests of bar owners, public space managers, tourism, commerce, and others.

#### 4: Discussion

The automated city, following Bagrit's definition, functions as a system, operating at maximum efficiency (and productivity) through the use of technologies of measurement, analysis and control, or the 3 'C's: communication, computation, and control. What do we take from this case study of an attempt at community-based noise control? And what might that contribute to developing a concept of post-automation?

##### *4.1: Communication: systems knowledge and social knowledges*

An interesting feature in the case study is how a project intervening in the messy worlds of a neighbourhood turned out to be over-layered with an invisible operating system, and that the information permitting communication between them was insufficient to the issue.

Residents were learning that data is rarely neutral. The kinds of data gathered, the methods used, how it gets interpreted, what gets overlooked, the context in which it is generated, and by whom, and what to do as a result, are all choices that shape the facts of a matter. For experts building Big Data city platforms, such as the Sentilo team, one sensor in one square is simply a data point feeding into their operating system. On the other side of that point, however, are residents connecting that data to life in all its richness in their square. Anthropologist Clifford Geertz argued many years ago that situations can only be made meaningful through 'thick description'. Applied to the Smart City, this means data cannot really be explained and used without understanding the contexts in which it arises and gets used. Data can only mobilise people and change things when it becomes thick with social meaning.

##### *4.2: Computation: calculations and mobilisations*

The case raises questions about the way digital technologies can help people mobilise around matters of concern, as much as any computation of the matter. Political calculations prove to be as important as estimates of noise.

Noise data in Plaça del Sol was becoming thick with social meaning. Collective data gathering proved more potent than decibel levels alone: it was simultaneously mobilising people into changing the situation. Noise was no longer an individual problem, but a collective issue. And

it was no longer just noise. The data project arose through face-to-face meetings in a physical workshop space. Importantly, this meant that neighbours got to know one another better, and had reasons for discussing life in the square when they bumped into one another. The Making Sense digital technology project was not simply producing codified knowledge about noise, it was also reinforcing and producing a collective that wanted to act. Open data on the Sentilo platform does not involve the production of shared experience and purpose in the same way as the community technology project. Sentilo does not automatically mobilise people into creating the Citizen's Assembly – that was enabled through a very different sociotechnical configuration of digital technology. It was the way Making Sense organised people, technologies and produced knowledge in a well-understood situation that mattered. And for that, Making Sense had to connect to a matter of concern to the citizens.

#### 4.3: Control, or negotiation

For the Council, technology activists, and residents of Plaça del Sol, data alone cannot solve their issues. Data cannot transcend the lively and contradictory social worlds that it measures. If data is to act then it needs ultimately to be brought back into those generative social contexts - which, as Jordi Giró at the Catalan Confederation of Neighbourhood Associations argued during one of our field interviews, means cultivating people skills and political capacity.

Technology vendors cannot sell such skills. Community technology projects like Making Sense can help cultivate the skills. However, Making Sense was necessarily limited in its conceptualisation and strategy towards the matter of concern. Beyond issues of economic power noted at the end of section three, lie questions of rights to public space, young peoples' needs to socialise, neighbouring squares worried about displaced activity, the Council's vision for Gràcia, and of course, the residents suffering the noise. Control over these processes, if there is any, operates in multiple ways and way beyond the sensing networks and smart city platform. Negotiating these issues involves work beyond automated data collection. It requires social anthropological understandings of the *botellón* and people's rights and responsibilities, alternative spaces and forms of socialising. It requires critical knowledge about the local economy and power structures, and the democratic negotiation between social worlds and alternative possibilities.

## 5: Conclusions

The post-automation concept attempts to signal and elaborate alternative ways of developing and using digital technologies compared to the automation logic of communication, computation and control for productive efficiencies.

In this paper, a case study was presented in which digital technologies associated with the smart city – sensors, Wifi, platforms, visualisation – were appropriated and used by citizen-activists to create their own environmental monitoring network. In so doing, work was achieved in forms that more automated urban operating systems often fail to notice. Data was made thick with social meaning which helped mobilise local activity. A collective was produced and mobilised, and which sought creative human inputs to solutions through a Citizen Assembly. Technologists learnt about community development, and community

residents learnt about technology. Existing knowledge (about noise) was codified into an officially-recognised form that enabled communication with authorities (at the council, and in terms of scientific research on health). Relations between noise and activities in the square could be computed and correlated.

However, limitations also became apparent, even in this human-centred, neighbourhood smart monitoring system. The root causes of the noise problem are structural – indeed, residents know this as noise became a proxy for reflecting upon multiple developments in and around their square. Further finessing or expanding the community technology will not address these structural issues – though they may continue to mobilise awareness. Rather, political programmes are required that convene the diversity of social issues beneath the monitored issue: mass tourism; gentrification; youth; leisure economies; and urban governance itself.

If automating the city involves communication, computation and control, then what about post-automation? Post-automation puts people back in the picture and focuses upon the negotiations they have with automating technologies and their purposes. Perhaps we can evoke 3 ‘D’s rather than 3 ‘C’s? Deliberation, diversity, and democracy? Deliberation across different social framings of the urban, rather than communicating between components in an urban system. Recognising the diversity of rationalities and feelings involved in producing knowledges and calculating strategic actions. And taking care in the democratic quality of reaching authoritative decisions and solutions, rather than seeking a machine-like notion of control. Going beyond the Smart City demands something its technocratic efficiency is supposed to make redundant: investment in old-fashioned, street-level skills in community development.

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