Chapter 9
Who's Smart? Whose City? The Sociopolitics of Urban Intelligence

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Abstract Visions of the "smart city" are becoming reality, translated from the realm of concepts into actual urban space. Proponents of smart city technologies invoke their potential to free us from the drudgery of urban life and solve our environmental problems. But can "smart cities" save us? There has been long-standing resistance to the scientific, positivist basis for planning. What happens when intelligent plans encounter messy politics, social systems, and divergent scales of urban governance? This paper explores the promises of "smart cities" and their stated rationale, and grounds a review of theoretical paradigms with new empirical research in Singapore and London. I present two key findings: First, there is no one "smart city," even *within* a city. Second, differences in scales and ideologies of urban governance *across* cities have significant impact on the way that actors frame their priorities and objectives around the role of urban technologies. Finally, I speculate on the ways that urban networked systems might enable and empower a transformative planning.

1 Introduction

Visions of a kind of technology-infused "smart city" are becoming reality, translated from the realm of concepts into actual urban space. In Singapore, real-time flood sensors give updates on water levels in rivers and reservoirs; in London, an "intelligent" video system automates congestion toll collection; and in Rio de Janeiro, an integrated city management system is being set up to monitor and predict everything from landslides to traffic. Scholars, engineers, urban designers, city leaders, and corporate executives alike invoke the promise of digitally networked urban technologies such as these to free us from the drudgery of urban life

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and solve our environmental problems (see, for example, Batty et al. 2012; Mitchell 1995, 2003; Ratti and Townsend 2011; Townsend 2013).

And yet, alongside the rhetoric of real-time, intelligent measurement, control, and management of this urban future, we confront daily reminders of the *lack* of control in cities. Cities increasingly exhibit economic, social, and spatial stratification (Goldsmith and Blakely 2010), with more and more urban residents living and working in substandard conditions (Garau et al. 2005; UN Habitat 2003). Disasters, "natural" or otherwise, expose the dysfunction of urban infrastructure—levees in New Orleans, flood channels in Jakarta, factories in Bangladesh, nuclear power plants in Fukushima, and commuter trains in New York City. In 2011 urban centers around the world erupted both in organized protest and violent riots (Castells 2012; Wasik 2012).

To what extent has the implementation of such "smart city" technologies fulfilled their promises? And what can we learn from the competing views of such urban interventions, especially as they hit the ground? In this chapter I explore the promises of "smart cities" and their stated rationale—specifically the vision of digitally networked urban space that has captured the attention of scholars and urban managers alike. I review two competing paradigms on scientific measurement of cities and the potential of urban technological systems, and situate the theoretical discussion with new empirical research in Singapore and London. The two cases explore the space between the advocacy of technology companies, and the reality checks of urban managers. I close by speculating on a way in which such technologies might prove transformative.

2 Corporate Digital Urbanism

Technology and infrastructure companies like IBM, Cisco, and Siemens vie for the attention of city governments. They promise similar results, with important distinctions. IBM emphasizes its extensive history in computing systems. The company embraces the idea of the city as a "system of systems" in its "Smarter Cities" initiative, and urges cities to pay attention to what IBM considers to be the six interconnected core systems of a city—people, business, transport, communication, water, and energy (Dirks and Keeling 2009). IBM's Rio Operations Center epitomizes this focus on systems, attempting to monitor and analyze information on weather, hydrology, and traffic in real-time (Fig. 1). Cisco's "Smart+Connected Communities" program builds on its core expertise in networking equipment and emphasizes the company's history of "translating" across different systems and networks, enabling the extensive interconnectivity we experience today. "Everything will be connected, intelligent, and green," proclaims (Cisco 2010, 2), a vision it is trying to realize in Songdo, Korea's self-proclaimed "City of the Future" (Fig. 2). Siemens (n.d.), an engineering and electronics company, stresses that it is not just the digital network but also its connection to the city's physical infrastructure, actual places and things, that is critical. The company touts its expertise in

Fig. 1 IBM control room in Rio de Janeiro. (Photograph by IBM)

Fig. 2 Songdo, a flagship "smart city" project involving Cisco, is Korea's self-proclaimed "city of the future." (KOREA Magazine)

building automation, transportation infrastructure, and utility grids. In Siemens' Crystal center in London, exhibits demonstrate physical changes in cities in response to desired economic and environmental outcomes (Figs. 3 and 4).

While emphasizing their specific core business focus, each of these companies brings up almost identical themes about the contemporary global and urban condition. Each cites the well-worn expression that "more than half the world's population lives in urban areas," as well as burgeoning environmental crises. They all proclaim the arrival of advanced technologies that now enable measurement of a city's "exact conditions" (Dirks and Keeling 2009, 12; see also Cisco 2010; Siemens 2011).

The motivations of these companies to launch these city-centered initiatives are evidently centered on potential profits. But why now? It has long been argued that information and communications technologies, along with transportation infrastructure, have propelled decentralization, leading to a "post-city age" (Webber 1968; see also Fishman 1987). But, even as explanations of the post-World War II shift out of (U.S.) cities was solidifying in both the sprawling suburbs and in scholars' thinking, others like Harvey (1989) and Zukin (1982) have noted the continuation of increasingly privatized and selective investment in specific places in central city areas in the 1970s. The shift seems not so much in a singular spatial direction, but in methods and arenas of expansion and investment. The shifting grounds and modes of urban growth and capital investment reflect Harvey's (1985)

Fig. 3 Exploring interdependent elements of a sustainable city at the Siemens Crystal in London. (Photograph by author)

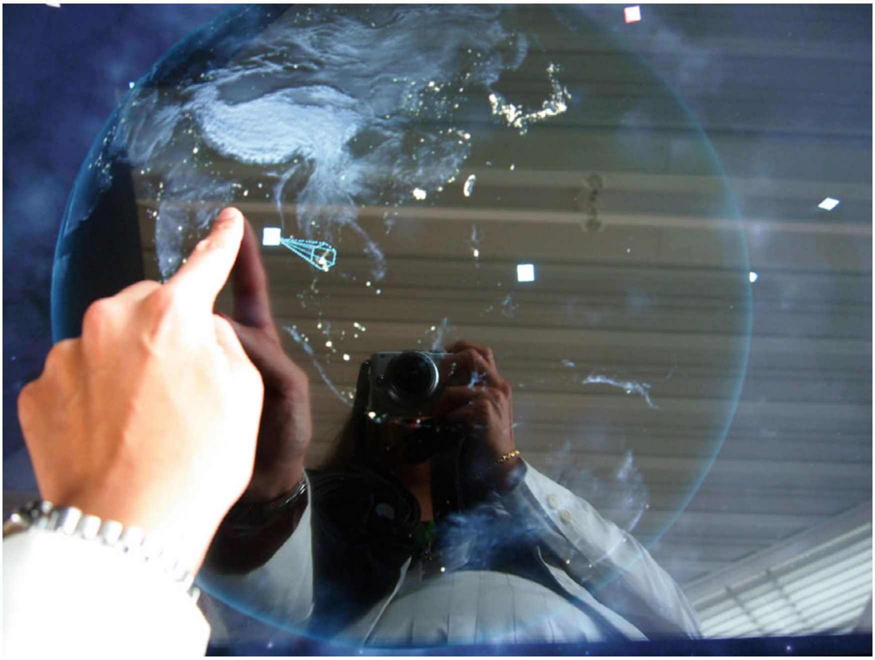

Fig. 4 Controlling the world and its cities with a flick of a finger at the Siemens Crystal in London. (Photograph by author)

assertion of the relationship between processes of urbanization and capitalist accumulation. The idea of the relationship between technology companies' urban focus and the search for new markets is concretely illustrated in Paroutis et al. (2014) study of IBM's business strategy during the 2008 recession.

Today, industry analysts, economists, and planners share optimism about the aligned future of markets and cities. A New York Times article on IBM's activities in Rio cites an estimate that the "smart" urban systems market will reach $57 billion by 2014 (Singer 2012). Economist Glaeser's (2012) embrace of urban density and height proposes that a de-regulated city would enable wealth, sustainability, health, happiness, and *intelligence*. Planner and architect Chakrabarti's (2013) "manifesto for urban America" details how design for "hyperdensification" can result in prosperity and sustainability. These themes are consistent with what is increasingly being viewed as the "urban age" (Burdett and Sudjic 2007; Brenner and Schmid 2014), when discourses of global social and environmental challenges *and* the opportunities for solutions are channeled by and through the continued growth of large urban centers.

While "smart cities" may be relatively new, the premise of being able to measure, know, and plan societal advancement extends a long lineage of justifications behind urban planning. Friedmann (1987, 67) details the evolution of a scientifically based notion of planning, beginning with Saint-Simon's vision of the scientists and engineers who would "observe and measure" the laws behind society in order to plan its progress. This positivist worldview underpins what Hall (2002) charts as the embracement of scientific analysis, monitoring, and control in professional planning in the 1960s. During this time, technological advances, including computerized data processing, and the idea of cities as complex systems, brought on new methods of planning, including modeling and predictions. A recent theoretical paper on "smart cities," written by IBM employees (Harrison and Donnelly 2011), appeals to these notions of the city as a system, invoking classic works by Jacobs (1961), Forrester (1974), and Alexander (1965). In fact, the references to the not-so-distant past may reflect lessons not learned. Goodspeed (2015) exposes the similarities between the current wave of technology companies' efforts to measure and optimize the city and the urban cybernetic theories of the 60s and 70s.

And today, confronting global urbanization and environmental crises (precisely the themes cited by technology companies), the call for the scientific, quantitative measuring of everything from the scale of the city to its impacts on the planet is as strong as ever (see, for example, Rosenzweig et al. 2010; Solecki et al. 2013).

It is important to note that there has been long-standing resistance to this scientific, positivist basis for planning. Rittel and Webber (1973, 158) warn of the inherent problems of an "idealized" planning system always on the search for "instruments of perfectability." What happens when the most intelligent plans and systems encounter "wicked problems" characterized by messy politics, stubborn social systems, and divergent scales of urban governance, geography, and ecology? And Friedmann (1987, 60) asserts the "illusion" of planners attempting to "build" a society like engineers build a bridge, and contrasts this scientific mode of thought with the planning traditions of "social learning" and "social mobilization." The decades since have been witness to both the explosion and fragmentation of post-positivist planning theories (Allmendinger 2002). Considerations of the role of technology in planning have followed alongside. Klosterman (1997), for example, builds on the communications view of planning to detail a vision of collective planning via information technologies.

3 Two Paradigms for the Smart City

The definition of the "smart city" is much contested (Hollands 2008). One prevalent definition—embraced by a broad constituency of technology companies, urban planners and designers, engineers, and city managers—is premised on the notion of an urban space threaded with digitally networked infrastructures, services, and devices, brought on by the pervasive increase in information and communication technologies (ICT) in the last thirty years. In this paper I explore the potential and drawbacks of these systems by looking to two specific diverging viewpoints—one a critical view concerned about aspects of power, epitomized by Manuel Castells' research on technology and society, and the other a more hopeful idea of digitally-supported liberation, perhaps best attributed to William Mitchell's writings and projects. These two theorists provide the bounds of possibilities, defined by macro level critique on one end, and a largely acritical embrace of technological potential on the other. Considering both together illuminates the conceptual terrain on which new "smart city" projects are enacted.

Castells (1989/1991) provides a critical analysis of the interrelationship of new technologies and the social structure in which such technologies arise, in particular, the spatial and social reorganization that accompanies the "informational mode" of development. In explaining the patterns of socioeconomic concentrating and dispersal that accompanies new information technologies, Castells coins the "space of flows," the "placeless" organizational space that enables the interaction between placed-based command operations and distributed services and production activities (Castells 1989/1991, 170). For Castells, the increasingly dominant nature of the space of flows brings on urban spatial and social differentiation, an unequal "dual city" (Castells 1989/1991, 172).

Castells (1996/2000) then exposes the contradictions in a "network society" between globally and instrumentally integrated informational technologies, and the emerging of locally specific actions based on primary sociocultural identities, creating oppositions between the internet and the "self." For Castells, "when the Net switches off the self, the self… constructs its meaning without global, instrumental reference" (Castells 1996/2000, 24). In elaborating on the "dual city," Castells traces differentiation not only within urban spaces but also across them, a global, striated system of connection and disconnection.

Mitchell (1995), in contrast, offers a prescient and generally optimistic view of how digital networks change the city. He relates structures and spatial arrangements of the digital age with economic opportunities and public services, public discourse, cultural activity, and urban experiences. "Traditionally, you needed to *go* someplace to do this sort of thing—to the agora, the forum, the piazza, the café, the bar, the pub, Main Street…" etc. (Mitchell 1995, 7, italics in original). Mitchell forecasts a technological reconfiguration of human habitat, a "bitspace" that will overlay traditional urban and rural landscapes (Mitchell 1995, 167). Ultimately, Mitchell envisions a new "global village" when all scales of people and objects are networked in "one densely interwoven system," human body and various scales of infrastructure interfaced with each other (Mitchell 1995, 173).

Mitchell (2003) further posits how technology has softened the physical boundaries of the city, "connectivity" supplanting "enclosure" as being the definitive urban condition. "My biological body meshes with the city," he enthuses (Mitchell 2003, 19). Mitchell describes a kind of two-prong sensory augmentation, where technologies have increasingly sculpted themselves to our bodies (for example, the miniaturization of handsets), and our own senses have been amplified or reproduced into space (with, say, cameras and scanners). In envisioning the multiplication of human sensory facets beyond the body into various realms of the city, Mitchell brings forth an urban cyborg fantasy, in which the breakdown of definitions between body and machine is further extended into the boundlessness of urban space.

These two concepts—Castells' dominating "space of flows," and Mitchell's embracing "cyborg self and networked city"—underlie two significant strands of scholarly thinking about the "smart city." Together these paradigmatic concepts present two poles against which to assess ongoing "smart city" initiatives.

In the one instance, in tune with Castells, new urban networked technologies enable corporations and political elites to create hierarchical spaces of physical and informational connectivity and settlement. It results in a "splintering urbanism," in which socioeconomic inequality is even further consolidated into the physical environment of the city (Graham and Marvin 2001; Graham 2002a, b). Technological fixes to presupposed urban vulnerabilities are also seen as potential tools to legitimize the continued growth, privatization, and securitization of urban centers (Hodson and Marvin 2010a, b). And the pro-business stance of both technology companies and city governments have reinforced criticisms that these solutions are harnessed towards the spatially and socially selective development of neoliberal capitalism, the "corporate smart city" (Hollands 2008, 2014).

In the other instance, extending Mitchell's vision, the increasing ubiquity of networked urban infrastructures and mobile devices like cellular phones and RFID chips allows a distributed intelligence to emerge between places, things, and people. The socio-technologically positivist view conceives this urban intelligence as bottom-up, "sociable," driven by the admittedly wondrous vision of our cities like "computers in open air" (Ratti and Townsend 2011, 44; see also Roche et al. 2012; Townsend 2013). The Copenhagen Wheel, a "smart bicycle" project by MIT Senseable Lab, for example, promises real-time mapping of a city's air quality (Fig. 5). While, in many cases, the projects promoted by the proponents of this view

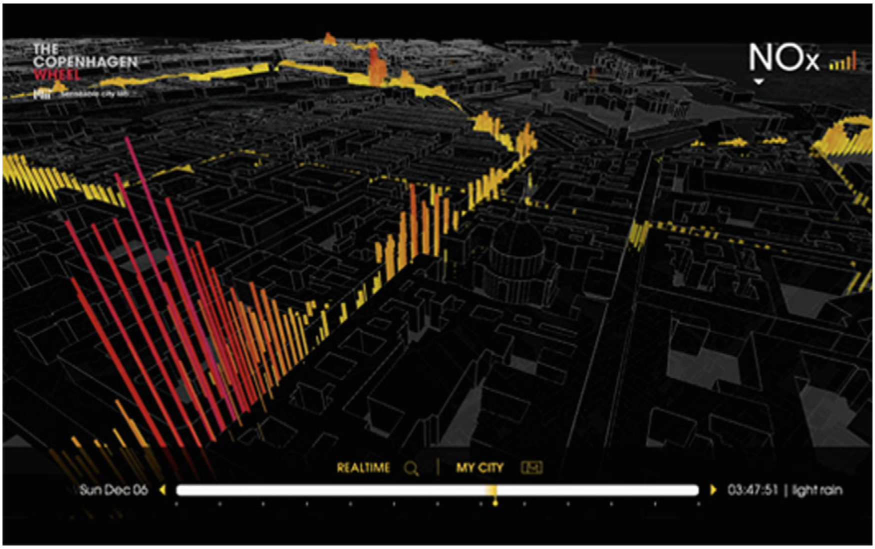

Fig. 5 Levels of atmospheric nitrogen oxides sensed and transmitted by the Copenhagen Wheel. (Image by MIT Senseable Lab)

include partnerships with the technology companies previously mentioned, they also tend to reject the state-controlled, centralized vision that many corporate-municipal initiatives hold (see, for example, Ratti and Townsend's (2011), Sassen's (2011), and Sennett's (2012) critiques of ground-up projects like Masdar in the United Arab Emirates and Songdo in Korea). Still, while these accounts invoke the use of technology in sociopolitical struggles, they often avoid a sustained analysis of power. In prioritizing the promises of technology over the structural reasons for contestation, they conflate the means and logics through which people mobilize with the tactics of those in power. Political change is treated like urban management, even though the objective of the former is transformation, the latter often continuity and the perpetuation of power structures. These arguments end up placing struggles for democracy on the same plane as traffic problems and the provision of health care and education (see, for example, Ratti and Townsend 2011).

4 Singapore and London

In probing these questions further, I look at "smart city" initiatives in two cities, Singapore and London. In this fast-moving context, it is understandable to point out the limitations of one or two case studies. However, in-depth studies of actual cases of "smart city" governance and implementation are critical in order to ascertain what really happens beyond the concepts and hype that is prevalent in the discourse (see, for example, Ching 2013; Shelton et al. 2015; Yigitcanlar and Lee 2014). These two cities hold particular lessons, separately and considered together. Both cities have active, established "smart city" initiatives and, as well, built examples of "smart" technologies in urban space. Both city governments have openly declared their support for such techno-urban futures (IDA n.d.; GLA 2013).

Given that both Singapore and London hold privileged positions as historical and present-day centers of trade—primary hubs in the global space of flows—with cohesive governance structures and ample wealth, one might ask whether and how these two cities offer lessons for others. In my view, they serve as two related yet differentiated paragons. Two ideal conditions: one, Singapore, the epitome of top-down planning, with enviable ability to implement social and spatial policies; the other, London, the archetypal Global City, still a powerful center of finance and culture. In comparison, they offer differences in political structure and administrative scales that illuminate the possibilities and challenges of governing and implementing smart urban technologies.

In my research, I focus on physical, spatial manifestations and sociopolitical systems. I conducted 14 in-depth, semi-structured interviews with city managers and planners, engineers and technology specialists, economic development officials, representative of a transnational corporation working on urban technologies, and privacy and technology advocates in both cities. I also made field visits to existing smart technology sites and city services, including transportation and water infrastructure, and reviewed documents by city agencies, technology companies, and media outlets, including local and national government "smart city" reports, various corporate white papers, primarily by IBM, Cisco, Siemens, and Veolia, and news accounts of "smart city" projects and investments.

4.1 Singapore

Small in spatial extent (less than half the size of London), Singapore boasts impressive achievements. It measures in the top ten in the world by purchasing power parity, twenty-seventh by human development index. Urban development in Singapore is generally top-down, a strong-state-led capitalism. Adhering to a model of centralized planning, the state strictly controls land use, environmental policies, and as well social relationships, evident in its reliance on ethnic quotas in public housing developments. As a historic port city, it was developed during British occupation and became a city-state after being invited to leave the Federation of Malaysia after disagreement over national social policies. Nevertheless, Singapore's urban and economic development is often invoked as an example for rapidly urbanizing cities of the Global South. Cities like Bangalore and Dalian look to Singapore as a model of technology-centered economic progress and a "livable" city (Chua 2011; Hoffman 2011), and Singaporean and Indian authorities have recently been in talks about potential partnerships in Indian Prime Minister Narendra Modi's stated plans to build 100 "smart cities" there (Tolan 2014).

Several initiatives in Singapore's built environment have been held up as "smart." These include the island's transportation network—with its extensive and smoothly running public bus and rail system, augmented with its "smart" fare card, and the central congestion pricing zone with automated estimated travel time notifications (Tan and Subramaniam 2012) (Fig. 6)—and real-time flood warning sensors in drainage canals. Beyond the realities on the ground, the city-state has also encouraged pilot initiatives in collaboration with technology companies, including winning a IBM Smarter Cities Challenge grant for the Jurong Lake District in 2012 (IBM n.d.), and announcing a partnership between the Singapore Housing Development Board (HDB) and French firms EDF and Veolia, that same year, to develop an urban modeling tool for Singapore public housing developments (EDF 2012).

Recently, Singapore's Infocomm Development Authority (IDA) has exploited its city-state status towards a new catchphrase, a "smart nation" (IDA 2014), or, according to Executive Deputy Chairman Steve Leonard, presenting the keynote at CommunicAsia 2014, "Singapore as one giant dashboarded entity." It is a vision in which an entire country is in sync, where "policy, people, and technology come together." Urban data analytics and management is seen as a "new frontier" for the nation, confirms Goh Chee Kiong, a senior economic development official, (2013, personal communication, 11 July). In this light, Singapore's overall approach to "smart cities" engagements appears to reflect a broader approach to urban development and nation building. As I've argued elsewhere, Singapore's development as

Fig. 6 Singapore traffic speed and travel time monitors. (Photograph by author)

a city has been wrought alongside its development as a nation, post-independence. Based on discourses of scarcity and survival, the country stakes its future on global links and the continued relevance of its development model (Goh, K. 2013). The current "smart nation" approach is consistent with the city-state's historical focus on establishing and maintaining ties to flows of global capital.

This vision of the "smart nation" is carried in lockstep within the upper levels of Singapore's government agencies and its private partners. Inquiring further into conceptualizations of the "smart city" across the various agencies reveals shades and differing outlooks and priorities. One issue concerns the role of corporations in "smart city" planning. Corporate technology companies like IBM and Siemens have enthusiastically touted their presence and embeddedness on the island. In the view of Singaporean economic development planners, this is because the corporations see the island as a "reference" market for Asia, a "leader for urban solutions" (Goh Chee Kiong 2013, personal communication, 11 July). And the government is confident about defining the terms of these relationships.

Another official involved in informational technology policy and planning is more direct in characterizing the government-corporate relationships as simply one of pragmatic commercial decision-making between (government) buyer and technology vendor. Because of the complexities of urban policy making and planning implementation, the companies, in his view, are not yet capable of providing much beyond the technology itself. They cannot yet "imagine the product." According to this official, the rhetoric of "smart cities" is simply that, rhetoric—"smoke and mirrors" (Henry Quek 2013, personal communication, 9 July). Indeed, the advocacy role of those in government information technology agencies, like IDA in Singapore, is critical in this aspect. They take the rhetoric in brochures and white papers, sift through the possibilities and opportunities in relation to their knowledge of the realities of urban governance processes, and explain them to those responsible for the "traditional" planning realms of transportation, housing, etc.

Whether speaking with government technology experts, officials in "traditional" municipal services, or key figures in economic development, one receives a significantly different response in terms of understanding the potential of the "smart city" and its place in current and future urban governance. This in itself is not a startling finding. More importantly, it suggests that the cohesive vision of a smooth urban digital space envisioned by many "smart city" proponents is difficult, perhaps impossible, to find. Instead, one finds a somewhat exploratory space where promised technologies are pondered over, tinkered with (tires kicked, so to speak), and literally bought and sold in bits and pieces as they are tentatively inserted into the workings of the city. The vagaries of urban governance, at the end of the road (sometimes literally), in large part define the impact of even the most comprehensive, ambitious, and forward-thinking technological vision.

Government officials hold conviction about the role of the state in making key—and good—decisions for citizens. This reinforces the leverage they believe they hold in public-private partnerships—evident, for example, in the planning and implementation of transportation. On the other hand, this context also hints at the darker side of pervasive urban sensing. Singapore's strict regulation of public behavior is well known—including laws curbing free speech. Government officials express no qualms about further securitization of public spaces, envisioning surveillance cameras smart enough to detect littering (Goh Chee Kiong 2013, personal communication, 11 July). Active government regulation, however, has not yet managed to quell increasing socioeconomic inequality in the city-state. This condition threatens to undermine basic societal balances that have maintained economic growth and political stability on the island in the recent decades (Economist 2014).

4.2 London

London, on one level, might be an odd place to find an aspiring global "smart city." A historic European urban center, it might be known more for monuments and a sense of propriety rather than broadband and automation. However, as the erstwhile center of empire, it has retained its position in international commerce and finance. Early efforts to digitally control city services and urban space were notable, including the iBus system that enables tracking of public transportation and easing of traffic flow; automated video cameras monitoring congestion pricing zones in central London (Fig. 7); and the oft-mentioned "Boris Bikes," a bike share program

Fig. 7 London's video-automated congestion pricing zone. (Photograph by author)

with centralized monitoring of bikes and stations (now widely replicated). Already considered one of the most surveilled cities in the world, the result of the so-called "Ring of Steel" developed during the Irish Republican Army insurgency period, the city now moves to install even more cameras and sensors.

London's historical role as a global center of commerce is evident in its embrace of "smart city" initiatives. City officials expect continued population growth, and are at pains to deliver services and an environment conducive to traditional banking and insurance sectors, as well as the growing technology sector. In 2013 the Smart London Board (2013) was formed to advise the Greater London Authority on visions for a smarter London. It released its first Smart London Plan late that year. The plan attempts to build off of the previous work, including the efforts to reform transportation and security during the 2012 Olympics and open data initiatives such as the CityDashboard. It ardently promotes London's existing digital infrastructure, and references the city's position as a center of culture and creativity. London's efforts are couched within a broader United Kingdom-wide initiative to encourage cities to pursue the economic potential of "smart urban systems" (BIS 2013).

Many aspects of the Smart London Plan are just beginning to be implemented. Speaking to local authorities, a key challenge in "smart city" planning is the relationship between territorial boundaries and urban governance. Cities often, if not always, comprise a set of administrative entities tied to specific territories—either nested, or in series, or both. Depending on the structures of governance, such entities may or may not be inclined to cooperate. London poses a particularly striking example of this. Greater London comprises the City of London and 32 boroughs, each with its own responsibilities for certain city services. The creation of the Greater London Authority in 1999 (and with it the first Mayor of London), was an attempt to bring greater regional governance and strategic urban planning. Within this structure, the City of London, the "Square Mile," presents a highly distinct sociopolitical space as a center of commercial activity—home of names like Rothschild and Lloyds—with relatively few residents. In contrast, this urban fragmentation is much less of a problem in Singapore due to its status as a city *and* nation and strong top-down national government.

This mismatch between priorities and governance scales is apparent in a number of ways. The "Boris Bikes," generally much loved and touted, was announced by the first Mayor of London Ken Livingstone and implemented by (and colloquially named after) his successor and current mayor Boris Johnson. The City of London acquiesced to this plan, and provided space for bike stations. But City of London planner Peter Wynne Rees brings up the contradiction of people getting off public transportation and onto bicycles, which in turn get in the way of the buses. He also notes the issue of the "loads and loads of vehicles moving the bikes around" (2013, personal communication, 30 July). To a broader point about "smart city" planning, Rees points out that some so-called "smart" aspects of London—including its transportation network and early digital communications infrastructure, were put in a "piecemeal way," because people wanted it, not in search of a "technopole."

On another level, Janet Laban, a senior planner in the City of London focused on sustainability, notes too the reluctance of large, high-profile companies in the Square Mile to sign on to smart grid initiatives, because of potential interference with high-velocity, algorithmic trading, or to the existing combined cooling, heat and power (CCHP) system (2013, personal communication, 30 July). Such reluctance poses roadblocks to the connectivity of "smart" infrastructure in the places it is arguably needed most.

London, like Singapore, is witnessing increasing socioeconomic inequality. Rapid and uneven economic growth—both within the city and globally—have had clear impact on the skylines and streets of both cities. Recent developments, including luxury towers and the massive Olympics effort, have been derided for their exclusionary nature. London's plan explicitly states the challenge of inequality, the task of addressing the "digital divide," and making access inclusive (Smart London Board 2013, 21). And yet, the plan—and its proponents—seems reticent to fully embrace the politics behind this concept. How do the principles of the "smart city" plan alter processes of urbanization and economic growth—processes that are themselves not in contradiction with the thrust for "smart city" initiatives?

The foregrounding of open data in London's plan offers some potential in this regard, something less evident in parallel discussions in Singapore. Open data advocate Gavin Starks, who sits on the Smart London Board, proclaims, "What would be the impact, for example, of having free Wi-Fi everywhere? At speed, for consumers and for businesses. That could be a very disruptive play for a telco (telecommunications company)" (2013, personal communication, 1 August). Starks' view of open data betrays an idealism about the possible community benefits of such initiatives. Of course, it remains to be seen if the open data initiatives in the Smart London Plan will achieve the objectives of socioeconomic inclusion.

4.3 Learning From…

Two key observations are evident from investigations in each city, and across them. First, echoing Hollands (2008), there is no one "smart city." But, additionally, there is no one "smart city" even *within* a city. Depending on whether I spoke to urban planners, technology consultants, infrastructure engineers, city economic development officials, industry experts, or technology company officials, I received a very different story of motivations, possibilities, practices, and end goals of the so-called "smart city." Differences in disciplinary expertise, job descriptions, implementation time-scales, and scales of urban governance are as important to the understanding of urban technologies as a common vision. This notwithstanding, some so-called "smart" technologies are already being implemented—in transportation and water infrastructure systems in Singapore; and in transportation and security in London. It is not that plans are not being realized; there seems to be a wide gap between what these various actors might envision today and what is and will be realized in the future.

Second, differences in scales and ideologies of urban governance *across* cities seem to have significant impact on the way that the many actors involved in "smart city" visioning frame their work and their priorities. In London I found distinctly stronger dialogues on open-source systems, and the ways that these might benefit smaller groups of users in a way that is, interestingly, both market and community friendly. In Singapore I found greater emphasis on government actions—simultaneously inviting private partnerships and investment and affirming government autonomy. These findings might appear unsurprising and even stereotypical. But they do demonstrate the uncertainty and intractability that transnational technology companies take on when partnering with local governments on long-term, large-scale projects.

5 "Smart" "Urban" Movement Building?

Perhaps neither of the paradigms offered by Castells and Mitchell finds its place wholly on the ground in Singapore or in London. But the threat of Castells' striated and unequal "dual city" is increasingly a reality. One might wait for either an equally dominating government structure or a more diffuse one, characterized by a commitment to openness, to ameliorate the worst effects of the growing inequality. Or, as planners tasked with envisioning urban futures and making them real, we might look to the technology itself for another way.

Given (1) the contesting scholarship on the threats and opportunities of urban network technologies, (2) the competing visions of what a "smart city" is, both in corporate literature and within urban governance, (3) the profit motive of corporations and its uncertain relationship with modes and objectives of city governance —and further, given that (4) technologies arise out of and are part of dominating socioeconomic structures (Castells 1989/1991)—can these technologies and strategies be harnessed towards a more just, inclusive, socially and environmentally sustainable city?

Castells himself provides a valuable and timely intervention. In 1989 he warned of the impending hegemony of the new "techno-economic paradigm," the superseding of spaces of places by the space of flows. He asserted that the response would involve knowing "how to articulate the meaning of places to this new functional space" (the space of flows) (Castells 1989/1991, 350). Ironically, in 2011 he finds such meaning, and space for resistance, in the flows themselves. Castells traces the origins and growth of social movements during the Arab Spring, European austerity protests, and Occupy Wall Street. He notes that movements may start on digital social networks, but they coalesce as movements by occupying urban space. But it's also not that simple. Movements then endure through interactions between cyberspace and urban space, in what Castells calls the "space of autonomy"—merging the globally-connected "free" space of networks with transformative power of actually claiming space in the city and openly challenging institutional structures (Castells 2012, 222).

This "space of autonomy," carved out by protestors and occupiers from both the emblematic urban spaces of oppressive regimes and the spaces of a now more mature Internet, offers an opening. The implementation of any part of the rhetorical and promised "smart city" is at best in its infancy at the moment. But, alongside the rapid growth of technologies and platforms such as social media, smartphones, and apps, it seems likely that many aspects of these smart urban systems will fast become part of our lives. As I write, infrastructure is being threaded with cable and sensors, public parks get open hotspots, people are being increasingly connected in less and less visible ways, the objects around us, from cars, to houses, to refrigerators, to our eye glasses, made to talk to each other. Planners, like many others, will have too many connections, too much data, and our problems will remain wicked. We could choose to look past the rhetoric of measurement and control, and explore the possibilities of this permeation of urban space (our realm, after all) with sensors and devices that can help *communicate, network, strategize, and organize,* to find our own space of autonomy. We might find, then, the spaces for a new wave of transformative planning.

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