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INTRODUCTION

Thinking through the politics of the smart city

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> "Traditionally, computers have been used to understand cities. After four decades of dazzling development, the same computer we deploy to understand our cities has become a new type of city. … the tools we made eventually will make us."
>
> —Daniel Sui (1997, p. 84, 85)

> "…in a long-term evolutionary perspective, humans and all they've thought will be just a transient and primitive precursor of the deeper cogitations of a machine-dominated culture extending into the far future and spreading far beyond our earth."
>
> —Martin Rees, former President of the Royal Society. (2015, p. 9)

What do you think about the "Smart City"? If you live in any large city—or if you pay attention to any of the press coverage or advertising that deals with big-city concerns—there is a good chance that you are now reflecting on a potent brew of associations, images, and connotations in response to this question. Cities are at the center of a smarter planet, IBM tells you. RFID chips, sensors, smart cards, and the emerging "Internet of Things" will deliver optimal speed, efficiency, and convenience, your local transit agency/privatized power utility/city government assures you. "Many Smart Ideas. One Smart Nation" declares the Smart Nation Singapore strategy. Cisco and AT&T are joining forces to build "Smart City Operations Centers" with municipal governments and local universities in several "spotlight cities" to provide officials with a "digital dashboard" view of "how assets are performing in near-real time." India's Ministry of Urban Development recently selected Bloomberg Philanthropies as the official "Knowledge Partner" to catalyze the Smart Cities Challenge, with its less-than-humble aspirations: "Smart Cities Improve Lives."

If you have followed the history of urban geography, these associations might seem all too familiar and yet a bit overwhelming in their current mainstream influence. Nearly 20-years-ago, an issue of *Urban Geography* opened with a special 50-year commemoration of Chauncy Harris and Edward Ullman's classic essay, "The Nature of Cities" (see Harris, 1997; Lake, 1997), and ended with a futuristic vision of how that nature was changing—Daniel Sui's (1997) progress report, "Reconstructing Urban Reality: From GIS to Electropolis." In the aftermath of "polarizing debate" between "positivist enthusiasts and post-positivist critics," Sui could see a stunning automated reincarnation of the cities-as-systems-within-systems-of-cities logics that had been so central to the urban Quantitative Revolution of the 1960s: "an increasing number of urban scholars have recognized that computers are dramatically changing the nature of cities, which we have

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been trying to understand using the same computers" (p. 74). Hence, the same journal issue traced the evolution of cyborg urbanism from the vantage point of personal, individual human geneaologies as well as contemporary technological ontologies. "What a difference 50 years makes!" Harris (1997, p. 25) exclaimed at the end of a panoramic review of the vast literature produced by urban geographers since 1945, punctuated by what he described as "the memories and meditations of an octogenarian":

> "International air mail began about half a century ago, but now urban geographers around the world are in virtually instantaneous communication by telephone, fax, and email. As I sit at my computer I cogitate on the efficiency and flexibility of the word processor, which makes writing, revising, and rearranging text, such as this, so much easier." (Harris, 1997, p. 24)

A few pages away, Dan Sui's progress report evaluated the "hope and hype" of electropolis, as information and communications technologies were undermining "long-accepted values and preconceptions about reality, space, intellect, place, community, and society" (Sui, 1997, p. 84). The promises of decentralized, radically pluralistic digital democracy stood in tension with a "computational paradigm" of an anthropomorphized machine: computers "have become a mechanism for defining social relationships, sustaining social rules, and strengthening social values" and "the elevation of information and computers to a metaphysical status" brings us to a point where we experience "machines as increasingly human-like" even as our own selves seem "increasingly machine-like" (Sui, 1997, p. 85).

And then, a few years later, Editor-in-Chief Brian Berry penned an editorial, "Teleportation Arrives," recounting the technological trajectory from 7 April 1927 (when Secretary of Commerce Herbert Hoover appeared on tiny screens in the first demonstration of intercity television transmission) to a press release issued on 7 April 2001 by the University of Texas, Austin. "Gov. Rick Perry … will appear live … as a 'holographic-like image' … during the dedication of a new center on The University of Texas at Dallas campus," the public relations staff announced (cited in Berry, 2001, p. 302), and the next day the *Dallas Morning News* reported on the success of the three-dimensional holographic performance that involved a "virtual" ribbon-cutting ceremony. The hype reminded Berry of an address he had delivered in 1969, "The Geography of the United States in the Year 2000," in which he described a vivid scene of a man in a circular room in a home in the suburbs of Phoenix having a conversation through "holography" with a man in a study at the University of Edinburgh. "Where, in this situation, does 'reality' begin and end?" Berry had asked in 1969, "What if the geography of face-to-face contacts, of physical movement … is replaced by a thin film of electrons spread over the countryside?" (Berry, 1970, pp. 49–50). Berry's declaration that "the revolutionary aspect of electronic environments" is that "they move the experience itself to the human nervous system," and his description of holographic walls, seemed to look back to Ray Bradbury's *Fahrenheit 451* (1953); but it could also have looked forward to anticipate *The Matrix, Her, Transcendence*, or Donna Haraway's (1997) analysis of the cyborg: "Traditionally, we have moved the body to the experience; increasingly we will move the experience to the body, and the body can therefore be located where it finds the non-electronic experiences most satisfying" (Berry, 1970, p. 49). And now, in 2016, amidst the brief cogitations involved in composing just the last few sentences in this paragraph introducing a special feature in *Urban Geography*, the smartphone buzzes and the inbox dings: more than a dozen customized

recommendations from publishers and public relations firms, a flood of listserv spam, an announcement of a comprehensive handbook instructing academics on how to use Amazon's Mechanical Turk to crowdsource "high quality" social science data, and *ding* a memo from an Associate Dean reminding instructors of the University's Academic Misconduct Policy and warning us about "a new gadget floating around campus." The "cheat watch" features up to 4 GB of storage, and is advertised on Amazon "specifically for the purpose of cheating," an Apple-watch knock-off designed to be "perfect for covertly viewing exam notes directly on your wrist" (Coughlan, 2016). Last summer, the CBC reported that authorities in Luoyang, Henan province, PRC, were using drones to proctor the hyper-competitive gaokao university entrance examinations (O'Neill, 2015).

These contextual considerations frame the challenge for a new generation working to document the pluralistic and often contradictory logics, consequences, and ontologies of urbanism in the age of the "Smart City" (Editors, 2015). The irony of the corporate hard-sell on the smart city, of course, is that humans are implored to welcome the new era of urban innovation at precisely the moment when ubiquitous, tele-mobile communication, Big Data, and artificial intelligence seem to render humans obsolete; it seems to matter less and less what *you* the reader, and *we* the writers, think of the smart city; the fundamental question is what the devices, the data trails, and the pattern recognition algorithms are doing/computing/thinking. Whereas the closing lines of Harvey's (1969, p. 486) *Explanation in Geography* declared, "By their models they shall know us" to herald the arrival of a new generation of revolutionary human geographers with "courage and ingenuity," with "wit and intelligence," today's urban geographies are defined by a newfound interest from fields such as physics (O'Sullivan & Manson, 2015) and proclamations that "it won't be the minds of humans, but those of machines, that will most fully understand the world" (Rees, 2015, p. 11).

What does the smart city, as a digital turn in urban governance, tell us about cities today? This is the central question that animated a special session of papers presented at a recent meeting of the Association of American Geographers, and now revised for publication in this special feature. The question is a bold challenge to the dominant "post-political" approach that situates the smart city as a technocratic matter of speed, efficiency, and other dimensions of the "optimization" of cities understood through the metaphors of markets and machines. The smart city has a very specific history in policy and politics, originating first from electronic governance efforts (typically termed e-gov), which at base sought to ensure a city government provided the means for residents, businesses, and visitors to find information about or communicate with city officials through the Internet (Kaylor, 2005; Santinha & Anselmo De Castro, 2010; Van Der Meer & Van Winden, 2003). Related efforts have focused on reducing the digital divide and supporting "digital inclusion" by providing computers, expanded broadband Internet connectivity, and training for underserved communities (Mossberger, Tolbert, & Franko, 2013; Servon, 2002). More recent projects explicitly branded as "smart city" evolved out of multiple types of digital governance efforts aimed at improving cities through information technology. From these sorts of digital urban projects in the late 1990s and early 2000s, cities continued to build out a broader digital presence, loosely following the continued integration of digital and mobile computing throughout much of society (Townsend, 2013). Over this same period, information and communications technologies themselves also evolved: smartphones, ubiquitous computing, and the always-on wireless Internet created a "sharing economy" (Botsman & Rogers, 2010)

of services emerging out of social media-style smartphone application (app) platforms—concentrated in cities due to higher population densities and higher average incomes—creating an ecosystem of services that have become inseparable from the digital devices that enable such activities. The services of the "sharing economy" were not inherently, originally associated with urban politics, but as McNeill's article in this special issue elaborates, the information technology companies providing these services can and do exert powerful self-serving influences on urban regimes. The "smart city" has transformed and accelerated the ongoing evolution of the "city as a growth machine" (Molotch, 1976).

There are many general reasons why cities of all sorts and sizes began to provide digital services above and beyond e-gov and online informational resources; a major reason was that other cities were doing it. The logic was inescapable: what city would not want to be "smart"? While not all cities embraced the explicit, "smart" label, most cities in the Global North and many in the Global South (see Goodspeed, 2015; Odendaal, 2006) initiated digitally driven smart city planning initiatives and infrastructure projects. Among the most widely known is Rio de Janeiro's Urban Operations Center, developed in partnership with IBM (Luque-Ayala & Marvin, 2016). The ongoing, infrastructural integration of digital devices and systems into urban society is a part of this trend, but so is the ideological imperative embraced by city governments that, to position themselves as entrepreneurial locations of the contemporary information and innovation economy (Harvey, 1989), they must ascribe to the techno-utopian discourse of urban futures through digital technology (Marvin, Luque-Ayala, & McFarlane, 2015).

Over the last 15 plus years, cities have increasingly been augmented by digital hardware and software, producing massive amounts of data about urban processes. This has been well documented in recent years (see for instance Crang & Graham, 2007; Easterling, 2014; Graham & Marvin, 2001; Kitchin, 2014; Kitchin & Dodge, 2011; Marvin et al., 2015; Mitchell, 2003; Shepard, 2011). Information and communications technologies not only connect cities to distanciated networks as part of the network society and global economy (Castells, 2000; Sassen, 2011), but today these systems also drive new forms of urban development (Shelton, Zook, & Wiig, 2015) as well as new methods of civic exchange and political contention between municipalities and their residents (Hollands, 2008, 2015). Discourses around so-called smart cities or smart urbanization writ large tend to position these data-driven changes as either a potential or actualized panacea (Townsend, 2013), an entirely new conceptual and material breakthrough (Carvalho, 2015; Goodspeed, 2015), or as a kind of dystopian imposition of technological rationality onto cities (Greenfield, 2013; Klauser, Paasche, & Söderström, 2014; Sadowski & Pasquale, 2015; Vanolo, 2014). Despite the rapid expansion of this interdisciplinary scrutiny—or perhaps because of this explosion—the precise nature of these social and spatial transformations remains unclear and contested: who has the right to the smart city? From an initial foray in 2008 with Rob Holland's "Will the Real Smart City Please Stand Up?," critical urban scholarship on the smart city has grown at a quickening pace each year. Parallel to this critical interest in the topic has been the growing interest in, and adoption of, smart urban projects in cities worldwide. Given the generality of the term as a floating signifier—which city would not want to be "smart"?—and in light of the widespread deployment of the "smart" moniker to describe all sorts of projects, it is unsurprising to see a variety of outcomes. One feature of these projects, however, stands out: their universalizing, all-encompassing framing. As the infrastructure of information technology has become so pervasive in cities—the constellation of mobile

wireless devices, digital computing and analytical algorithms, and powerful sensor/ surveillance networks—these socio-technological systems now undergird all efforts to foster some semblance of "digital intelligence" within and about the urban condition.

The impacts of "smart," digital information technologies on cities have not gone unnoticed by urban geographers. Furthermore, recent scholarship on the smart city has extended the investigation of these processes beyond the emblematic sites and developers, beyond both the corporate exemplars like Rio de Janeiro (Goodspeed, 2015; Luque-Ayala & Marvin, 2015) and greenfield smart urban developments (Cugurullo, 2013; Halpern, Lecavalier, Calvillo, & Pietsch, 2013), into the more quotidian integrations of the digital into cities of all sorts and sizes. The essays in this collection extend the critical engagement with the topic, investigating how, why, and where the smart city reshapes urban politics, governance, and policymaking.

While the smart city writ large is a recent shift in urban governance and development strategies, these technological changes have not emerged in a vacuum. The smart city, however it is manifest, operates on a continuum of integrating data and the digital into city management strategies first established in the 1970s (Light, 2003) and more recently entrepreneurial governance strategies ongoing since the 1980s (Harvey, 1989; Sbragia, 1996). The logic of data, of multiple efficiencies enacted through monitoring, in real time or not, of predetermined variables is a foundation of smart city projects and planning. But data and the digital are the product of human interventions and decisions: the digital is not objective, merely the mediator or boundary object (Star & Griesemer, 1989) between a city and its subjects. We mention this because a foundational goal of this special issue is to metaphorically and literally place the smart city into the past, present, and future of actually existing urban governance structures (Brenner & Theodore, 2002) and the profit-driven ambitions of information technology corporations that format smart city solutions as well as the more widespread techno-utopianism of the Internet and automated, algorithmic-computational thinking.

This special issue emphasizes smart cities as a transformative process within cities rather than considering the smart city simply as a manifestation of technological triumphalism. This approach emphasizes the smart city within the wider shifts in urban governance under local and global political and economic change, post-global financial crisis. The essays approach the smart city empirically, through the specific tactics in particular cities and information technology corporations that have gone into turning a relatively generic term, the smart city, into particular, political contexts. Doing so considers how and where new socio-technical systems reconfigure the relationships of urban governance and policymaking, and how these systems remain embedded in long-standing social structures at both local and global scales. The essays focus on the political processes and outcomes of smart, data-driven urbanism, critically examining the dominance of computer scientists and management consultants in the making and management of these projects ostensibly aimed at administering a digital public good. While much smart city scholarship has critiqued the global technology corporations such as IBM (McNeill, 2015; Söderström, Paasche, & Klauser, 2014; Wiig, 2015), or considered the early, newly built examples of Masdar, United Arab Emirates (Cugurullo, 2013) and New Songdo, South Korea (Halpern et. al., 2013), the essays in this collection address the matter from the perspective of how smart city discourses are actually being mobilized and realized in more "ordinary" cities (Amin & Graham, 1997; Robinson, 2006). The essays focus on the new as well as long-standing ideas behind smart cities, data-driven urban governance, and the role of information technology in urban politics.

The special issue begins with an essay that situates the imperative of information technology corporations to reshape urban governance to their benefit. These corporations drive smart city innovations, but in San Francisco and elsewhere they also adapt local politics to their interests and competitive, comparative advantage. McNeill's article analyzes how San Francisco engaged in municipal policy contortions in order to maintain and enhance its importance as a—if not *the*—capital of Silicon Valley. As globally important information technology corporations selectively reorient their operations out of suburban office parks into the more urbanized quarters of the Bay Area, their desires begin to drive the evolving political economy of "tech-friendly" urban development. The ubiquitous personal technologies accessed through smartphone apps—Uber, AirBnb, Twitter, and the venture capital firms funding these companies—are demanding that the city's government provide amenities for their highly paid workers as well as low city taxes for the firms, amenities that are not shared among the city's poor nor working class residents.

Pollio's essay, in turn, traces Italy's efforts to craft a post-global financial crisis austerity policy in cities, through the adoption of a smart city discourse. This discourse offered a foundation for policy-driven change that was, at least nominally, about innovating new governance strategies for fostering a pro-innovation economic climate. In this sense, the smart city operated as a political device more than a digital fix for urban welfare in times of financial constraints, a form of austerity that is meant to innovate service provision rather than simply reduce public budgets. In this context, smart city policies created material spaces where digital entrepreneurs could meet up, strategize, and design new social and economic activities. While these activities emerged from Italian cities' desire to apply the smart city terminology to a post-austerity situation, they created locally distinctive outcomes that differ significantly from the San Francisco and Philadelphia cases examined by McNeill and Wiig, respectively.

Wiig's essay explores how Philadelphia, with IBM's advising, advanced smart city policymaking as an entrepreneurial ambition to promote the city's economy globally through a brand new, untested smartphone app for workforce education. While the project itself failed to train citizens for jobs in the new economy, the mayor promoted it as a success in drawing enterprise into the city. The smart city acted to rhetorically position Philadelphia as a "smart" place to do business even though the actual goal of the project remained unmet, indicating a need to look beyond policy bombast at how outcomes meet stated goals.

Barnes' article examines the centrality of urban data collection and analysis to the decision-making capacity of smart city policies, creating what she diagnoses as "entrepreneurial governance by code." Rather than allowing greater democratic accountability and citizen engagement, data-driven governance has transformed the potential of smart city policies into mechanisms through which cities compete to sell themselves. Urban data in this context hold value not for citizens to monitor their government, but for software entrepreneurs to innovate new services to market to city and citizen alike.

Wrapping up the special issue by examining how addressing the future is central to smart city consulting and policymaking today, Merricks White's essay considers how an anticipatory smart city discourse presents aspatial, technological solutions to mass urbanization, global climate change, and fiscal austerity in a fashion curiously divorced from existing cities. The city may be the object through which to affect resilient change, but the focus is on the technological fix to the global problem, not the particulars of an individual city that will enact the "intelligent" change.

The articles in this special issue document how the smart city, as a digital turn in the means (and sometimes the ends) of urban governance, helps us understand the contemporary urban condition. These essays sync their analysis with critical urban scholarship on urban governance as growth machines, as well as urban governance under neoliberal, entrepreneurial, and now austerity politics, within the imperative of a transforming, urbanizing planet. Whether as an emergent political-economic player in cities, an adaptation or augmentation of existing governance strategies, or an interactive component through which new information and technology policy experts sell their services to cities, the digital turn in urban politics is ongoing and inextinguishable. In political as well as analytical terms, the right to the smart city remains an open, contested question.

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