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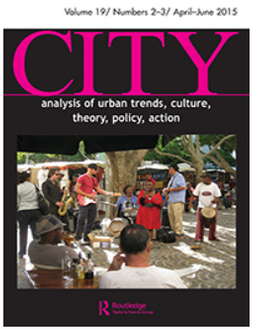

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This paper explores IBM's Smarter Cities Challenge as an example of global smart city policymaking. The evolution of IBM's smart city thinking is discussed, then a case study of Philadelphia's online workforce education initiative, Digital On-Ramps, is presented as an example of IBM's consulting services. Philadelphia's rationale for working with IBM and the translation of IBM's ideas into locally adapted initiatives is considered. The paper argues that critical scholarship on the smart city over-emphasizes IBM's agency in driving the discourse. Unpacking how and why cities enrolled in smart city policymaking with IBM places city governments as key actors advancing the smart city paradigm. Two points are made about the policy mobility of the smart city as a mask for entrepreneurial governance. (1) Smart city efforts are best understood as examples of outward-looking policy promotion for the globalized economy. (2) These policies proposed citywide benefit through a variety of digital governance augmentations, unlike established urban, economic development projects such as a downtown redevelopment. Yet, the policy rhetoric of positive change was always oriented to fostering globalized business enterprise. As such, implementing the particulars of often-untested smart city policies mattered less than their capacity to attract multinational corporations.

Key words: entrepreneurial city, IBM, Philadelphia, policy mobilities, smart city, urban governance

Introduction

The smart city has arrived, albeit unevenly and in different manifestations, through the continued implementation of information technologies in mediating urban governance, civic exchange, and the flow of people, goods and data through cities (Hollands 2008; Luque, McFarlane, and Marvin 2014; Townsend 2013). The critical engagement with the smart city in urban scholarship articulates the problematic role major information technology corporations play in pushing this 'techno-utopian' vision of urban change (Luque, McFarlane, and Marvin 2014, 74). This paradigm advances a 'smartmentality' (Vanolo 2013) of urban management through data-driven metrics, verging on a new era of 'governing through code' (Klauser, Paasche, and Söderström 2014). IBM has emerged as a leading proponent of the smart city discourse over the last five years, and the global information technology corporation worked at becoming what Söderström, Paasche, and Klauser (2014) term an 'obligatory passage point' delimiting and defining the smart city governance paradigm (citing Callon 1986). Yet little of this

scholarship looks beyond the policy narratives of smart city initiatives to actively ground the work in cities that adopted these policies (Kitchin 2015).

The techno-utopian vision of and discourse around the smart city matters, a point Söderström, Paasche, and Klauser (2014) argue, but the agency of this discourse, and IBM's role in furthering the discourse, must be balanced against the rationale cities gave for enrolling in smart city policymaking to begin with. For instance, IBM's bombastic and prolific promotional materials, white papers and policy reports all offer a rhetoric of transformative change that is not necessarily reflected in the outcomes of the initiatives, a point that will be expanded on below. The continued critique of the smart city must be mediated through examinations of how the policies are assembled, adapted and implemented.

By charting the evolution of IBM's Smarter Cities Challenge, a three-year event beginning in 2010 where IBM donated their consultation services to strategize technology-driven solutions for a variety of urban problems, this paper examines IBM's smart city policymaking as an example of globally circulating policy mobilities (McCann and Ward 2011). Via the Challenge, cities adopted IBM's smart city proposals to achieve what McCann (2013) termed 'extrospective policy boosterism' using policy, in this case untested techno-utopian policy, to highlight ambitious economic potential. The smart city acted as a mask for entrepreneurial governance strategies. Instead of improvements specifically targeted to business enterprise such as downtown redevelopment, the policies proposed widespread urban change through digital augmentation. The cities that participated in the Challenge were able to present an image of competitive, creative and strategic governance immediately following the global financial crisis, a time when municipal budgets were cut by shrinking tax revenues. Successfully enacting IBM's policies was not necessarily a city's priority.

With a case study of Philadelphia's smart city initiative, Digital On-Ramps, I argue that aligning policy rhetoric with a city's needs was much more complex than implementing a technological fix. IBM's Philadelphia initiative called for solving chronic underemployment among 600,000 residents in the de-industrialized inner city through a workforce education software application (typically called an 'app') (IBM 2011a). This was a step in the longer, messier process of engaging government, non-governmental organizations, private enterprise and community stakeholders in creating job opportunities in Philadelphia. This smart city app could be useful to city residents, but as proposed by IBM and celebrated by Philadelphia's mayor it was successful primarily as a promotional device. Implementation of the smart city policy was secondary to the utility of the initiative in selling the city as a promising location for globalized enterprise to set up businesses. For this particular presentation of the smart city, the intended audience was outward-focused beyond the city and its residents, intended to signify the city as smart much more than to advance a new regime of data-driven urban governance. Smart city policymaking proposed citywide benefit, instead of direct benefit to business enterprise through downtown redevelopment, but the overall goal was to signal the city as attractive to global business.

The policy mobility of the smart city

In the USA, the smart city served entrepreneurial governance strategies, of city government's working to grow business opportunity (Hollands 2008, citing Harvey 1989). The smart city as a policy device emerges through urban-technological change, where 'instrumental and seductive forms of *power* are at work in these discourses, often in the form of a technological determinism that assumes that greater connectivity to online information necessarily leads to more informed, and thereby economically more "useful", citizens' (McFarlane 2011, 140). A core assumption of the smart city is techno-

utopian, as McFarlane (2011, 140) articulates: that access to and connectivity to information is assumed to be inherently beneficial to a city's residents. General work on the smart city such as Townsend's (2013) popularize the potential of smart urban thinking to transform cities, but cast a largely uncritical eye on the entire process, assuming there is no other path forward *but* to use information technologies to 'solve' urban problems. This rationale sidesteps the inherently technocratic rationale of this approach, a rationale that has largely been discredited (see, i.e. Fairfield 1994; Ford 1913; Schultz and McShane 1978 as well as Graham and Marvin 1996, 2001). Techno-utopian smart city solutions present a distraction from *actually* addressing the longstanding urban inequalities these policies are intended to fix (Luque, McFarlane, and Marvin 2014; see also Greenfield 2013), assuming technology will lead to a positive, utopian future, an idea widely disputed even as it drives much information technology development (Segal 2005; Winner 1997). As a governance strategy, the smart city serves as a platform for a city to sell itself, where 'business-driven technology and gentrification could be interpreted to imply that this urban form is relatively unconcerned with class inequality' (Hollands 2008, 303), even as the projects proposed often claim to address social, economic and environmental issues that could be central to reducing marginalization. Hollands (2008) identified the smart city as entrepreneurial, but how smart city policies are harnessed for entrepreneurial governance has been under-studied. Rhetorically, the smart city matters because it diverts attention away from problems of economic inequality through grand policy gestures for globally oriented promotion.

To consider the smart city as a new iteration of entrepreneurial governance strategies requires situating the topic within recent debates about policy mobilities. This branch of urban scholarship considers the relational and territorial impacts of the circulation of policy concepts as they assist cities to stand out as competitive in and beyond their proximate region, creating similar expectations and outcomes of best governance practices devoid from local context and adapted from far-off places (McCann and Ward 2010, 2011). The inter-urban economic pressure of cities to compete globally factors into the adoption of these policies (Jensen 2005, 2007; McCann 2011, 2013; Prince 2014). The smart city in this fashion becomes a discursive strategy to 'sell' a city globally by designing technologically driven policies that would ostensibly improve residents and industries. Unlike the policy boosterism around urban sustainability that McCann (2013, 11) examines, the newness of the smart city meant that cities were not using successful local policies to highlight the importance of their model, instead, the boosterism was awarded through IBM's reputation. Transferring smart city policies from IBM's corporate knowledge to city governments enacted the policy's importance for the city. Smart city policies are made mobile through documents such as the detailed consulting reports and white papers IBM produces and distributes publicly through their vast Internet presence, online and print journalism celebrating these efforts, and cities' press releases and promotional events signaling their smart city status.

IBM positioned itself as an obligatory passage point (Söderström, Paasche, and Klauser 2014, citing Callon 1986), a necessary, unavoidable conduit between the technocratic solution, city government and the territory of the city itself. As Söderström, Paasche, and Klauser (2014, 308) argue, the discourse of transforming cities into smart cities 'is conceived to channel urban development strategies through the technological solutions of IT companies. However, the impetus to engage with smart city thinking and the responsibility to implement these 'solutions' falls to the city government. IBM's smart city is an encapsulation of their analytics and data science expertise. With the Smarter Cities Challenge, IBM's smart city was translated into particular policy solutions for city governments enrolled into the

process by choice. The origins and impetus for this process are discussed in the next section, which examines IBM's evolution into an urban consultancy firm.

The evolution of IBM's smart city consultancy

IBM's work as a smart city policy consultant, a 'non-state, private-sector, profit-driven actor' (Prince 2011, 195) can be traced back to around 2005, when the chairman and CEO Samuel Palmisano asked his senior vice presidents to identify new project themes that could impact 'important problems of the world' (IBM Smarter Cities Director 2012). The call for themes was fulfilled by a three-day, online 'chat event' for IBM's employees and their families, business partners and customers. A total of 100,000 people took part. IBM's Smarter Planet was one of the ideas that emerged from the event (IBM Smarter Cities Director 2012). The Smarter Planet work had a broad spectrum including efficiency solutions for industry, health and other social concerns. In turn, as part of their Smarter Planet work, IBM's smart city consulting focused on information-technology-driven urban change with city governments as clients or partners.

In late 2007, an internal study tested a hypothesis that came from this company-wide discussion, finding that there were a lot of similarities between the information technology solutions to these 'important problems of the world'. These similarities could be organized through a data-driven 'middleware', a 'shareable [software] platform that you could use if you were looking at various kinds of water management, energy management, transportation, things of this kind' (IBM Smarter Cities Director 2012). In IBM's vision as announced by the Chairman and CEO in 2008, investing in digital systems was a way for cities to improve their management of services, and through this to lower their chances of economic decline (Palmisano 2008, 2010). Launching the Smarter Planet campaign appeared to pay off for IBM, with the corporation's stock price going up 50% in the year after announcing the enterprise (Lohr 2010).

The idea for a data analysis platform for municipal service management originated with this internal study. In August 2008, the Smarter Cities Director was consulting on energy efficiency and sustainable power distribution in the under-construction Masdar City development of the United Arab Emirates. Masdar City intended to produce its energy through solar technologies, necessitating efficient, smart grid systems for electricity distribution (see Cugurullo 2013 for a discussion of Masdar City). Because there would be occasions where the solar technologies could not produce enough electricity (e.g. due to overcast days), Masdar City's planners had to determine how to allocate energy to all the different users, from private homes to the public transportation networks. Deciding how to prioritize users became a matter of policy, one that the Director felt could be met with 'a control system for a city' (IBM Smarter Cities Director 2012). The discourse of an urban 'control system' was central to IBM's smart city vision, where the complexity of the urban condition, and governance of said condition, is reducible to data variables manageable through computerized control systems.

IBM's smart city control system was constructed with Rio de Janeiro's Urban Operations Center. The Operations Center was implemented in anticipation of the 2014 FIFA World Cup and the 2016 Summer Olympic Games. This center coordinates 30 city government offices in one space, reacting to disruptive or catastrophic events such as mudslides resulting from a torrential rainstorm or riots after a sporting event (Hamm 2011; Singer 2012; see also Goodspeed 2015). In the main room, live weather and street-level video feeds combine with social media analysis, crime and security monitoring, and the like. With this, live data took on a key role in managing the city.

From these initial operation center projects, IBM established their vision of the

smart city as a techno-utopian discourse. The component parts of the overall management system were separated into different services applicable to smaller, targeted projects for other cities, the policy moving based on interest and perceived needs. The smart city was a new and growing market, targeting 'sensors, networks, and analytics for local and global issues' (Swabey 2012) to improve services for many different entities, all with different concerns and interests. Throughout their promotional literature and other documentation, 'smart' equaled 'efficient' equaled 'beneficial'. Who benefited, and where in a city those benefits were located, remained ambiguous, as did the meaning of 'efficiency'.

IBM's smart city work was promoted through a web portal populated with information content of all sorts, from basic descriptions of IBM's approach to 'smart', to project descriptions and free, downloadable white papers.[1] The content ranged from general to specialized, accessible to the public but geared to professionals and policy actors. The volume of materials available on the website is indicative both of IBM's investment in smart consultation services and the role of informative websites in disseminating their approach to the smart city.

As an example of policy mobility, IBM transferred the smart city concept by taking past consultancy experiences, like in Masdar City or Rio de Janeiro, and integrating this into other cities. This urban consultancy merged with their longstanding data analytic capacities to signal the corporation's ability to provide policy strategies. With the Smarter Cities Challenge, IBM had an opportunity to present their vision of the smart city's potential to a much wider audience of city governments worldwide.

Origins of IBM's Smarter Cities Challenge

To market their urban planning abilities, IBM initiated the Smarter Cities Challenge. IBM announced the Challenge in 2010 and chose the first round of 24 cities later that year (IBM 2013a). The event was scheduled to last three years; however, it transitioned to an ongoing effort. IBM found that cities were interested in the 'smart' management strategies and their potential for improving on urban issues (IBM Smarter Cities Director 2012), but were also interested in learning how they could harness this urban intelligence to promote themselves as 'nodes' in the networked, globalized information economy (Castells 2000; Sassen 2001). IBM's Smarter Cities Director discussed this in 2007 and 2008, after the height of the global financial crisis, when cities were affected enormously by the economic downturn. Participating in the Challenge became a means of signaling the city's innovative capacity in a challenging economic climate (IBM Smarter Cities Director 2012).

Cities used the Challenge to signal their weathering of the economic downturn, that they were still 'open for business'. When asked why cities applied to the Smarter Cities Challenge, the Director responded:

> '[The Smarter Cities Challenge] generated huge interest from cities all over the world, *even though we hadn't really begun to explain what the business case was for these things, what the return on investment was going to be, how much money could we help you save.* [. . .] *It took us a long time to understand that what was really driving this sort of thing is economic development*. Particularly at that time, this was six months after the economic crash, many cities around the world were looking to get their economies going again, and what they discovered in the last several years is that they are in competition with one another in ways that they had not had to compete before. So traditionally cities compete with one another at a state level, maybe within regions within a large state, or perhaps they are competing at a national level, but now cities like Dubuque [Iowa] find themselves competing with cities they had never heard of, cities in China.' (IBM Smarter Cities Director 2012; italics added)

This comment from the Director echoes Holland's (2008) and McFarlane's (2011)

respective arguments that the smart city is a technology-driven variant of the entrepreneurial city; this point is further reinforced in an essay published by two IBM engineers, who write that the interest in smartness stems from a desire for economic competitiveness (Harrison and Donnelly 2011). A crucial theme is found in the first sentence of the above quote: cities were clamoring to partner with IBM for smart city consulting even before IBM had defined how the consulting would benefit cities. Cities wanted to improve their global economic visibility through timely policies created in partnership with one of the major international information technology corporations. This was the case even before the cities knew what a smart city project could do or fix. Cities wanted to work with IBM to market their capacity for innovative economic growth.

IBM endowed involved cities with their respected corporate mark, a badge that city governments saw as crucial to standing out in the globalized economy. Engaging in the Challenge signaled that cities were on top of a fast policy transfer around information technology governance and as such, they would make 'intelligent' locations to conduct business as well.

Mayor's offices submitted proposals to the Challenge, identifying an issue that they wanted IBM's help in solving (IBM Corporate Citizenship 2012). The response to the Challenge indicates how cities willfully enrolled in IBM's smart city storytelling (Söderström, Paasche, and Klauser 2014), how the techno-utopian discourse transferred into the practice of governing cities. The smart city mobilized through IBM's consulting capacities and promotional support, as they landed in a variety of cities and became part of 'various constitutive relationships that existed beyond [a city's] physical extent' (McCann and Ward 2012, 47–48). The cities were given a policy document they could use to signal their economic potential; implementing the policy as recommended by IBM was up to the local actors. Once IBM gave the cities their report, the cities were able to brand themselves as a smart city before completing the project (successfully or otherwise?).

Themes of IBM's Smarter Cities Challenge

Worldwide, IBM (2013a) organized their Smarter Cities Challenge around nine topics: Administration, Citizen Engagement, Economic Development, Education & Workforce, Environment, Public Safety, Social Services, Transportation and Urban Planning. The proposed initiatives entailed everything from building new urban districts, installing sensor-based management systems or streamlining electronic government (e-Gov) procedures through implementing online website portals.

The projects proposed by the Challenge had to effect incremental change quickly (IBM 2013a). Cities articulated their smart city desires by presenting a problem that could be solved through the technocratic means IBM offered. This narrow definition of the smart city limited the potential of data and analytics to what IBM established: the techno-utopian vision had to fit within a quick fix framework. Little heed was paid to the particular context or specific, often longstanding factors that could have hindered the data-driven solutions, nor the social or technical challenges that could have impeded implementation.

Although IBM's promotional material stated that they 'created the Smarter Cities Challenge to help 100 cities' (IBM 2013a), only 62 cities participated by the third and final year of the event in 2013. Of the 62 involved cities, 26 were in North America, 5 in South America, 5 in Africa, 10 in Europe, 14 in Asia and 2 in Oceania (IBM 2013a). Of the 26 cities in North America, 21 participants were in the USA. These US cities applied for consultation on the entire variety of themes but one. There was no regional clustering of cities, nor an immediately obvious correlation of rationales for participating. While neither New York City nor Los Angeles—the two largest urban

areas in the USA—were participants, many of the cities were still prominent nodes in the global economy, such as Atlanta, Chicago and Philadelphia.

Typically, IBM sent a team of around six engineers and consultants for two to three weeks to each city. The teams would interview a diverse range of city government officials and use information gleaned from those exchanges as the basis of their report (IBM 2013a; IBM Corporate Citizenship 2012). Over the three years, 300 IBM employees participated in the Challenge (IBM 2013b, 3). The IBM Director of Corporate Citizenship Initiatives (2012) stated that IBM selected cities based on the city government,

> '[. . .] being open to collaboration, to using analytics to help not only track information but be proactive about using predictive analytics to improve the flow of the city whether it be for specific pieces such as safety or security or other areas of the city's functioning'.

In this vision of urban management, the potential of data to 'solve' urban problems was central: data and analytics would drive better governance. Three examples of smart city initiatives from US cities follow:

- **Education & workforce.** With a project titled 'Digital On-Ramps', Philadelphia, Pennsylvania sought to develop a cloud-computing-based, cross-platform—in the sense of providing accessibility from smartphones, tablets or a traditional web browser—workforce training program that would teach what they termed 'twenty-first century work-ready' skills (City of Philadelphia 2012) to the large number of underemployed, marginalized residents of the city (IBM 2011a). This project is expanded on in the next section.
- **Environment.** In order to comply with the city's ecological sustainability goals, Boulder, Colorado's energy utility installed smart energy meters and implemented a smart electricity grid. This occurred without significant public input as to how this new energy utility would benefit residents, which led to residents complaining about the system. Asked to address how Boulder might present the smart grid to the residents and ratepayers in a high visibility, socially beneficial and ecologically sustainable fashion, IBM's consultants suggested ways of providing 'customer-facing initiatives' such as a web portal where users could monitor their energy usage in real time (IBM 2011b) (see Figure 1).
- **Urban planning.** With the rerouting of the I-95/I-195 freeway interchange, downtown Providence, Rhode Island opened up 20 acres of the city's core to redevelopment. The city aimed to capitalize on this opportunity by transforming the zone into a 'Knowledge District', to entice new industries such as bioscience or healthcare into the area. The 'smart' component of the project centered on re-designing the permitting process for opening a business or constructing a building, first in the new economic zone and later in the entire city. The objective of the new permitting process was to create a web-based portal where users could upload documents and then track the progress of their permit in an open, transparent manner. The overall aim was to present Providence as a more business-friendly city where incorporating was quick and easy (IBM 2011c) (see Figure 2).

This brief overview of the Smarter Cities Challenge's thematic areas highlights how cities interpreted IBM's vision of the smart city through local issues. For IBM, better municipal governance through data was the foundation of a smart city (IBM Corporate Citizenship 2012). What data could become, or how it might transform governance through new, algorithmic forms or monitoring and analysis (Kitchin 2014), was a prominent component of the policies. Better quality, better organized, more open and shareable data, analysis of this data and

Figure 1 Boulder's smart city proposal sought to transform electrical infrastructure into a responsive system monitoring use demand in real time to moderate electricity production and consequently work toward urban sustainability goals (Photo: Alan Wiig, 2013).

Figure 2 Providence is replacing the former site of a major freeway interchange with a smart city, knowledge economy redevelopment (Photo: Alan Wiig, 2012).

transparency around the findings of this data were all perceived as productive outcomes of these projects. However, what data could offer remained under-developed, as did the potential for successful implementation of an initiative: the consultancy and the projects were roundly untested. The nine project areas highlight the perception among city leaders that information technology, typically in the form of data access, monitoring and/or analysis, filtered through a public website, was the key to engineering a smart city. In this view, information technology inherently led to cost savings through more efficient governance, through the mundane, everyday accessibility of the Internet and website portals. The perception of benefit in these initiatives assumed that technological initiatives could be implemented quickly and easily, and that social and economic concerns both could be met by technological solutions.

Even in IBM's promotional description of the smart city, the appearance of urban intelligence was important. The successful implementation of a smart city initiative into a functional project was no more important than a city being perceived of as a smart city. In this context, improving a city was a matter of both progress and image, even as these concepts remained vaguely defined. In IBM's definition, smart equated to 'social and economic progress', and also ties to a city's 'vision of what it would like to become and how it would like to be perceived' (IBM Global Business Services 2010, 1).

The next section discusses how the inflated rhetoric of smart urban change found in IBM's policy documents did not achieve the intended outcomes in Philadelphia.

Implications of smart city policymaking in Philadelphia

Philadelphia, Pennsylvania is located between New York City and Washington, DC in the Mid-Atlantic USA (see Figure 3). While the city has remained among the top global cities in a number of categories including financial services (Sassen 2011), Philadelphia has not recovered from the decline in its manufacturing industries that began in the 1920s and continued until collapse in the 1970s (Gyourko, Margo, and Haughwout 2005, 20). The city has a concentration of higher education, health services, telecommunications and pharmaceutical industries, but a significant number of residents do not have the general education nor workforce training for jobs in these new fields. This issue effectively separates a significant portion of Philadelphia's residents from work opportunities (IBM 2011a). In turn, without an entry-level workforce to complement the trained workforce, the city worried that global enterprise might hesitate to establish in the city because the perceived lack of an employee pool. Digital On-Ramps' impetus was to address the skills gap between city residents and entry-level jobs in the information-focused industries through a mobile app and website for digital literacy, workforce education that could also connect participants to employers. Philadelphia presents a notable smart city case because IBM chose to celebrate the city by giving its mayor the keynote, kickoff slot in their Smarter Cities Summit, an invitation-only event at IBM's global headquarters outside New York City for the mayors of cities that participated in the Challenge (IBM 2013c).

Building Digital On-Ramps to the information superhighway

Six of IBM's consultants came to Philadelphia for three weeks in October 2011, where they talked to around 70 members of city government, higher education and other anchor institutions, local non-governmental organizations and business interests. Their report was published early in 2012. The principal recommendation was to use Digital On-Ramps as an umbrella organization of government offices and private organizations concerned with employment and education.

Figure 3 The proposals to work with IBM's Smarter Cities Challenge consulting services had to come from each city's mayor's office. Philadelphia's City Hall, shown here, became a central location in the circulation of smart city policies between IBM and the municipal government (Photo: Alan Wiig, 2013).

This umbrella organization would then guide the city's desire to leverage an 'anytime, anywhere' online learning app for new workforce education and training (IBM 2011a) to connect new industries with program participants for needed jobs. The steering committee brought together education and literacy policy actors with IBM's local representative, from their suburban Philadelphia office outside the city itself, along with other organizations invested in community development and neighborhood change (Drexel University Program Manager and Drexel University Senior Web Architect 2013). Digital On-Ramps could then combat the city's systematic unemployment through implementation of their cloud-computing, web-based app (City of Philadelphia 2012; IBM 2011a).

Digital On-Ramps' services were provided through a public–private partnership with Philadelphia Academies, Inc., a local non-governmental education consultation firm that advocates workforce-focused education for local youth. The firm's president was the wife of Philadelphia's mayor. Under Philadelphia Academies, Inc.'s lead, the smart city policy boosterism from the mayor's office became an active device within longer standing education efforts (Philadelphia Academies, Inc. 2011). Once IBM's report disseminated into the city's governance strategies around digital education and literacy, the policy document acted as an intermediary, a guide for the middle-level technocrats working under Digital On-Ramps' steering committee.

The intent of Digital On-Ramps' educational programming was to complement existing workforce training efforts in the city such as community centers and public high schools. While outside the scope of this paper, it is worth noting that Philadelphia's public school system has faced massive funding cuts over the last decade, as part of a widespread neoliberal project in the city; all education efforts had to take this into consideration (Bulkley 2007; Hackworth 2007, 36–37; Jack and Sludden 2013;

Lytle 2013; Maranto 2005, 155). Through enlisting smartphones and other Internet-enabled devices, the organizers hoped to make it easier for interested residents to access educational deliverables, leading to a target of 33,000 unemployed or underemployed residents finding work by 2017. IBM's report recommended a full rollout of the project by early 2013 (IBM 2011a, 37). The project had a pilot rollout to 500 high school students in the spring of 2013 (Philadelphia Academies, Inc., personal communication with staff member, April 2013).

By November 2012, when Philadelphia's mayor spoke at IBM's event mentioned above, he described Digital On-Ramps as a success, even though it had not yet implemented any programming, the app was not available and no one had found a job through the consortia's efforts. Identifying the sort of jobs the pilot's participants were qualified for was difficult (Drexel University Program Manager and Drexel University Senior Web Architect 2013). Making policy and achieving successful outcomes through those policies, in the timeframes given, were largely misaligned. Building literacy and improving employment opportunities required much more than the potential of a mobile app to educate and connect users to employers, especially given the ongoing cuts to public education in the city.

Advanced manufacturing in smart city Philadelphia

The initial target industry for Digital On-Ramps was advanced manufacturing (Drexel University Program Manager and Drexel University Senior Web Architect 2013), which sat at the heart of new enterprise Philadelphia desired (City of Philadelphia Department of Commerce, n.d.). Although Digital On-Ramps' steering committee had not settled on a definition for advanced manufacturing by the time the pilot began (Drexel University Program Manager and Drexel University Senior Web Architect 2013), the term reflected a push from the US federal economic development agencies to re-invest in manufacturing around high-tech industries. The federal definition considered advanced manufacturing an industry that could quickly adapt to changing customer demands by utilizing 'computer, high precision, and information technologies integrated with a high performance work force in a production system capable of furnishing a heterogeneous mix of products in small or large volumes . . . ' (Science and Technology Policy Institute 2010, 3). Advanced manufacturing created a flexible business template that could adapt to changing economic demands, reducing economic homogeneity such as that found in industrial-era Philadelphia. Digital On-Ramps' app could train employees with basic skills for these manufacturing companies that would locate in the city because of its newly competitive workforce. The rationale was circular and entirely dependent on private industry finding the city's promotional efforts persuasive.

The app-based training was for advanced manufacturing, but when asked, members of the steering committee for Digital On-Ramps were unable to point to businesses in the city working in that industry (Drexel University Program Manager and Drexel University Senior Web Architect 2013). In a sense, Digital On-Ramps was an example of 'if you build it, they will come' thinking, which was an issue with projects of this sort that the Director of Innovation Management in the City's Office of Innovation and Technology (2012) raised. The techno-utopian policy solution aspired to an unrealized near future when the employment situation would improve. The low-literacy, low-job-skill residents were represented by a policy coalition whose ability to create attainable jobs was hampered by the steering committee and the mayor's overarching desires to promote Philadelphia as an intelligent place for business.

Describing how to implement the smart city initiative was not part of IBM's

consultancy. Digital On-Ramps' pilot raised more issues than provided actionable solutions. The pilot's 500 youth at four public high schools were introduced to online learning modules designed by Philadelphia Academies, Inc. Problems emerged quickly: the website-app developer could not meet the needs of the program, where issues like forgotten passwords necessitated emailing the developer instead of a quick, automatic reset from a project leader. Additionally, the pilot was implemented on desktop computers not via a smartphone app, as envisioned. The mid-level technocrats tasked with implementing the pilot intended for teachers to conduct the lessons, but the teachers were not able or unwilling to add the lessons into their schedules, leaving no one to manage the youth through the program (Philadelphia Academies, Inc. Data Specialist 2014). After the pilot's problems, Digital On-Ramps retreated to the planning stage. As of fall 2014, they were in the process of transitioning to more manageable deliverables, focusing on succeeding as an umbrella organization connecting job seekers to careers as well as bringing the interested public and private organizations together.

For Digital On-Ramps to align to IBM's guiding policy document meant addressing many more issues beyond the software app, issues not covered in IBM's report. An entire network of local and regional employers would have to be identified in order to create a functional smart city growth coalition united to both bring new enterprise to the city but also to secure jobs for Digital On-Ramps' participants in the resulting industries. These issues were mentioned in passing in IBM's document—and are part of Digital On-Ramps' ongoing mission—but IBM's initial timeline for fostering these relationships was, in the end, impossible to meet. The mayor presented the initiative as a success, before the pilot even began, because IBM delivered their report and Digital On-Ramps started its work, but building a relevant workforce education app from scratch, a brand new and untested process, did not happen in the given time (Philadelphia Academies, Inc. Data Specialist 2014).

Smart city results versus intentions

In Philadelphia, translating IBM's smart city policy into action proved much more difficult than IBM's engineers anticipated. Social and technical difficulties overrode the techno-utopian vision of improved employment opportunities through an app. Digital On-Ramps was an innovative smart city initiative but as an implementable, ongoing project the policy's vision was impossible to enact. Once the smart solution entered the messy reality of urban governance, of entrenched poverty in a de-industrialized inner city with few employment opportunities, the discourse of change faltered. IBM's report for Philadelphia acted as a guide, but by its very nature, written by outsiders unfamiliar with the local context of poverty and the lack of economic opportunity, the report could not anticipate the social and technical challenges faced by the team tasked with implementing the policy (Director of Innovation Management 2012). Despite the supposed intent of addressing widespread socioeconomic inequality through an app, the lasting impact of this smart city initiative was outward-facing promotion. This fostered a discourse of economic change within an entrepreneurial governance climate that did not adequately address the problems the smart policy solutions were ostensibly implemented to solve.

For Philadelphia, the particulars of its smart projects became less crucial than participating in the global discussion of the possibilities of these systems for improving a city's economy. This was not to say that the individuals and organizations involved in Digital On-Ramps were dismissive of the project's ability to raise employment numbers in the city: the need for workforce training as well as improved digital literacy were not in question. What remained

unclear was how—and where—this project would actively impact the marginalized residents it was intended to serve. Important questions remained unanswered: Where would these advanced manufacturing factories and their jobs be located: in the poor neighborhoods that lost their industrial base decades ago, or in the central districts that have remained economically successful? What sort of jobs would actually be available?

Expanding Philadelphia's advanced manufacturing sector by both training workers in relevant skills and attracting the industry to the city did fulfill the motives of Digital On-Ramps. However, there were many sorts of mismatch going on. The city was piloting an untested workforce training system to build skills for an industry that the Digital On-Ramps organizers had difficulty identifying and locating. The lack of a cohesive project did not stop Philadelphia's mayor from proclaiming the success of the smart city: the particulars of the initiative were important, but not as important as the ability of the initiative to signal the city as a 'smart city'.

Discussion and conclusion

The rhetoric of the smart city matters for how these policies are enrolled into larger and longer term strategies of economic development. The presentation of smart city initiatives must be compared against the actions that are implicit or explicit in these policies. The smart city discourse has territorial impacts that must be traced: digitally minded governance policies have material consequences and these consequences need to be compared against the actual areas and activities that intended to benefit from the policy work, a point articulated by Shelton, Zook, and Wiig (2015).

Rather than take IBM's discourse at its word, as Söderström, Paasche, and Klauser (2014) largely do, considering IBM's Smarter Cities Challenge and the Philadelphia case presents a more problematic perspective, where smart city solutions smash against existing socioeconomic and sociotechnical problems: the industry targeted by the smart city workforce education online training program was nascent in the region, and the online app itself, the heart of the smart city solution, never opened to the public in the timeframe allotted in the policy document. The disconnect between the use of the smart city concept and actually existing examples of smart city initiatives in cities worldwide is an important difference to hold in tension when studying the smart city topic. Because IBM and the other global information technology consultancies working on techno-utopian urban governance solutions have presented a particular vision of a smart city does not imply that other examples of digitally motivated civic exchange do not exist. The labeling of 'smart', or the lack thereof, matters when considering the rhetoric presented by city governments to their residents and the world.

For IBM to truly become an obligatory passage point as Söderström, Paasche, and Klauser (2014) argue, the corporation would have to provide better consultancy: the policy recommendations they provided Philadelphia had unrealistic timeframes and an unclear pathway to implementation. Translating policy discourse into practice proved impossible. While their consulting was problematic in Philadelphia, IBM still lauded the city and its mayor as representative of a smart city. The techno-utopianism of Philadelphia's effort to find employment for 600,000 residents through an app was unrealistic and irrational in practice, but the vision was what mattered. Embodying the smart city meant proposing a major initiative, never before attempted. Successfully implementing the initiative was secondary, and dependent on an advanced manufacturing cluster that could not be identified by the planners, if it existed in the city at all.

The smart city acted as a digitized facsimile of the entrepreneurial city. A techno-utopian

policy masked global ambitions, signaling a city as a smart city full of economic vitality. The smart city was an empty rhetorical device able to be filled with any number of comparable or conflicting definitions, since all cities want to be smart, or at least to appear not 'dumb'. Participating in the Challenge allowed Philadelphia to signal its ability to stay on top of fast policy transfer for economic development at a crucial moment of economic uncertainty. In writing, the policy change would benefit the entire population, but the intent of the policymaking process was always to improve the climate for global business. The potential of smart city policies to change urban governance is significant and important to examine closely. However, the Challenge in general and the Philadelphia case in particular raise issues with the analysis of the smart city in critical urban scholarship. IBM gained significant authority through the Challenge and their other smart city efforts, but the discourse of change that IBM and their partner cities presented was not matched by successful action on the ground. Moving forward, smart city policy rhetoric must be compared against the outcomes of these policies before conclusions are drawn as to the agency of the smart city to transform urban, digital governance strategies. The smart city must be considered not as a radical break from past efforts at economic policymaking, but as an extension of them.

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Note

1 http://www.ibm.com/smarterplanet/us/en/smarter_cities/overview/

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