



Grounding Urban Data

Interview with Rob Kitchin

New Geographies: We can say that as a society we are generating, processing, transmitting, and storing massive amounts of information. However, focusing solely on the technical capabilities of new information technologies paints a limited picture of the highly charged and quite complex relationship between information and communications technologies (ICTs) and society as a whole. Perhaps another way of entering this conversation is to read the influence of this information revolution (revolutionary, both in terms of quantity and technology) on our perception of another aspect of the contemporary societal condition: urbanity. Perhaps we can start by discussing the reciprocal relationship between “big data” and urban environments. If past experiments in data-driven urban planning and design have shown us anything, it is that techno-scientific approaches to design can be problematic. They were not able to fully capture the intricacies of the urban environment. But do we have a new potential with big (urban) data for this kind of approach to observing, analyzing, conceptualizing, and constructing our built environment? Beyond theoretical discourse, what practicalities does big data afford our understanding of, and our agency in, the built environment?

Rob Kitchin: There's no doubt that big urban data does offer us a new real-time evidence base from which to understand cities. And new data analytics based on machine learning offer us new opportunities to analyze, map, and model urban environments and processes. We are now generating a phenomenal amount of structured and unstructured data about cities from satellites, aerial surveys, surveillance cameras, sensors and scanners, digital devices such as smartphones, and the interactions and transactions that take place over networked systems relating to consumption, production, travel, social engagement, and so on. Advances in computational power and analytical techniques mean it is evermore possible to store, link, and extract information from these data. And we're only really at the beginning of this era of big urban data. Over time, the flows of data will increase further, and the techniques for making sense of them will advance. That said, cities are incredibly complex, open systems made up of a multitude of diverse, interconnected systems that stretch out across the globe in terms of flows of goods and services. They are embedded in urban hierarchies. They are affected by structural forces and political and business decisions made in a multitude of places.

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They are full of millions of people who act in all kinds of ways and are thoroughly infused with culture, history, and politics. Even with more data, new analytics, and enhanced computation, it is therefore very difficult to create robust models of city development, and even more difficult to translate these contextually into policy.

I thus worry when people make pronouncements about how big data and associated models offer a better way forward for knowing and managing cities. Built within these claims is an assumption that big data and the models built on them will ultimately let us divine the truth of cities. Moreover, as the data will speak for themselves and the models will be built through machine learning, how to understand and run cities will manifest itself largely without the need for any deep domain knowledge about cities—their history, their politics and culture, their political economy, their inequalities and tensions and battles, their modes of governance, their environment. This condition promotes particular forms of knowledge about cities, that is, epistemic (scientific knowledge) and technical (practical instrumental knowledge), which work to marginalize and replace phronesis (knowledge derived from practice and deliberation) and metis (knowledge based on experience). Hard facts and models trump other kinds of knowing, and undermine and displace other scientific forms of urban knowledge that are less systematic and continuous, such as policy analysis, interviews, focus groups, surveys, etc. So as a new form of knowledge is developed, other forms are potentially sidelined. That, I think, will be to our detriment, because for all the hoopla about big urban data and urban science, it has numerous limitations, including methodological and technical shortcomings and data quality issues. I would prefer to think about big urban data as complementing—not replacing—other urban knowledges. It's not necessarily better: it offers another perspective.

NG: So much has been said about smart cities recently. How do you define the concept of a “smart” city? What opportunities does this emerging concept present for our current urban condition?

RK: What is interesting to me about the term “smart city” is that it is open to multiple interpretations. For some, a smart city is one that is instrumented; that is, computation is built into the very fabric of the city, so that its data flows can be monitored in real time and it can be programmed to respond in real time. So, for example, in an intelligent transport system, data about traffic is fed back from cameras, sensors, and transponders located across the system and used to alter traffic light sequencing or dynamically change speed signs. For others, a smart city is one that uses information and communication technologies to foster creativity, innovation, productivity, competitiveness, and governance, enhancing human capital and quality of life in order to grow the indigenous economy and attract inward investment.

In both cases, the use of ICTs is central, so a shorthand way of defining a smart city is that it is one that uses ICTs to augment, enhance, and reconfigure its social, economic, and governance systems. The opportunities that the smart city presents are gains in efficiency, effectiveness, productivity, safety, security, creativity, participation, transparency, and accountability in governance. Of course, the smart city also comes with a number of concerns, including technocratic governance, increased surveillance, erosion of privacy, social sorting, anticipatory governance, control creep, buggy and hackable city systems, and widening social inequalities. The challenge facing networked urbanism is to get the balance right between the positives and the negatives.

NG: We have arguably entered an age of real-time information. But are we getting closer to a conception of real-time cities? Can you elaborate on the role of real-time analytics

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in the monitoring and management of cities? How do you see these practices evolving as the gap between monitoring and action is increasingly shortened through big data urban applications?

RK: In many cases we are already in the age of real-time cities. Big urban data is flowing into control rooms related to transportation infrastructures (road system, public transit), utilities (energy, water), and the environment (sensors monitoring pollution, water levels, noise levels, land movement, etc.). Public service delivery data is increasingly being captured through management systems in use in city departments, public administration databases, social media, and crowdsourcing apps that enable citizens to report issues to city officials. These are complemented by a range of data outputted on a short temporal scale (weekly, monthly, and quarterly) that provides a set of urban indicators for measuring city performance. Together, these data provide a wealth of information about the city that is increasingly used in city management.

In general terms, this use of real-time data happens in two ways. Some municipalities use it to underpin forms of new managerialism—to explicitly guide operational practices and policy formulation. In these cases, the data is reviewed in weekly meetings to assess performance of city service units and managers, reward those meeting and exceeding targets, discipline those underachieving, and guide new strategies, policy, and budgeting. In other cases, such data is used in a more descriptive way, to complement a variety of information derived from other sources. Here, governance is seen as complex and multilevel in nature and not easily captured or steered through data levers.

The way I see big data urban governance developing, if the present trajectory continues, is first, through an attempt to integrate various data silos into centralized facilities. This will enable data to be conjoined. Second, I see it developing through city operating systems that manage and control city services through a single, coordinated platform (much like the ERP systems used by companies to coordinate activities across multiple domains). Third, I think more and more city services will be layered into these city operating systems, which will increasingly become the means by which city workers' performance will be evaluated (and city workers disciplined): it will thus deepen the extent of the emerging audit society. Fourth, these systems will act as a means of disciplining citizens through forms of automated management—autonomous, automatic, and automated means of regulating and socially sorting citizens based on their actions having been surveilled and then evaluated by software. The relationship between ICTs and governance has prefigured this trajectory in countries such as the United Kingdom and the United States during the past twenty years, driven by discourses of safety, security, productivity, efficiency, and transparency, and there is a strong path dependency that I think will be difficult to redirect. However, the extent to which systems actually improve in efficiency and effectiveness, I believe, will be highly variable. The history of IT management systems to date reveals a patchy rate of success in anticipated gains, as well as many unanticipated outcomes.

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NG: Smart urbanism, enabled by big data, is increasingly portrayed as a new urban future inherently devoid of the political ideologies that have influenced cities in the past. What challenges can you identify in such a conception? Are smart city projects inherently apolitical, efficient, sustainable, and transparent? Can smart cities create more direct participation and collaboration between citizens and local government?

RK: I do find it odd, the way in which smart city developments are often positioned as pragmatic, commonsensical, and non-ideological. Many academics (especially those working on technical developments) frame their work in purely scientific, technical,

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and pragmatic terms. Businesses aim at presenting their initiatives as inclusive and neutral, as if they did not have a vested interest in, or are not involved in lobbying around, issues such as deregulation, privatization, or other urban policies. The politics of smart cities, and the potentially negative consequences, are either ignored or summarily dismissed as halting progress. Yet, as I've already elaborated, the smart city is far from apolitical and non-ideological: it is infused with politics, and with a certain vision of how cities will be managed and run in the future.

There has been some pushback against this apolitical positioning by critical academics, city managers, and citizens, who would like to make explicit and even reimagine the politics of smart cities. The result has been a move within the discourse to highlight ideas of citizen empowerment and participation. On one level this is positive, encouraging more citizen engagement around smart city developments. On another level, the rhetoric is being absorbed into the discourse without altering the underlying structural processes at work. So, for example, there are moves to open data, run hackathons, and conduct citizen consultation, yet the thrust of neoliberal reforms and technocratic governance are not being deflected. In other words, you can now get open data that shows you how the health system is being privatized, you can now create your own apps that tell citizens about the city, but you are still being surveilled and the data is still being used to discipline and socially sort you. You can take part in roundtables about city developments, but the dominant drivers of urban development are still capitalist interests. In other words, the danger is that citizens are given the perception that they are recasting the smart city, whereas in reality they are operating at one scale when the key decisions and processes are operating at another. That's not to dismiss attempts to reimagine smart cities or to create more direct participation and collaboration between citizens and local governments, but only to acknowledge that there are many powerful interests at play in this space.

NG: Given the current wave of privatization of urban command and control systems by multinational IT companies (such as IBM), how do we begin to read the emerging confluence of power and knowledge? Can we say we are entering a new age of neoliberal power/knowledge nexus?

RK: I think the first thing to say here is that urban command and control centers are not yet being fully privatized, though they might be in the future. At present, what I think is happening is that cities are entering into public-private partnerships where companies sell or license urban operating systems, which are then staffed and run by city officials (although they might be serviced and maintained by the company). If cities want such operating systems, they have no alternative but to enter into this partnership: cities do not possess the staff or the skill sets to develop such systems for themselves. This means, however, that private companies are becoming more involved in running and maintaining critical city infrastructure. Over time I imagine there will be pressure to start to outsource the staffing and running of the systems, as has happened with other city services. For example, in countries such as the United Kingdom, much transport and utilities provisions have been privatized, as have large chunks of services such as education, health, security, prisons, etc. This is very clearly part of a neoliberal drive to hollow out the state, turning it into an agency that manages contracts on behalf of cities and citizens rather than delivers services. To my mind, this raises all kinds of questions around the shifting power/knowledge of cities, especially given that whoever controls big urban data gains an enormous bank of information that enables them to intervene in city governance in a variety of ways that might ultimately benefit themselves. It also means that critical infrastructure is being run for profit, not for the public

good, the danger there being that the quality and distribution of such infrastructure might become uneven and unequal, in line with the ability to pay and the possibilities of leveraging further profit, thus deepening sociospatial inequalities. Critical commentators have homed in on these aspect of smart cities, but there is much more work to be done to understand how the political economy of cities is being affected by smart city efforts.

NG: Given the focus of civic command and control systems on security (Rio de Janeiro's, for example, which emphasizes environmental resiliency, anti-terrorism, and the accident-proofing of urban infrastructures) and also the emerging politics of information in the twenty-first century (exemplified by the direct access of government institutions like the U.S. National Security Agency and the UK's Government Communications Headquarters to every aspect of their citizens' lives), how imminent are the threats of surveillance and militarization in the civic space?

RK: I think concerns about the surveillance and militarization of civic and domestic space are absolutely warranted. Vast quantities of data about cities and citizens are being generated daily and used for all kinds of purposes that affect people directly and indirectly. We are coming to live in an age where we are no longer lost in the crowd; our movements, interactions, and transactions are being tracked and traced by various public and private entities. While this data remains mostly in silos (and thus the trails remain disjointed), they are evermore being combined through data aggregators, mined for insights, and used to draw conclusions about people and segment services. Legal provisions concerning data generation and protection are struggling to adapt to the quickly changing terrain. And as the WikiLeaks and Snowden revelations exposed, national governments are at the forefront of mass spying on citizens without their knowledge.

In states with weak forms of democracy, the technologies of the smart city pose many potential concerns to the freedoms and rights of citizens. Interconnected and flattened city systems that can track and trace individuals—through monitoring the locations of their phones (sensing their MAC address), their vehicles (using automatic plate number recognition), their faces (using facial recognition software linked to CCTV), their interactions (their email and phone records), their social media, their household consumption (using smart metering), and so on—open up the potential for an Orwellian-style panopticon. Taken to their logical conclusion, they form the perfect sociotechnical assemblage for a totalitarian state: an all-seeing, all-tracking, all-reacting system that stifles dissent before it has chance to organize. And while governments and companies may reject such an assessment as alarmist or overblown—arguing that they are only trying to improve cities and their economy, transportation, environment, safety, security, and so on for all citizens, mainly using anonymous data or metadata—the empirical evidence reveals that as such technologies are being deployed and massive amounts of data are being generated and conjoined, privacy is being eroded, people are being predictively profiled and socially sorted, software-enabled governance is becoming more routinized and pervasive, and inequalities are widening. I don't think we should lose sight of these issues. Yes, smart city technologies can potentially improve the lives of citizens, but they can also do this in remarkably uneven, unequal, and discriminatory ways, depending upon how those technologies are deployed.

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NG: Would you expand on your previous answer and elaborate on the contemporary confidence in democratic and bottom-up social organizations, ranging from grassroots disaster relief to political uprisings? Where do you see the power of public organizations when their intelligence is founded on privatized information platforms and infrastructures?

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RK: One has to believe, I think, in the power of democracy and the activism and advocacy of citizens and community organizations to act as a counterweight to statist and corporate power in the age of the smart city. Smart technologies may be tools of control and profit, but they are also the tools of resistance, transgression, and freedom. As tools, technologies can be wielded by many and used and re-appropriated in all kinds of ways. And, yes, the power to act in the city might be asymmetrical and divided, and this could become more imbalanced given who owns and controls the technologies, but events such as the Arab Spring and the civil organizing that took place during Hurricane Sandy show how democracy and the public good, by deploying ICTs, can quickly rise up and make a difference, even if they are closed down afterward.

As I've already noted, however, the danger is that citizen engagement and grassroots organizing forms a relatively weak or moribund counterweight to the deep-rooted structural changes taking place with respect to how states and cities are organized and run. Although rolled out as examples of bottom-up citizen participation and democracy, the fundamental changes occur in a different register. In this sense, I do think that those who are concerned about the political ideology and processes at work in many smart city visions need their counterarguments to work at different levels. It is not simply enough to demand open data; it needs to be accompanied by political work around data protection and security, how data is being generated and used, and the political ideology of the neoliberal city. This, I think, is important work in reimagining and recasting what a smart city is and how it can be developed and deployed.

Indeed, I'm not against smart cities per se: clearly networked urbanism has much to offer in terms of aiding how cities are managed, providing solutions to issues such as energy usage and traffic congestion. And they do provide new opportunities for innovation, entrepreneurship, and economic development. But I do think we need to be careful in how we go about creating smart cities. Often the smart city vision is presented as a *fait accompli*, as if how it is currently unfolding is the only, or most logical, or most reasonable, form—that there's a certain immutable path dependency in operation—rather than the vision and ideology underpinning smart city developments being entirely mutable and open to being reconfigured by design decisions, laws and regulations, and so on in line with public opinion. This, I think, is the challenge of creating smart cities, to build them so that they best serve the common good and not simply the market ambitions of companies or the control desires of states.

And that is a big challenge, when technological development and its rolling out and embedding into society is happening so quickly, with the changes new technologies bring rapidly becoming the new norm. Think, for example, about smartphones and how they have become ubiquitous in a very short space of time and, in so doing, how they have reconfigured notions of privacy. The pace of change is such that there isn't sufficient time for reflection and consideration as to their pros and cons. Policy response has become reactive rather than proactive. Somehow we have to find a way to become more proactive, to create smart cities that maximize the benefits while minimizing the negatives.

