Author/s:
McQuire, S

Title:
Beyond the smart city: a communications-led agenda for twentyfirst century cities

Date:
2023-06-27

Citation:
McQuire, S. (2023). Beyond the smart city: a communications-led agenda for twentyfirst century cities. Online Media and Global Communication, 2 (2), pp.148-169. https://doi.org/10.1515/omgc-2023-0018.

Persistent Link:
https://hdl.handle.net/11343/340608

Scott McQuire*

Beyond the smart city: a communications-led agenda for twentyfirst century cities

https://doi.org/10.1515/omgc-2023-0018
Received April 11, 2023; accepted May 26, 2023

Abstract: Digital media technologies, from networked sensors to large video screens and mobile devices, have become pervasive urban infrastructure in the twentyfirst century. The dominant framework for understanding the integration of digital technology into urban space has been smart city discourse. In this article, I will argue that this framework, as it has so far been articulated, is inadequate to maximizing the social potential of digital urban infrastructure. Digital urban infrastructure not only changes how cities look, but how they function as social settings. I will propose the 'communicative city' as an alternative framework for thinking about digitally mediated cities. The communicative city offers an opportunity to consider networked urban space as a test case in which key problematics of contemporary globalized media are materially instantiated. It is the frontier zone at which everyday experiences of embodied media and new forms of communicative agency collide with powerful logics of tracing and tracking, and the widespread deployment of new forms of automation and machine learning as techniques of urban governance.

Keywords: communicative city; digital infrastructure; smart city; urban communication

1 Introduction

The first decade of the 2000s was marked by a rapid rise in the global prominence of the 'smart city'.[1] While the term inevitably lacked consensus as to its precise meaning, it gained considerable momentum by combining an industry-led agenda for digital infrastructure provision with a broad, data-led urban imaginary. Smart

1 One, admittedly imprecise but indicative, measure of this comes from Google's N-Gram viewer, where a search for the 'smart city' string languishes near zero until the year 2000, tips upwards from around 2007 and then spikes almost perpendicularly from 2010 onwards.

Article note: This article underwent single-blind peer review.

***Corresponding author: Scott McQuire**, School of Culture and Communication, University of Melbourne, Grattan Street, Parkville, VIC, 3010, Australia, E-mail: mcquire@unimelb.edu.au. https://orcid.org/0000-0001-7698-987X

city discourse built on experiments with urban computing dating back to the 1960s, but translated these to the new conditions of 'big data' society, in which digital infrastructure such as networked sensors and mobile devices alleviated many of the traditional logistical constraints on urban data collection. Since its initial elaboration the smart city concept has been subject to significant and sustained criticism relating to its perceived limitations, notably a top-down, overly technocratic orientation. Nevertheless, it continues to exert a considerable pull on contemporary urban policy and imagination.

In what follows I will argue that the smart city discourse arose as a particular, historically situated response to the distinctive conditions and potentials that have emerged with the rollout of digital urban infrastructure. The question today is whether the smart city agenda is capable of fulfilling the promises often made in its name, most notably its claims to improve the *quality* of urban life. Of course, at issue is how we might define 'quality of life', which will always and inevitably be a contested and deeply *political* designation. In this vein, it is important to recognize that digital urban infrastructure changes how cities function as complex 'systems' but also as social settings. Can smart city programs designed to privilege efficiency and 'optimization' translate to the empowerment of citizens and other urban inhabitants? How can contemporary data-intensive approaches to urban life better negotiate the problems of overweening surveillance that have shadowed the smart city imaginary from its inception?

Challenging the narrowness of the smart city model has become increasingly urgent as the digital urban infrastructure which first spawned smart city imaginaries is being bracketed onto new forms of machine learning and automated decision making, and new data-led techniques of urban governance are being operationalized around the world. The Covid-pandemic demonstrated the capacity for existing digital infrastructure to be rapidly consolidated into a new system for urban population control, as personal mobile phones were widely used to record people movement in societies as diverse as China and Australia. The pandemic also showcased some of the new state-corporate interdependencies that might propagate such a system. In lectures delivered in the late 1970s Michel Foucault noted that paradigm shifts in urban governance frequently occur in response to crisis, such as war, natural disaster or pandemic. If the Covid pandemic has provided us with an indicator of a possible urban future built around what Foucault (2007) termed 'biopolitical security' and implemented through a specific mobilization of digital urban infrastructure, we need to pause and ask: is it the future we want?

In this essay, I argue that the smart city framework, at least as it has been articulated to this point, is inadequate to the historic process of digitizing the city. In its place, I suggest we need to approach the city, and especially the design and operation of its digital infrastructure, from a communication standpoint. As I will

outline below, this demands recognition that 'communication' is not simply a matter of engineering better signal-to-noise ratios or modelling more efficient forms of transmission, but is a fundamentally *social* process. 'Communication' in this sense is *constitutive* of the individual and collective identities of humans as distinctive symbol-manipulating, story-telling, technological beings.

2 From the global city to networked society

The transformation of the internet from its specialised, defence-led origins in the US to become a general purpose backbone of global communications in the 2000s has had major and frequently unintended consequences for urban life. Here I want to delineate three thresholds in the development of digital networks which have been significant to the development of the smart city as a distinctive concept and commercial agenda.

The first emerged in the 1980s, when internet use was only just breaking out of research networks into selected pockets of US counter-culture. Nevertheless, the impact of privately-owned corporate networked communication was already becoming apparent on patterns of economic activity. Towards the end of the 1980s, Manuel Castells (1989: 6), building on his long-standing interest in urban economies, advanced his concept of the 'space of flows'—describing a new paradigm of time-sharing practices enabled by information and communication technologies—that characterised what he dubbed as the 'information city'. Saskia Sassen (1991) also identified new cross-border economic flows as critical enablers of the 'global city', which she argued was producing a 'partial unbundling' of the nation-state in favour of other units and scales of organization.

Unlike much speculative theorizing of the 1990s, which equated the rise of the internet society with the wholesale 'disappearance' of space, place and materiality, both Castells and Sassen argued that this development was neither purely technological nor primarily 'immaterial'.[2] Writing a decade after he first advanced the concept, Castells (1999: 146) summarised the 'space of flows' in a manner that prefigures the contemporary infrastructure 'turn' in media and communications research.

---

2 A prime example of this speculative hyperbole was 'Cyberspace and the American dream. A Magna Carter for the Knowledge Age' produced for the tech think-tank Progress and Freedom Foundation (Dyson et al. 1994) which opens with the declaration: 'The central event of the twentieth century is the overthrow of matter.'

> The material arrangements that allow for simultaneity of social practices without territorial contiguity. It is not purely electronic space […] It is made up first of all of a technological infrastructure of information systems, telecommunications, and transportation lines.

Sassen's (1991) 'global city' was similarly conceptualised as a territorialized 'command and control centre' enabling the spatial dispersal of economic activity associated with the new phase of globalization. The 'global city'—and in her initial formulation there were only five—depended on specific urban concentrations of management, financial and legal skills as much as it does technological developments in telecommunications and digital connectivity.

A second, somewhat different, threshold of network society was crossed in the mid-1990s, leveraging Tim Berners-Lee's 1989 public release of the protocols for the 'world wide web'. Alongside the massive economic speculation that marked the original 'dotcom boom' that ramped up at this time was an exponential upsurge in public internet use, although this remained uneven and concentrated in relatively few territories for at least another decade.[3] Growing popular use meant that 'internet society' not only ascended to a new scale, but started to assume new valences. This is the moment that gave birth to Napster, and saw Google tilting heroically at the entrenched windmills of 'old media' symbolised by Hollywood, network television and newspapers. It inspired those as diverse as musician and founder of the Electronic Frontiers Foundation John Perry Barlow and media baron Rupert Murdoch to forecast the communication-led demise of 'authoritarian' regimes around the world.[4]

---

3 It's worth recalling that the internet was not available in China until 1989, and access remained relatively restricted until the new millennium. However, over the last two decades, China has become the largest national population online.

4 Barlow's Declaration of the Independence of Cyberspace (Barlow 1996) was written in 1996 at the World Economic Forum in Davos. It was structured around a binary opposition between cyberspace as the realm of 'mind' and the realm of 'bodies' where governments can properly exert sovereignty. It was disdainful not only of state-led censorship on the internet (specifically motivated by the passing of the US Telecommunications Decency Act in 1996) but also of the enforcement of intellectual property rights online, arguing: "In our world, whatever the human mind may create can be reproduced and distributed infinitely at no cost. The global conveyance of thought no longer requires your factories to accomplish." Whatever the merits of his arguments, subsequent history suggests that his broad claim that regulation "will not work in a world that will soon be blanketed in bit-bearing media" hasn't aged well. Following his acquisition of Hong Kong-based Star TV to give him a footprint into mainland China, Rupert Murdoch argued in a speech given in London that: "Advances in the technology of communications have proved an unambiguous threat to totalitarian regimes". (quoted in Page 2003: 467) While he had satellite television rather than the internet in mind, Murdoch's stance lasted only a few months. His faith in technology-led liberation crumbled in the face of his ambition to operate a successful cable network in China and Murdoch soon turned his energy to railing at Google for being a parasite on his newspapers.

This optimistic—indeed utopic—moment, soon extended to extolling the new 'social' platforms such as YouTube (2004) and Facebook (2004) as the pathway enabling 'fans' to become media co-producers, and inspired a new level of rhetoric about 'participation' and user-led digital agency (for example, Jenkins 2006). This resulted in often-expansive claims about the impending 'democratization', not only of media industries, but of politics and society, and inspired *Time* to declare 'You'—the individual internet user—as their 'person of the year' in 2006. Rather than using hindsight to poke holes in some of the more expansive thought-bubbles from the time, I want to underline the way that growing popular use of the internet effectively redefined the dominant parameters for understanding of digital, networked and computational media. Instead of specialised tools for engineers and 'nerds', networked digital media became the stuff of everyday life and mass culture, creating an enthusiasm for 'participation' and an aura of 'democratization' that lingers, albeit in significantly modified forms, even today.

A third paradigm of network society started to emerge in the 2000s, even as the participation rhetoric was still taking root and spreading into multiple domains such as medicine and health care, science, marketing, government, and business. This third shift, which encompasses diverse developments such as ubiquitous computing (Weiser 1991), the networking of previously 'siloed' digital infrastructure from payment and ticketing systems to surveillance cameras, the rise of mobile phones and the integration of internet capabilities into mobile devices, is characterized by a very different spatial distribution of networked digital media *within* cities. Where being 'connected' to media had once demanded physical proximity to specialised sites—wired telephones, home-based television receivers, desktop computers, etc.—the 2000s saw a rapid unbundling of this constraint. This new condition, which I have previously theorized in terms of *geomedia* (McQuire 2016), meant that networked urban space came to be characterized by new possibilities for distributed interactivity, participation and social agency, as information could be accessed, processed and consumed 'on site'. However, these new possibilities were accompanied at every step by a more pervasive architecture of data capture that has since become central to dominant commercial logics (Zuboff 2019), as well as the new operational logics of tracking and positional tracing that characterize contemporary urban space. This is the complex terrain in which the smart city concept was first elaborated and takes root.

3 Smartening up the city

While urban computing has a history dating from the 1960s, the 'smart city' label didn't become prominent until well into the first decade of the new millennium

(McQuire 2022). The basic concept draws on elements of all three of the different 'moments' of networked society that I have noted above: (i) the growing capacity for distributed realtime synchronization that Castells identified as 'the space of flows'; (ii) the participatory and ostensibly 'democratic' ethos that was frequently attached to digital media from the mid-1990s; (iii) the new capacities for pervasive data capture and positional data use that emerges with the threshold of geomedia in the 2000s. This heritage means the smart city has frequently straddled the central fault line that defines the digitization and networking of contemporary society, as new potential for communication and collaborative exchange on a transnational scale is accompanied by growing capacities for granular data collection, including individual positional tracking, at population scale (Kitchin 2014). The result, as Mondschein et al. (2019) have pointed out, is that "the emergence of the smart cities paradigm has amplified longstanding tensions between democracy and technocracy in planning".

The smart city concept directly piggy-backed on several contemporary developments, including the 'internet of things' discourse as well as a mix of smart growth and intelligent city projects that all emerged in the late 1990s (Rosati and Conti 2016; Söderström et al. 2014). All these developments were dependent on the new availability of cheap and plentiful data, which became a key feature of the maturing network society. Data abundance is where the smart city breaks significantly from earlier urban computing scenarios such as the RAND-led experiments in New York that began in 1969 (see Author 2022). As much as it relies on advanced computer modelling and analytics, the smart city imaginary is data-centric and dependent on a suite of technologies including network connectivity, digital sensors, and computation capabilities, but also the mass uptake of mobile devices that now play such a critical role in urban data generation.[5]

An oft-cited definition of the smart city authored for IBM in 2011 described it as: "one that makes optimal use of all the interconnected information available today to better understand and control its operations and optimise the use of limited resources." (Cosgrove et al. 2011) In an article 'Smart homes, smart cities', written for the Siemens magazine *Pictures of the Future*, a similar vision was outlined: "Several decades from now, cities will have countless autonomous intelligently functioning IT systems that will have perfect knowledge of users' habits and energy consumption and provide optimum service—for example, by bringing renewable energy online as needed. […] The goal of such a city is to optimally regulate and control resources by means of autonomous IT systems" (Siemens 2008: 68). In a paper produced for Cisco around the same time, Falconer and Mitchell (2012) described the smart city approach as involving "scalable solutions that take advantage of information and

5 As Greenfield (2013) notes, citizen devices are 'treated both as interface objects and as sources of the most granular data regarding our whereabouts, activities and intentions'.

communications technology (ICT) to increase efficiencies, reduce costs, and enhance quality of life. Cities that take this approach are commonly referred to as Smart Cities […]" These same themes have been repeated innumerable times with relatively small variations in smart city promotional materials such as newsletters and vendor websites around the world. The basic smart city model involves (i) data capture (ii) information processing and analytics; (iii) provision of feedback using processed information—potentially in realtime—to modulate resource use or service delivery. Summarised as key words it might read: data + optimisation = control. The tripartite formula of Lenin's famous dictum "Soviets + electricity = communism" is not too far away![6]

The corporate origins of the smart city concept are well-known. The idea emerged from a confluence of major companies including Siemens, Cisco and IBM (Luque-Ayala and Marvin 2015; Söderström et al. 2014). These origins explain—at least to some extent—some of the problems that were soon identified in relation to the smart city agenda: the fact that it was vendor-led and that it privileged top-down approaches involving the implementation of 'end-to-end' managerial solutions.[7] Regarding this corporate genesis, Adam Greenfield (2013: 13–14) has commented: "It's as if the foundational works of twentieth-century urbanist thought had been collectively authored by United States Steel, General Motors, the Otis Elevator Company and Bell Telephone rather than Le Corbusier or Jane Jacobs".

While a key motivating concern of smart city approaches has been improving sustainability by reducing energy and resource use—aims which, at least superficially, lent themselves to the 'systems optimization' approaches that dominated existing computing—it is notable that the smart city concept has always included a regular slippage towards broader claims about citizen empowerment and 'quality of life'. Many of these have been contentious and remain to be demonstrated.

Evaluating claims about citizen empowerment, Adam Greenfield (2013: 60) noted the asymmetry of data provision in key smart city projects: while citizens get 'alerts' resulting from processed data, "neither IBM no any of its peers among the smart-city vendors has ever suggested that citizens be offered direct access to the disaggregated raw feeds". Anthony Townsend (2013) and Saskia Sassen both made similar points about the way that smart city system design tended to privilege a 'managerial' vision over citizen engagement. Sassen argued:

---

6 Lenin's (1964) formulation was actually "Communism is Soviet Power + Electrification of the Whole Country"—the title of a report he delivered in December 1920.

7 Schaffers et al. (2011: 437) argued that 'Technology push is still dominant in the actual research agenda' and that 'smart city solutions are currently more vendor push than city government pull based'.

> The planners of intelligent cities, notably Songdo in South Korea actually make these technologies invisible, and hence put them in command rather than in dialogue with users. One effect is that intelligent cities represent closed systems, and that is a pity. It will cut their lives short. They will become obsolete sooner. (2011a)

Jennifer Gabrys' (2016: 231–234) salutary analysis of FixMyStreet—one of the most commonly cited examples of a popular 'smart city' application—acknowledges the way the design of the app enables a range of user literacies and agency, but concludes that it is nevertheless structured around the centrality of passive data collection. In other words, it implements a fundamentally *extractive* logic, in which data is collected from individuals and communities so as to better manage them. As a result, Gabrys (2016: 187) notes that, rather than a more open agenda of 'empowerment', citizen agency in smart city systems tends to be highly circumscribed: 'Urban citizens become sensing nodes—or citizen sensors—within smart city proposals.'

4 Rethinking the smart city

I noted above that both smart city rhetoric and programs have often been caught between technocratic and democratic approaches to urban governance. If the initial vendor-led agenda was skewed more to the technocratic end of the spectrum, there has since been greater aspiration to at least explore what a more 'democractic' orientation might involve. As Mondschein et al. (2019: 1) point out that, parallel to the smart city discourse—and occasionally intersecting it—has been "an increased interest in engaged planning that empowers communities, valuing local input and control over urban investment and design". This current draws on a longer history of interest in 'participatory' planning that dates at least from the 1960s (see Brownill and Carpenter 2007; McQuire 2016: 91–97).

While it is inevitably risky to generalize across diverse projects and contexts, the last decade has seen the reworking of aspects of smart city rhetoric. There have been multiple practical experiments in finding new ways of engaging publics in urban planning and decision-making, including adopting new modes of information provision (open government publishing, open data sets), making wider use of diagnostic tools (online polls and surveys) as well as conducting experiments in collaborative knowledge generation and collective urban ambiance (urban citizen-science projects, urban art projects). Academic and consultant Boyd Cohen (2015) has advanced a three phase typology of the smart city, drawing on the terminology of software updates that Tim O'Reilly (coiner of 'web 2.0' back in 2004) popularised as a general descriptor of paradigm change. In Cohen's account, Smart City 1.0 corresponds to the initial vendor led, tech-centric paradigm I have described above. Smart City 2.0 is

technology-enabled but 'city led', with cities increasingly initiating specific and more localized smart city programs. Smart City 3.0 pertains to an era of 'citizen co-creation' implying a move up Arnstein's (1969) well-known participation ladder (see also Cardullo and Kitchin 2019). Cohen acknowledges that these phases will overlap in practice and, indeed, advocates a blend of city-led and citizen-enabled initiatives, as the optimum model.

My reading of recent developments in global smart city programs is more cautious. Evidence of a wholesale paradigm change remains scant. Nevertheless, one important thing which has emerged over the last decade is greater recognition of the complexity of labels such as 'participation' and 'citizen engagement'. In particular, research that builds on the frameworks for understanding technology-uptake that were pioneered in areas such as the social studies of science have consistently demonstrated the way that individual outcomes are contingent on the interplay of a diverse range of factors including local cultural norms, the specific materialities of technology design, and the organizational and institutional settings of those promoting and leading the initiatives.

For instance, Staffans et al. (2020) describe a recent project that sought to embrace different forms of knowledge in the planning process. They acknowledge that digital technology such as social media platforms has been widely used in order to broaden public input by enabling information to be easily collected and distributed. However, they argue that the impact of 'participatory' information access has been diluted by insufficient attention being paid to the kinds of communication models and techniques needed to foster effective collaboration. In particular, they contend that there is a lack of recognition of the different models and practices of communication that are needed to better support public participation in planning, where modes of engagement might range from online consultation with broad and diverse publics to facilitating small, face to face collaborative meetings.

In a related but slightly different vein, Mondschein et al. (2019) note that the aim of 'engaging' inhabitants in the process of data collecting is not always compatible with the aim of 'empowering' them. Data collection tends to be most efficient and accurate when the process is highly automated; for example, using an app that can run in the background on a mobile phone. Open source solutions are more likely to offer greater capacity to provide users with 'transparency' as to how data is being collected and shaped by the software. But such solutions frequently demand a higher level of technical knowledge from participants. Using 'off-the shelf' proprietary devices and systems to collect data might reduce transparency, but have the benefit of widening the range of community participants because of the lower level of technical knowledge required.

These kinds of trade-offs complicate decision making at all levels. As Adam Greenfield (2013: 25) has pointed out, the material details of particular technological solutions can never be taken for granted:

> Think for a moment of the interactive touchscreens we see so often in renderings of the smart city. As it happens, there are a number of technologies on which a touchscreen can be based, but they're not simply interchangeable with one another. Each differs markedly from others in terms of the granularity with which it is able to detect a touch event, the temperature range it can operate effectively within, the kinds of display element it is most compatible with, and so on.

This issue of how technology might 'lock-in' certain modes of engagement extends to deeper problems that beset smart city approaches predicated on abstract values such as 'optimization'. Greenfield (2013: 53) notes that engineers have long understood that there is no single standard of 'optimization' in relation to technological deployment, as operational choices always involve trade-offs between one type of performance and another. However, recognition of this kind of *politics* remains thin in smart city literature, where questions of what is being 'optimized', for whom, and to what end, are rarely prosecuted in any depth.

All these examples highlight the challenge involved in moving towards Cohen's vision of 'Smart City 3.0', or in assuming that any such movement will be smooth, progressive and linear. Even in smart city agendas that do pay more than lips service to issue such as *quality* of social life, this is largely defined in terms of access to services such as transport and healthcare. A good example is the index that Cohen has developed for the Smart Cities Council since 2011 to enable cities to self-assess their progress towards a state of 'smartness' (Smart Cities Council 2023). The index lists multiple indicators that are divided into six key domains: Environment, Mobility, Government, Economy, People, and Living. This seems promising but if you drill down into domains such as People, you find three sub-sections of Inclusion, Education and Creativity. 'Inclusion' is defined solely in the terms of traditional development communication, measured by four factors: % of internet-connected households, % of residents with smart phone access, % of civic engagement activities offered by the municipality in the last year, and voter participation in municipal elections. Living also has three-sub-categories (Culture and Well-being, Safety, and Health). Safety is all about crime levels and 'smart crime prevention' such as 'live video cameras' and 'predictive software technologies'. Both approaches are notable for their deeply problematic history in terms of their impact on urban public space, including their role in perpetuating race-based biases in policing (see for example Richardson et al. 2019). Adopting them as key indicators of 'safety' flies in the face of this history.

Culture and Well-being seem similarly problematic. It includes indicators assessing basic material conditions (potable water, sanitation, overcrowding, deficient material quality, or lacking electricity), as well as measures of inequality (using the Gini coefficient which measures income or wealth inequality), quality of life (Mercer ranking, which focuses on expatriate employees) and % of municipal budget allocated to 'culture'. None of these measures speak to critical issues of urban culture, such as sense of belonging or confidence to mix with others in public.

Some of this perhaps understandable. There is certainly a role for 'indicators' in urban planning and the data assembled for Smart Cities Council Index could be useful for limited and specific purposes. However, when such limited and ambiguous indicators are read as legitimate indexes for comparative analysis of broad values such as 'Living', a false economy is being perpetuated. If one of the distinctive elements of the smart city approach has been its exploitation of new streams of data, this datacentric nature can easily become a weakness as much as a strength. Datacentrism reinforces a tendency that is evident in the Smart Cities Council index; namely to seek out and privilege those 'indicators' that have already been quantified or are (seemingly) capable of being quantified. What goes missing in all these accounts of 'smartness' are factors that are more difficult, if not impossible, to quantify.

As many urban sociologists including Jane Jacobs (1961) and Richard Sennett (1978) have long argued, serendipitous and unscripted everyday urban interactions, including those with strangers, are vital not only to individual wellbeing but to social wellbeing. Such unplanned and informal interactions play a critical role in establishing what we might think of as urban social capital, manifested as sense of belonging, civic identity, trust and community resilience. Social encounter is, by definition, highly contextual, situated and ephemeral. It is about mood and ambience as much as more solid, measurable attributes such as the number or demographic composition of a crowd. While changing demographics are undoubtedly an important part of the modern urban story, so are these other attributes of social encounter. The fact that these attributes are hard to capture and quantify does not mean they are unimportant or insignificant. As I have argued at length elsewhere, unplanned encounters in public space remain critical to developing the social skills for living with others in contemporary urban contexts, which are defined by greater demographic heterogeneity, including differences in cultural background, lifestyle, ethnicity, religion and language (McQuire 2016). Cities around the world face new challenges in terms of sustaining social bonds in this new context of great scale and diversity.

5 Communication as an expanded urban paradigm

It is arguably possible to shoehorn more attributes into existing smart city agendas. But it might be equally or more productive to think about replacing the 'smart' designator with others which are less datacentric. One term that has been productively explored over the last 15 years is the concept of the communicative city (see Gumpert and Drucker 2008; Drucker and Gumpert 2016; McQuire and Wei 2021). Of course, cities have 'always' been centres of communication in a broad sense. We can position 'communication' as a key part of the desire for sociality that has been as fundamental to the history of urbanism as has the desire for security (the walled city) and economic prosperity (the diverse marketplace of buyers and sellers). But establishing the communicative city as a *critical* concept capable of giving insight into contemporary urbanism depends on several more specific moves:

1. Recognizing the modern city as a distinctive environment for communication, defined in part by its greater social heterogeneity and cultural complexity. This is related to the new scale and patterns of migration that has been such a crucial feature of modernity, but also to the loosening of the social frames that guide the development of personal and collective identity associated with the post-World War II era of 'reflexive modernity' (Beck et al. 1994)
2. Simultaneously recognizing that the modern city is formed at the confluence of symbolic and technological systems that define modern 'media'. In other words, the city consists not only of spaces *for* communication (such as streets and public squares) but is increasingly comprised of material elements that have distinctive communicative functions (Barns 2020; McQuire 2008).
3. While the communicative elements of the city have traditionally included material forms such as architecture and public art, urban communication practices are currently undergoing a radical mutation as contemporary cities are being recalibrated by digital infrastructure. This includes the emergence of distinctive spatially situated forms such as 'urban screens', the mass uptake of mobile communication devices using cellular and broadband networks, and the transformation of existing informational signage into dynamic, networked forms.

If we approach the deployment of urban digital infrastructure from the perspective of urban communication—where communication is understood as a sociotechnical process that is constitutive of individual and collective identity—I argue we can arrive at a better framework for utilising contemporary urban transformations than offered by the 'smart city'.

I'll try to demonstrate how a 'communicative city' approach might differ in ambition and stance from a conventional smart city approach with reference to two practical examples. The first is drawn from the city of Melbourne where I live. In 2012, as part of a project called 'Urban Forest', the Melbourne City Council gave all the trees within the central area of the city individual email addresses. The idea was that members of the public could use the addresses to report problems such as damage to a tree or a branch falling down on a road. The project adopted a classic 'smart city' approach, in which members of the public are recruited as mobile data gatherers. However, somewhat unexpectedly people started using the system to do other things. They started using the email addresses to express affection, gratitude, concern and attachment to specific trees they knew and loved. When a council officer released some of the emails to the media, the story ended up being reported all over the world. An article from the US magazine *The Atlantic* described the emails as 'love letters' (LaFrance 2015). This reporting inspired more and more messages to be sent, including from people living overseas. It eventually inspired local residents to mobilize in neighbourhood groups in order to care for trees in their area.

Why is this significant? As a smart city project, the information architecture was restricted to individuals providing 'feedback' to the city. The aim was to use members of the public as observers and mobile reporters. There was no ambition to turn individual concern into matters of shared concern. In fact, the public affect described above would have remained largely invisible if not for the unexpected publishing of selected emails as a news story. However, once this shared concern became visible through mainstream media, the project also became a forum for *enacting* a new mode of belonging to the city. Citizens could still play the 'reporting to authority' role expected of them in the smart city. But the Urban Forest example demonstrates how such projects might achieve a richer mix of objectives if designed with a different communication architecture in mind.[8]

A second example comes from the Nuage Vert (Green cloud) action which used laser projection to highlight the emission cloud from a power station in Helsinki in 2008.[9] The green outline on the emission cloud was designed to expand and shrink in

8 The Urban Forest Strategy 2012–2032 now includes more formal mechanisms for citizen and inhabitant participation, with calls to conduct 'citizen-science' mapping of urban nature, as well as a tree planting and other activities. See https://www.melbourne.vic.gov.au/community/greening-the-city/urban-forest/Pages/urban-forest.aspx Citizen participation has now been rebadged under the broader 'Participate Melbourne' portal. See https://participate.melbourne.vic.gov.au/citizenforester?_ga=2.132481678.1000083500.1678243283-888278806.1678243283.

9 Nuage Vert originally sought to project on the invisible clouds of the two incinerators that burn the rubbish of Paris. The Helsinki project went ahead after permission was refused several times to project in France, citing public safety grounds. Photographs and documentation are available at http://www.hehe.org/projets/nuage-ver-no-1-helsinki.

concert with energy use, creating a distinctive 'public data visualization' (Moere and Hill 2012) of real-time electricity consumption. This was done in conjunction with a local initiative encouraging nearby residents to 'unplug' electrical appliances during the event. The 'point' of this small-scale initiative was less the amount of energy 'saved' during the action, than the fact that the projection could be seen publicly from 10 km away. This meant that the event drew the attention of the city—and of the entire nation—to the issue of energy consumption. As a project, it also involved making new linkages—communication networks—between different actors in the urban energy economy, including the officials responsible for power generation, local residents, activists and artists, government representatives and others.

Like the Urban Forest project, Nuage Vert Helsinki is indicative of how a communicative city approach might be linked to traditional smart city operations such as energy reduction, while expanding them beyond a technocratic, optimization agenda or even a city-led information gathering and information provision agenda. These projects are not just about using digital infrastructure to do what Sassen (2011b) termed 'talking back to the city'. They represent a further stage in demonstrating the potential for urban digital infrastructure to become a means of fostering public discourse and peer-based communication among diverse groups of stakeholders and inhabitants. My contention here is that such communication is not only important in terms of public engagement and developing an informed polity, but is a critical part of developing the broad-based attitudinal and behavior changes needed to create more sustainable cities.

6 Coda: open communication or computational biopolitical security?

Following the rapid spread of Covid-19 in early 2020, governments around the world turned to digital infrastructure such as mobile phones as a key way of regulating urban population movement. This included a variety of developments such as passive contact tracking, active 'check-in' to specific sites, spot-checking of digital health records, and quarantine monitoring. For example, in March 2020, the Australian government initiated development of the CovidSafe app which used Bluetooth to collect data about the proximity of an individual user to other people (or their phones). If someone tested positive to the virus, a list of their recent 'near contacts' could be generated.[10] A number of Australian State governments also adopted

10 CovidSafe was based on the BlueTrace protocol originally developed by the Singaporean Government, and used in Singapore's Trace Together app. The CovidSafe project ran into significant

mandatory 'check-in' protocols using QR codes to create registers of all those entering locations such as workplaces, public transport, shops, cafes and bars, and so on. Other countries used variations of similar approaches. In China, citizens were often required to check-in when entering certain sites such as supermarkets and shopping malls (either manually or with QR codes) but also had to display digital health records in order to access these places. In Russia, the Moscow government developed a digital app to monitor infected citizens undergoing home-based quarantine. The Moscow Social Monitoring app required users to take a selfie at random times to prove they were isolating at home. The app gained access to the user's location, phone calls, camera and other sensors, network information, and other data, and used face-recognition technology to compare submitted selfies to an individual's profile photograph held on record.

The deployment of such systems raise many issues, including those of personal privacy. While these are important, what I want to focus on here is, firstly, how rapidly many governments were able to establish these new mechanisms for the governance of urban mobility. This revealed the fact that the digital infrastructure required for mass urban surveillance was already largely in place in many territories. The developments associated with the threshold of geomedia, namely the ubiquity of embedded and mobile digital devices, the capacity to collect and assign spatialised data at scale through GPS systems, and the distributed connectivity enabling rapid 'feedback' through the entire system, had already matured and been normalised. Governments merely had to initiate software add-ons and issue new proclamations mandating their use.

A second point concerns the fact that the normalisation of mass urban surveillance had been driven largely by the corporate sector and the operation of the 'free market'. The extent to which data about urban movement was already routinely captured by various actors such as the telecommunication service providers was revealed by the release of extensive 'mobility data' for hundreds of cities and regions around the world by Apple and Alphabet (parent company of Google).[11] As the two manufacturers holding a monopoly on nearly all the mobile phone operating systems on the planet, these companies had access to data on a scale and at a granularity that even major State actors lacked. A similar interdependency between the tech sector and the state was revealed in China, where State-initiated digital health records were deployed through popular social media apps run by Alibaba and Ten Cent.

technical difficulties and closed after less than 2 years, having identified less than 20 contacts not also identified through manual contact tracing.

11 See https://www.google.com/covid19/mobility/ and https://covid19.apple.com/mobility. Both companies stopped making the reports publicly available during 2022.

As a response to the urgency of the pandemic, at least some of these developments 'made sense'. However, considered as part of a longer historical trajectory, they point to the potential emergence of a new paradigm of urban governance, in which urban mobility is increasingly administered through digital networks. This trajectory is being sharpened by the tendency towards the use of individual biometric data, such as the measurements used in face recognition systems, to automate processes such as 'check-in'.[12]

In the lectures he gave at the C*ollege de France* in the late 1970s, Michel Foucault discussed the way that mutations in forms of power often occurred in response to crisis, including war, natural disaster and disease. In his lectures later published under the title *Security, Territory, Population*, Foucault (2007) contrasted responses to leprosy in the Middle Ages with the later treatment of plague, especially during the Great Plague of London in 1665. Responses to leprosy generally involved isolating the infected by confining them to a particular area—the so-called 'leper colony'. In contrast, plague spread too rapidly to be dealt with effectively by excluding infected individuals. Instead of removing the infected *from* the city, the interior of the city itself had to be recalibrated by inventing a new socio-spatial system of urban governance.

As was his wont, Foucault pays close attention to the way that changes in architecture and urban space proceeded in tandem with administrative and regulatory changes. He describes the way that plague controls in London initiated a new stratification and segmentation of urban space, enabling intensive regulation of inhabitant activity right down to the level of the individual private home:

> These plague regulations involve literally imposing a partitioning grid on the regions and towns struck by plague, with regulations indicating when people can go out, how, at what times, what they must do at home, what type of food they must have, prohibiting certain types of contact, requiring to present themselves to inspectors, and to open their homes to inspectors. We can say that this is a disciplinary type of system. (Foucault 2007: 10).

12 The Moscow Social monitoring app was one example which gained notoriety for its use of face recognition technology, but there were similar moves in several Australian states. South Australia introduced an app to monitor home quarantine which also used face recognition software. People were required to provide proof of their location within 15 min of contact by showing their face which was compared automatically to a registration photograph submitted previously. The app was developed by a private company, GenVis who have since expanded their offerings into what they describe as a 'G2G suite' that is employed in border management and quarantine processes, by WA police, as well the NT and Tasmanian governments. There was surprisingly little public discussion of these developments, despite Australia being a country which refused to have a national photo ID card as recently as 1985.

This new administrative system was initially experienced as a great burden—something that is described in detail by contemporary journalist and novelist Daniel Defoe (2003) writing in his famous plague journal. But, over time it hardened and was formalised into the new architectural and spatial arrangements that mesh with new forms of knowledge to become the dominant social paradigm of 'disciplinary society', famously symbolised for Foucault by Bentham's penitentiary panopticon which he adopts as the central metaphor of his book *Discipline and Punish*.

However, even as the disciplinary society was becoming dominant, a different form of power is becoming evident. Where disciplinary power was predicated on positing a binary relation between the categories of the 'normal' and the 'abnormal' established by various experts, biopolitical power involves a shift towards a more empirically-based, probabilistic calculus of risk. Again, Foucault develops this line of thought through the example of disease—in this instance smallpox, which was endemic in Europe in the eighteenth century. The management of smallpox followed a quite different set of protocols to that of plague, partly because successful preventive techniques—inoculation and eventually vaccination—emerged early on. As a result, it was no was no longer a matter of observing and containing the spread of infection but involved more detailed observation of the population as a whole. Risk began to be calculated across different groups according to factors such as age, or place of residence, with the aim of being able to determine the relative costs and benefits of intervention via vaccination. This is what Foucault (2007: 59) describes as a "typical mechanism of security". Instead of dividing people according to the pre-established 'norms' of disciplinary knowledge, empirical evidence is gathered from the population treated as a whole in order to calculate the potential risks that impact different segments. Unlike the response to plague, which involved the stratification and segmentation of urban space, Foucault (2007: 65) argues "the problem is no longer that of fixing and demarcating the territory, but of allowing circulations to take place […]".

Responses to the Covid pandemic emphasizing the mass collection and analysis of empirical data to create distributions of risk across entire populations, as well as the use of digital communication to monitor and modulate circulation, suggest that we remain firmly within the biopolitical paradigm in a broad sense. But there are major difference from the tendencies that Foucault observed beginning back in the eighteenth century. Most obviously, the techniques for collecting and analysing data using enumeration, statistical analysis and pattern discrimination, can now be implemented far more easily and efficiently than in the past. The digitization and computerization of societies that has been a central feature of the past three or four decades has created the conditions of 'data surplus' that have inspired new forms of data-intensive governance, including the smart city imaginaries of the early 2000s. A second difference is the way this digital apparatus is now being rapidly

augmented with new forms of machine learning and automated decision-making, resulting in a new system of biopolitical urban governance operating on a scale and at a speed that Foucault did not contemplate.

Automated forms of decision-making (often glossed as 'artificial intelligence') raise urgent issues for urban governance. Technology is always subject to the possibility of error, something that was made obvious by the repeated complaints about the Moscow Social Monitoring app which became notorious not just for its aggressive data capture but the fact that it simply didn't work as it was supposed to. Some users were receiving multiple demands to prove their location hour after hour, while others received fines despite having complied with requests to prove they were quarantining (see Human Rights Watch 2020). Technology is also always subject to potential misuse, something that was most dramatically demonstrated by the Cambridge Analytica use of data captured from Facebook users in breach of the platform's own regulations, resulting in the largest ever fines levied against a company for privacy infractions. But the growing use of automated decision-making to decide whether or not you can access a service or enter a space raises the new spectre of the *automation of bias*. Discussing the contemporary use of Market Value Analysis (MVA), a data-driven spatial governance technology used to guide development decisions across scores of cities in the United States over the last 20 years, Sara Safransky (2020: 201) notes "the big data and algorithms used in the MVA have built-in biases and assumptions about race, risk, and value that reflect and reproduce the historical prejudices entrenched in real-estate markets."

Problems with automated decision making, such as racial and gendered differences in access to home finance, or the higher error rates for non-white skin that affected early face recognition systems, are now well-known (see for example Noble 2018). However, there remains a lingering assumption that these are teething problems that can be 'overcome' by obtaining better datasets and developing better technology.[13] This misrecognizes the deeper issue, which stems from the fact that knowledge is not 'neutral'. Automated decision-making systems aim to be 'objective' but they inevitably build in perspectives—through choices made about names and classifications, relational hierarchies, platform architectures—that are literally 'world-making' (see Crawford and Paglen 2019)

This does not mean there is no place for digital tracking and tracing in urban life. Rather, it underlines the need for a different attitude towards the use of such

13 For instance, the industry response to problems with facial recognition has generally been to seek to establish larger scale and more diverse training sets.

infrastructure, one that goes beyond issues such as privacy, transparency and explainability, to address the need for ongoing evaluation of the ways in which automated systems *inevitably* embed hierarchies into their processes. For this reason, current calls to rethink the operation of digital urban infrastructure should not be limited to enhancing personal privacy protection (as important as this is). Rather, there is an urgent need to address more fundamental questions, beginning with questions about when it is appropriate to collect 'data', how this might occur and the process will inevitably shape both the 'data' and understanding of the problem. Adopting a communicative city framework asks us to rethink our existing models of technological deployment, and especially the assumption that just because we can collect data at historically low transaction costs, it is something we *should* do. Adopting a communicative city framework asks us to complement the emergent sustainability agenda of efficient resource use with wider ambitions based on enhancing communication and sociability, and through this, of advancing agendas such as those relating to environmental justice.

In the end, the challenge I am pointing to is not simply about enhancing 'participation' or 'public good' in existing smart city agendas, as if these are predefined and stable qualities. Rather, we have to begin thinking these relations anew, as they are recast at the intersection of very different technological systems and social settings. This requires a very different understanding of the relation between power, technology, and inhabitation than is countenanced by contemporary smart city agendas. Over the last 50 years, the 'optimization' scenarios privileged by computer science have muscled out many other understandings of the city—local knowledge, narrative understandings, even architectural knowledge—in favour of quantified data and new forms of pattern recognition. Datafication of the city has enhanced the voices of data scientists and those who employ them. It has been popular with city governments as it can be a way of 'depoliticising' decision-making.[14] A communicative city agenda in the twentyfirst century certainly needs to return us to a more people-centred framework. But this is not 'people-centred' in the way this phrase is frequently mobilized. It needs to understand how social interactions in urban spaces *work* in the era of digital urban infrastructure, where embodied interactions are also constantly mediated in various ways.

14 Safranksy (2020: 200) argues: "One reason data-driven decision making has gained popularity is because it diffuses contentious planning decisions at a time when finance capital is reorganizing the form and function of municipal governance. The value-laden choices (possibly controversial) that go into data production are rarely open to public debate."

References

Arnstein, Sherry. 1969. A ladder of citizen participation. *Journal of the American Institute of Planners* 35(4). 216–224.

Barlow, John Perry. 1996. A declaration of the independence of cyberspace. Available at: https://www.eff.org/cyberspace-independence.

Barns, Sandra. 2020. *Platform urbanism: Negotiating platform ecosystems in connected cities*. Singapore: Palgrave McMillan.

Beck, Ulrich, Giddens Anthony & Scott Lash. 1994. *Reflexive modernization: Politics, tradition and aesthetics in the modern social order*. Oxford: Polity.

Brownill, Susan & Juliet Carpenter. 2007. Increasing participation in planning: Emergent experiences of the reformed planning system in England. *Planning Practice and Research* 22(4). 619–634.

Cardullo, Paolo. & Rob Kitchin. 2019. Being a 'citizen' in the smart city: Up and down the scaffold of smart citizen participation in Dublin, Ireland. *Geojournal* 84(1). 1–13.

Castells, Manuel. 1989. *The informational city: Information technology, economic restructuring, and the urban regional process*. Oxford, UK; Cambridge, Massachusetts: Blackwell.

Castells, Manuel. 1999. Grassrooting the space of flows. *Urban Geography* 20(4). 294–302.

Cohen, Boyd. 2015. The three generations of the smart cities. Available at: https://www.fastcompany.com/3047795/the-3-generations-of-smart-cities.

Cosgrove, Michael, Kehoe Michael, De Gennaro Steven, Harrison Colin, Harthoorn Wim, Hogan John, Meegan John, Nesbitt Pam & Christina Peters. 2011. *Smart cities series: Introducing the IBM city operations and management solutions*. IBM.

Crawford, Kate & Trevor Paglen. 2019. *Excavating AI: The politics of images in machine learning training sets*. New York: The AI Now Institute. Available at: https://excavating.ai.

Defoe, Daniel. 2003. *A journal of the plague year*. London: Penguin.

Drucker, Sue & Gary Gumpert. 2016. The communicative city redux. *International Journal of Communication* 10(1). 1366–1387.

Dyson, Esther, Gilder George, Keyworth George & Alvin Toffler. 1994. Cyberspace and the American dream. A magna carta for the knowledge age. *New Perspectives Quarterly* 11. 26–37.

Falconer, Gordon & Shane Mitchell. 2012. *Smart city framework. A systematic process for enabling smart + connected communities*. CISCO. Available at: http://www.cisco.com/web/about/ac79/docs/ps/motm/Smart-City-Framework.pdf.

Foucault, Michel. 2007. In Michel Senellart (ed.), *Security territory population; lectures at the college de France 1977–1978* trans. Graham Burchell. Houndsmills & Hampshire: Palgrave MacMillan.

Gabrys, Jennifer. 2016. *Program earth: Environmental sensing technology and the making of a computational planet*. Minneapolis: University of Minnesota Press.

Greenfield, Adam. 2013. *Against the smart city*. New York: DO.

Gumpert, Gary & Sue Drucker. 2008. Communicative cities. *International Communication Gazette* 70(3–4). 195–208.

Human Rights Watch. 2020. Russia: Intrusive tracking app wrongly fines muscovites (May 21). Available at: https://www.hrw.org/news/2020/05/21/russia-intrusive-tracking-app-wrongly-fines-muscovites.

Jacobs, Jane. 1961. *The death and life of great American cities*. New York: Random House.

Jenkins, Henry. 2006. *Convergence culture: Where old and new media collide*. New York: New York University Press.

Kitchin, Rob. 2014. The real-time city? Big data and smart urbanism. *Geojournal* 79. 1–14.

LaFrance, Adrienne. 2015. When you give a tree an email address. *The Atlantic*, (July 15). Available at: https://www.theatlantic.com/technology/archive/2015/07/when-you-give-a-tree-an-email-address/398210/.

Lenin, Vladimir Ilyich. 1964. Communism is Soviet power + electrification of the whole country. In *Collected works*, vol. XXXI, 513–518. Moscow: Progress Publishers.

Luque-Ayala, Andrés & Simon Marvin. 2015. Developing a critical understanding of smart urbanism. *Urban Studies* 52(12). 2105–2116.

McQuire, Scott. 2008. *The media city: Media, architecture and urban space*. London: Sage, Theory Culture and Society.

McQuire, Scott. 2016. *Geomedia: Networked cities and the future of public space*. Cambridge: Polity Press.

Scott McQuire & Sun Wei (eds.). 2021. *Communicative cities and urban space*. London & New York: Routledge.

McQuire, Scott. 2022. The city without qualities: Inventing urban computing. *New Media & Society* 24(11). 2396–2418.

Moere, Andrew Vande & Dan Hill. 2012. Designing for the situated and public visualization of urban data. *Journal of Urban Technology* 19(2). 25–46.

Mondschein, Andrew, Zihou Zhang & Mona El Khafif. 2019. Community-centered urban sensing: Smart engaged planning and design in a dysfunctional urban context. *International Journal of E-Planning Research* 8(4). 1–16.

Noble, Safiya. 2018. *Algorithms of oppression: How search engines reinforce racism*. New York: New York University Press.

Page, Bruce. 2003. *The Murdoch archipelago*. London: Simon & Schuster.

Richardson, Rashida, Jason Schultz & Kate Crawford. 2019. Dirty data, bad predictions: How civil rights violations impact police data, predictive policing systems, and justice. *New York University Law Review* 94. 193–232.

Rosati, Umberto & Sergio Conti. 2016. What is a smart city project? An urban model or a corporate business plan? *Procedia - Social and Behavioral Sciences* 223. 968–973.

Safransky, Sara. 2020. Geographies of algorithmic violence: Redlining the smart city. *International Journal of Urban and Regional Research* 44(2). 200–218.

Sassen, Saskia. 1991. *The global city: New York, London, Tokyo*. Princeton, NJ: Princeton University Press.

Sassen, Saskia. 2011a. Open source urbanism. *New city reader #15:local*. Available at: http://www.newcityreader.net/issue15.html.

Sassen, Saskia. 2011b. Talking back to your intelligent city. Available at: http://voices.mckinseyonsociety.com/talking-back-to-your-intelligent-city/.

Schaffers, Hans, Komninos Nicos, Pallot Marc, Brigitte Trousse, Michael Nilsson & Alvaro Oliveira. 2011. Smart cities and the future internet: Towards cooperation frameworks for open innovation, In John Domingue, et al. (eds.), *The future internet. Future internet assembly 2011: Achievements and technological promises*. Berlin & Heidelberg: Springer.

Sennett, Richard. 1978. *The fall of public man: On the social psychology of capitalism*. New York: Vintage Books.

Siemens. 2008. *Pictures of the future: The magazine for research and innovation*. Erlangen: Publicis Publishing.

Smart Cities Council. 2023. Smart city index master indicators. https://www.smartcitiescouncil.com/resources/smart-city-index-master-indicators-survey.

Söderström, Ola, Till Paasche & Francisco Klauser. 2014. Smart cities as corporate storytelling. *City* 18(3). 307–320.

Staffans, Aija, Maarit Kahila-Tani, Stan Geertman, Pihla Sillanpää & Liisa Horelli. 2020. Communication-oriented and process-sensitive planning support. *International Journal of E-Planning Research (IJEPR)* 9(2). 1–20.

Townsend, Anthony. 2013. *Smart cities: Big data, civic hackers, and the quest for a new utopia*. New York: W. W. Norton.

Weiser, Mark. 1991. The computer in the 21st century. *Scientific American* (Special Issue on Communications, Computers, and Networks) (September). Available at: http://web.media.mit.edu/~anjchang/ti01/weiser-sciam91-ubicomp.pdf.

Zuboff, Shoshana. 2019. *The Age of surveillance capitalism*. New York: Public Affairs.