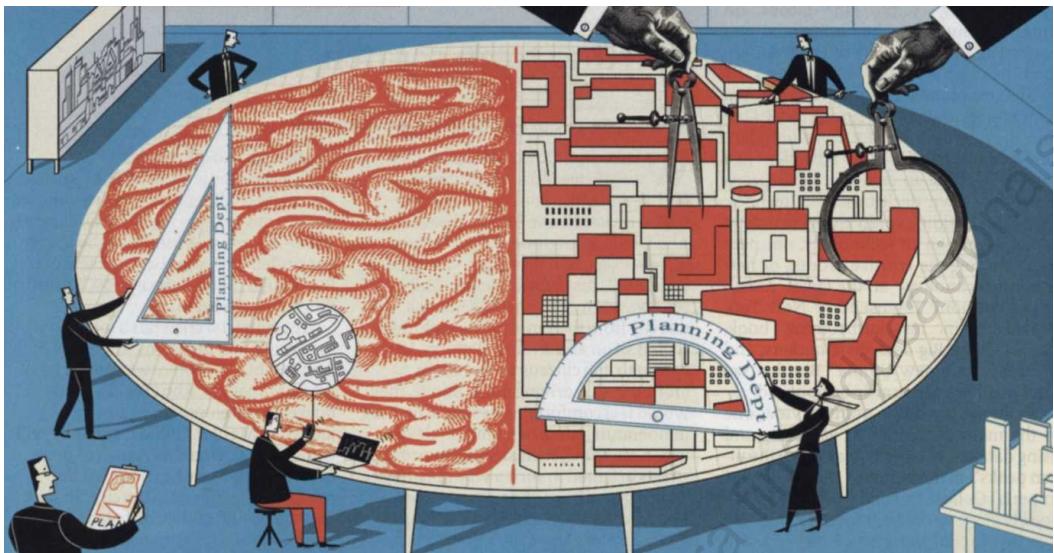


The multiplexed metropolis

Enthusiasts think that data services can change cities in this century as much as electricity did in the last one. They are a long way from proving their case



Even thieves, it seems, now have a smartphone app. Makkie Klauwe (it means something like "easy pickings" in Amsterdam slang) reveals the city's best places for pilfering—for instance Reestraat and Tuinstraat, where bicycles appear to be a good target. The app depends for its dark arts on pulling together publicly available data on disposable income, crime levels and other problems reported in a district. A good place to steal might, for instance, have high income, low reported crime and broken streetlights.

Luckily for Amsterdam's citizens and tourists, Makkie Klauwe does not exist. Bram Fritz, a graphic-design student, thought it up for an app contest the city held in 2011 (it won first prize in the "safety" category). Although he says he might write the app one day, the main aim was to kindle a debate over the ever greater amount of easily available data that can change urban life. "I wanted to confront citizens with what could become a threat to their property," explains Mr Fritz.

As they go about their business of producing most of the world's wealth, novelty and human interaction, cities also produce a vast amount of data. The people who run cities are ever more keen on putting those data to work. Hardly a week passes without a mayor somewhere in the world unveiling a "smart-city" project—often at one of the many conferences hailing the concept. In August China announced such a programme, this one spread around nine pilot sites across the country. Earlier this year Kenya's then president, Mwai Kibaki, broke ground on Konza Techno City outside Nairobi.

City bytes

Academics like Ricky Burdett of the London School of Economics (LSE) see integrated systems for collecting, processing and acting on data as offering a "second electrification" to the world's metropolises. The power cables that penetrated cities in the late 19th century transformed their shape (there are no tall buildings without lifts), their transit systems, their nightlife, their sewerage (cities need a lot of pumps). Ubiquitous data services might have impacts as wide-ranging: they could make cities more liveable, more efficient, more sustainable, perhaps more democratic. In an era of mass urbanisation—the United Nations expects the number of city dwellers to reach 6.3 billion by 2050, as many people as there were on the planet ten years ago—that could matter a lot.

But clever cities will not necessarily be better ones. Rather than becoming paragons of democracy, they could turn into electronic panopticons in which everybody is constantly watched. They could be paralysed by hackers, or by bugs in labyrinthine software. They could furnish new ways to exclude the poor. They might even put at risk the serendipity that makes cities such creative places, argues Richard Sennett, a sociologist at the LSE, making them "stupefying" instead.

These divergent views about the cities of the 21st century recall the "planners versus people" polarisation of the 20th. Some planners, echoing the architect Le Corbusier's dictum that "a house is a machine for living in", saw cities as assemblages of such machinery—factories for life, as it were—which would benefit from central planning, uniformity and lots of concrete. Le Corbusier himself suggested a "Plan Voisin" that would have given a big chunk of central Paris over to vast cruciform towers arrayed with such regularity as to make Baron Haussmann's boulevards look higgledy-piggledy.

Critics of the taste for the totalitarian embodied in such plans—and put into practice all over the world, on a less epic scale, as cities were rebuilt around the needs of the car—abhorred such top-down imposition. "Cities have the capability of providing something for everybody, only because, and only when, they are created by everybody," wrote Jane Jacobs, an American author, in her influential 1961 book "The Death and Life of Great American Cities".

The use of data in cities pits top-down against bottom-up in a similar way. One side stresses the need for citywide planning and control, the other advocates just providing access to data that lets citizens make their own decisions. "The technology giants building smart cities are mostly paying attention to technology, not people...ignoring the creative process of harnessing technology at the grass roots," writes Anthony Townsend of New York University in his forthcoming book, "Smart Cities: Big data, civic hackers, and the quest for a new Utopia". But the two sides need not necessarily be opposed.

From the top-down point of view, one of the main attractions of gathering and using data about cities is "flattening the urban peaks", in the words of David Gann of Imperial College in London, who chairs a board set up to develop ideas for making Britain's capital work more cleverly. If a mixture of the right data and the right policies and interventions can make the morning traffic run more smoothly, or spread out the evening peak in energy use, cities could do more with less.

Shouting fire in a crowded town

Engineers dream of a digital nervous system that captures data from every nook and cranny: from sewers, parking spaces, school thermostats, cameras designed to show how many windows have lights turned on behind them, and so on. Powerful computers then crunch the data, optimise operations and tell the authorities about incipient problems. It is a notion of control happily abetted by technology companies that want to sell components and services: "Unlocking a one trillion dollar opportunity" was the tagline of a smart-city workshop in Singapore earlier this year.

Proponents claim that the right tools, properly hooked up, would allow a new level of integrated response. A fire alarm would not simply call out fire engines: it could determine their best route, redirect traffic away from it, warn downwind schools to close their windows and make sure that there were no nearby water mains shut down for maintenance. The strains of big events—whether anticipated, like a sports festival, or unlooked for, like a flood—could be predicted and planned for.

Some want to build the sort of data networks necessary for this into new cities from the start (see box). With existing cities they need to be stuck on piecemeal. Stockholm and Singapore have developed sophisticated toll-road systems to manage traffic. Barcelona, one of the few big cities to have a powerful chief information officer, has a plan for "intelligent" lamposts along its avenues, starting with the Passeig de Gràcia. They will be able to spot things like free

parking spaces, queues in front of museums, full rubbish bins and even suspicious movements of people.

Although many such systems are supposed to work automatically, it is a rare smart-city project that does not aspire to a NASA-style control room filled with electronics, earnestness and a sense of the future. In Rio de Janeiro, for instance, dozens of operators from 30 different departments sit in front of a wall of screens showing images from some of the 400 CCTV cameras placed throughout the city, as well as weather data and police reports. The hope is that the system will help Rio manage the crowds during next year's football World Cup and the 2016 Olympics.

From the bottom-up view, the control room is a smartphone. Devices that know where they are have allowed enthusiasts to build all kinds of new applications such as Foursquare, an app which lets users signal their location to friends. These come into their own in the dense social worlds of cities. Both activists with political agendas and companies wanting to make money off services have been pestering city governments, among other bodies, to make more and more of their data available for all sorts of purposes, with smartphone apps in pride of place.

They have had some success. New York's NYC OpenData offers the public more than 1,000 sets of data, from a list of requests to clean graffiti to results from health inspections. The website of San Francisco, another open-data pioneer, features dozens of apps, locating everything from parking spaces and playgrounds to registered sex offenders. Such inventiveness is not restricted to rich countries. A Bangalore start-up called Mapunity is using data from street cameras, phone networks and city buses to provide drivers with timely traffic information.

Some cities hold "data dives" at which activists and experts in analytic technique pore over data from diverse sources looking for fruitful new ways to combine them. Others hold competitions, like the one which commended Makkie Klauwe. But this enthusiasm has rarely, so far, translated into game-changing success: except in the area of public transport, few apps using open data have made the jump from interesting novelty to reliable consumer service. Venture capitalists have not proved very enthusiastic about them; many developers have given up. The data provided by cities may be free, but they are often poorly formatted or lacking in necessary metadata—such as details of location. Commercial data cost money.

But if bottom-up approaches have their problems, so too do those that come from the top. Many cities lack the necessary resources for the more ambitious dreams of city planners. Companies such as Cisco, IBM and Siemens are all eager to sell them systems. "None has met its revenue targets," says a smart-city expert at a big consultancy. A new "infrastructure and cities" division at Siemens has the lowest profit margin of all of Siemens's big businesses.

Those cities which do have the cash often do not spend it. With little experience in making such purchases they can be cautious about big bets. And however worthy it is, an initiative that benefits many departments but is to be paid for by only one will often fall by the wayside, says Léan Doody of Arup, a consultancy.

Political culture matters too. Barcelona favours strong independent leadership. Amsterdam, with a topographically appropriate preference for flat hierarchies, has eschewed a dedicated department and master plan, preferring projects to filter up. There is more than one way to be a smart city just as there was more than one way to get electrified. Late-19th-century Chicago was lit up by entrepreneurs. In Berlin political and business groups came together to build a centralised power grid. London muddled along in a mess of fragmented authorities and vested interests: in 1913 it had 65 electrical utilities using 49 different standards for their supply.

Data deferred

London eventually caught up, and obstacles to implementing intelligent systems for cities will probably fall away over time, too. The importance of political culture, though, will remain.

Even leaving aside the requirements of police forces, one of the things any system improving the efficiency of a city has to keep tabs on is its citizens. Wireless networks already allow cities to track the flow of people and their communications in real time. In the Chinese city of Chongqing, in Dubai and elsewhere CCTV cameras keep a watchful eye on practically every street corner. Every car that enters central London is logged by the congestion-charging system.

Policymakers and academics have begun to think about how to mitigate the risks this poses. Nick Leon, head of service design at the Royal College of Art, argues that developers of smart-city services should, like architects, be accredited. Irving Wladawsky-Berger, a former IBM executive now at the Centre for Urban Science and Progress in New York, suggests that cities learn from health care or the keepers of national archives about rules and norms for privacy. Saskia Sassen, a sociologist at Columbia University, takes a more radical line. She wants cities to open their software kimonos: "All of our computerised systems should become transparent. The city would become literally a publicly shared domain."

Political choices of this sort will influence technological choices. Many of the people actually setting up information systems for cities see their job as providing a platform—something like a computer operating system (think Windows) or a shared web service (think Facebook)—for which other people can write applications and services. Some operating systems, such as iOS, which runs Apple's phones and tablets, are "walled gardens" that constrain what app-makers can offer. Its rival Android, developed by Google, is more open to developers. Some platforms offer almost everything a user needs without any additions; much of what most people want to do on Facebook can be done with no extra apps. Others are bare-bone affairs that need third-party bells and whistles.

Tim O'Reilly, one of the IT industry's more thoughtful gurus, talks of a future in which government itself is best seen as a platform. If that is the way things are headed, cities may be in the van. City governments could provide basic services such as environmental and traffic information, a citywide payment system along the lines of those now often used for mass transit and firewalls to keep users safe from hackers and other digital mischief-makers—and let citizens and companies use them to build their own offerings. But the balance between what the city provides and what is sorted out by the citizens and the companies they do business with will differ from place to place.

And that variety should, in itself, act as a safeguard against dystopia. One of the great things about cities is that they can and do compete with each other. In most countries people have at least some choice as to which city to live and do business in. The quality of the information platform a city offers will increasingly become a factor in those choices. Future cities may seek to control their internal flows of goods, services and even citizens. They will not be able to stop a run for the exits.



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