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The empty rhetoric of the smart city: from digital inclusion to economic promotion in Philadelphia

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Smart city initiatives have been adopted by cities worldwide, proposing forward-looking, technological solutions to urban problems big and small. These policies are indicative of a digitized urban condition, where social and economic exchange rely on globalized telecommunications networks, and governance strategies follow suit. Propelled through events such as IBM's Smarter Cities Challenge, the smart city acts as a data-driven logic urban change where widespread benefit to a city and its residents is proposed, masking the utility of these policies to further entrepreneurial economic development strategies. In this article, I present a case study of the Digital On-Ramps initiative that emerged from IBM's policy-consultation in Philadelphia. The initiative proposed a social media-style workforce education application (app) to train up to 500,000 low-literacy residents for jobs in the information and knowledge economy, but even as the city's mayor declared the project a success, it did not meet expectations. This essay argues that the rhetoric of intelligent, transformative digital change works much more to "sell" a city in the global economy than to actually address urban inequalities.

Keywords: smart city; internet; entrepreneurial urbanism; policy mobilities; Philadelphia; IBM

Introduction: proclaiming Philadelphia a "smart city"

In November 2012, the City of Philadelphia's Mayor Michael Nutter gave the keynote, plenary speech at IBM's Smarter Cities Summit. This invitation-only event was held at IBM's global headquarters in Armonk, an upscale suburban hamlet just north of New York City. The Summit brought together 30 mayors from cities that participated in IBM's Smarter Cities Challenge, a three-year, global event that paired city governments with IBM's consultants to create technological solutions to urban problems (IBM, 2013). Mayor Nutter spoke for over 10 minutes, first considering Philadelphia's decline as its industrial and manufacturing economy moved elsewhere in the region and the world during the latter half of the twentieth century. Then he brought the audience into the city's twenty-first century economy of "eds, meds, and beds," otherwise known as "a thriving education sector, a booming medical technology, hospital, and pharmaceutical industry, [. . .] and hospitality and tourism putting heads on beds" (Nutter, 2012a). Mayor Nutter put forward an image of a reinvigorated city aligned to the globalized economy: dynamic, competitive, and strong. But not all was positive in the City of Brotherly Love, because as Nutter continued:

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> [Philadelphia's] economic drivers have changed for the most part, but our city workforce has not. Currently two-thirds of the jobs in the city require high literacy skills but only one-third of our residents have the skills needed to fill those positions. Too many Philadelphians lack the basic skills necessary to compete in the workforce of today and for the jobs of tomorrow, including nearly 500,000 Philadelphia adults who may function below adult literacy levels [. . .]. (Nutter, 2012a)

The Mayor went on to discuss Digital On-Ramps, the smart city initiative that IBM advised on, as a means of harnessing ubiquitous digital connectivity, cloud computing, and a mobile application—effectively a smartphone "app"—to connect these low-literacy residents to workforce education lessons and through that to employment opportunities in the city's twenty-first century economy. This speech illustrated a common rhetorical theme in the mayor's presentation of Philadelphia as a smart city, a theme enrolled in an ongoing, entrepreneurial economic growth agenda that oriented the city towards globalized enterprise (City of Philadelphia, 2011; DVRCP, 2009, 2012; Philadelphia Business Services, 2009, 2012).

In the smart city as described by IBM's policy document for Philadelphia (IBM, 2011), marginalized residents would attain relevant skills and then find a job through a social media-style educational application on the smartphone that most likely carried daily. This vision of a smart city reflects a notion of "urban intelligence" developed to improve a city's economic competitiveness and then to improve inner city residents' employment opportunities. The city needed trained workers in order to compete in the globalized economy, and even though Digital On-Ramps purported to serve marginalized residents through workforce training, it also acted to sell the city to business elite. To quote Mayor Nutter's speech in Armonk a second time:

> Bridging the digital divide though, is not just a moral issue. It is an economic and educational imperative. . . The civil rights issue of the twenty-first century will be knowledge and information access. If you can't access information in this global economy, unfortunately you will be left behind. We can't afford to allow that to happen. (Nutter, 2012a)

Adopting a smart city project was a way to attain economic prominence and attract new enterprise from within and beyond the region. The need to provide skills and jobs for residents was a factor of economic competitiveness not an imperative to provide for residents in general. With his speech, Mayor Nutter positioned Digital On-Ramps as a successful project, already contributing to its employment goals, but at that time, the project had neither recruited a single participant nor to secured a job for anyone (Digital On-Ramps Data Specialist, 2014; Drexel University Program Manager and Drexel University Senior Web Architect, 2013). More than securing jobs for residents in-need, the discursive ability of the smart city term to promote the city as innovative was what mattered. IBM's Summit and Nutter's speech offered a podium from which to promote Philadelphia as an intelligent city that was actively working to bring global enterprise to the city and region. Mayor Nutter stated that the smart city was an inclusive effort at workforce literacy (Nutter, 2012b), but in actuality this smart city initiative primarily promoted economic growth.

The aim of this essay is to understand the tensions between the smart city policy script of improving on urban problems and the underlying benefit of these policies, which was oriented to the globalized information economy. If Digital On-Ramps' workforce education effort represented the smart city for Philadelphia, then it is necessary to chart both the aims and outcomes of this policy effort to transfer information technology analytic

insights to urban governance and to align the stated goals with the absence of results. This essay first situates the smart city among post-industrial, entrepreneurial, and neoliberal urban governance transition in Philadelphia, before turning to an examination of Digital On-Ramps through the experiences of the mid-level technocrats who took this entrepreneurial initiative from IBM's policy document (IBM, 2011) to a piloted initiative between 2011 and 2013. The essay concludes by arguing for the importance of comparing policy rhetoric—which was largely the extent of the smart city—against the reality of digitally driven urban change: who benefits, where those benefits are found, and what are the implications for the urban condition writ-large? I argue that, as a matter of urban policy-making, the smart city acted as an extension of existing, globally oriented entrepreneurial economic development strategies.

By responding to the entrepreneurial turn in municipal management through the cost-cutting potential of digital methods of civic engagement, these initiatives allowed cities to show they could create efficient and innovative uses of information technology for governance. As such, there is little new about the smart city, even as the concept has gained significant traction in cities worldwide. While smart city polices purport to improve on urban inequalities, they more often function as economic promotion. While this essay offers a case study of Philadelphia, the case is not unique and has relevance for de-industrialized cities across North America. In the 2010–2013 period where IBM offered their smart city consulting via the Smarter Cities Challenge, 33 other cities from the US, Canada, and Mexico participated (IBM, 2013).

Laying the foundations for a smart city

Cities are today enveloped in a "haze of software instructions" (Amin & Thrift, 2002, p. 125). As information and communication technologies have left the desktop and the landline telephone to become wireless and mobile (Graham & Marvin, 1996; Mitchell 2003) and as connection to the Internet is now pocketable in the form of smartphones and other networked computing devices (Wiig, 2013), urban governance has accordingly taken on new forms of civic exchange through these novel means of interacting with residents, businesses, and visitors (Hollands, 2008; Townsend, 2013). While much smart city scholarship critiques the near-future potential of these urban technologies to transform cities in a variety of fashions (Greenfield, 2013; Klauser, Paasche, & Söderström, 2014; Söderström, Paasche, & Klauser, 2014), in-depth, empirical studies of digitally driven, data-focused urban change remain lacking (Kitchin, 2014a). Accordingly, this essay explores how smart city policies were folded into existing, entrepreneurial governance strategies in Philadelphia, strategies that prioritized economic promotion even as they presented a script of widespread social benefit (Harvey, 1989; Hollands, 2008). In this analysis of policy discourse and outcomes, the logic of digital efficiency and technological improvement sat outside of critique, an example of the positivist belief that the Internet, digital connectivity, and social media hold the capacity to transform cities and socio-spatial exchange (Rabari and Storper 2015; Roche, 2014; Wyly, 2013, 2014).

The smart city as a governance device encompasses the integration of buildings, neighborhoods, digital–urban infrastructures, city government, and citizen activities with data analysis to "solve" a wide variety of urban issues. Smart city policies propose to enable more efficient use and organization of urban systems, leading to a more "intelligent" city by implementing a number of socially and economically desirable deliverables, including maintaining economic viability and vitality in a global economy, ecological sustainability via smart electrical grid technologies and the like, resident safety,

surveillance, and health, e-government services, improved, more efficient transportation systems, and more robust communication systems (Harrison & Donnelly, 2011; Hollands, 2008; Kitchin, 2014b; Townsend, 2013), but how and where these deliverables actually, actively impact cities and their residents was rarely considered in the planning documentation and the rollout of the policies into operational projects. Smart city initiatives acted as a localization of globally circulating policy concepts (Söderström et al., 2014; Wiig, 2015), where the smart city's technological potential signaled inventive ideas for urban change but rarely targeted marginalized neighborhoods outright (Shelton, Zook, & Wiig, 2015). Much recent, critical scholarship on the smart city (Goodspeed, 2015; Greenfield, 2013; Klauser et al., 2014; Söderström et al., 2014; Vanolo, 2014) pushes back against IBM and the other drivers of the "urban intelligence industrial complex" (Hill, 2013) but does not proceed past the corporate drivers of this top-down, technocratic policy discourse into how cities are enrolling in the process. This essay provides an empirical case study of how one city did so, and the divide between stated desires for workforce education and civic engagement and outcomes much more focused on global economic promotion through innovative policymaking.

Scholarship on global policy transfer, or policy mobilities, considers the deployment of policies, practice, and best knowledge between cities, considering how initiatives from elsewhere inform developments in another location, arguing that mobile policies form a cornerstone of contemporary, entrepreneurial governance strategies utilizing expert knowledge typically formed elsewhere to impact particular cities through urban policies (Cochrane & Ward, 2012; McCann & Ward, 2011; Prince, 2014). Mayor Nutter's work promoting Philadelphia through IBM's Armonk event discussed above was part of a larger turn in civic promotion through mayors going global to promote their city's economic capacities, where public benefit was redefined as privatized economic growth (MacLeod, 2011), so much so that the mayor's promotional efforts were never positioned towards a local audience (Beal and Pinson 2014). While outside the purview of this essay, I consider IBM's smart city as an example of policy mobility in an earlier essay (Wiig, 2015).

This essay considers what happened when one city's smart city policy arrived from IBM, and then what occurred as that policy was made operational. Once the policy entered into the untidiness of the city itself, the precise, targeted, intelligent solution to an urban problem was much more difficult to enact than IBM's policy document accounted for. The Philadelphia case presents a means of contrasting policy rhetoric with outcomes, where the ambitious goals acted much more for economic promotion, and the technological change remained unrealized. Methodologically, the research underpinning this essay took place between 2012 and 2014 and consisted of fieldwork in Philadelphia, discourse analysis (e.g. Fairclough, 2003), and narrative analysis (e.g. Riessman, 1993) of policy documents, press releases from the Philadelphia Mayor's Office and IBM, as well as speeches from relevant parties and interviews with the mid-level planners involved in implementing Digital On-Ramps. The analysis focused on unpacking the difference between policy rhetoric and outcomes, as well as the gaps between presentation of benefit of the smart city project for Philadelphia's residents, and the way the project functioned to promote the city within the global economy.

The urban condition in twenty-first century, globalized Philadelphia

Philadelphia's urban form, neighborhoods, and population itself were an outcome largely of an industrial manufacturing economy (Simon & Alnutt, 2007) that by the 1970s

relocated or disappeared, leaving behind a fractured landscape of inner city poverty often proximate to successful, "premium networked zones" of economic strength (Graham & Marvin, 2001). While, to an extent, the city's downtown stabilized into a "node" in the globalized information economy (Castells, 2000, 2001; Sassen, 2011), as a whole the city suffered from "high taxes, high crime rates, and poor schools", all of which drove the continued outmigration, and, according to the business community, these governance factors continued to impact the city's potential for attracting new industry (Simon & Alnutt, 2007, p. 395). In this city of over 1,526,000 (US Census Bureau, 2010), poverty and inequality remained high. As of 2012, Philadelphia's poverty rate was 26.2%. Statewide the rate was 13.1% and the nationwide average was 14.9% (US Census Bureau, 2012); the city had concentrations of poverty at nearly double the state's rate.

The neoliberal governance negotiations between providing services for residents left behind by post-industrial economic restructuring and aggressively transforming Philadelphia into a node in the globalized economy had been ongoing since the early 1980s (Bauman, 1990, p. 142 and 149; Hackworth, 2007, pp. 36–37; Hayllar, 1999; Massey, 1990, p. 330; Wallace, Wallace, Ullmann, & Andrews, 1999, p. 117, citing). Since then, the transition away from industrial manufacturing left little opportunity for decent paying jobs for inner-city residents (see also Norton & Rees, 1979). Also in the 1980s, the slashing of city services, including the layoff of 2,400 city employees, "dismantle[d] the local welfare state…within the sufficiently narrow ideological confines of fiscal responsibility" (Hackworth, 2007, p. 37). The economic development focus around education, medicine, and hospitality that Mayor Nutter described in his keynote talk (Nutter, 2012a) emerged in the 1990s; anchor institutions of education and medicine were among the largest employers in the city by the late 1990s (Harkavy & Zuckerman, 1999; Kromer, 2010) and remained strong through the first decade of the twenty-first century. Even as the city's anchor-institution and globalized economy continued to grow, the opportunities for unskilled and low-skilled workers remained few and far between, primarily in low-pay service industry positions (Edmunds, Pearsall, & Porterfield, 2014), which spoke both to the need for smart city training such as proposed by the Digital On-Ramps initiative, as well as the need to create more pathways to employment in general.

The workers of the industrial economy and the neighborhoods that housed those workers were to a large extent left out of the transition to a globalized, information economy (Gilbert, 2010; Gilbert & Masucci, 2011). The city's poverty, unemployment, and general marginalization was spatially concentrated in the formerly industrial areas, as well as racially segregated in specific neighborhoods, most prominently in North Philadelphia just north of City Hall (Gilbert & Masucci, 2011, p. 53). Philadelphia County (the city and the county share the same metropolitan boundary) had the highest unemployment rate in the region in 2013, at 8.4%; the average unemployment rate for the region was 6.4% and the median was 6.5%, while nationwide, the unemployment rate at that time was 6.5% (US Bureau of Labor Statistics, 2013). Economic inequality was latent throughout large swaths of the inner city, where access to local, neighborhood-based employment, city services, transportation, and safety were sparse (Gilbert & Masucci, 2011; Wacquant, 1996).

The downtown neighborhoods of Center City Philadelphia and around the University of Pennsylvania and Drexel University in West Philadelphia, where the information economy was quite prominent, transitioned out of their post-industrial downturn, while other inner-city and outlying neighborhoods, which were home to much larger working class and minority populations, had not transitioned past their industrial origins. What

work was available for residents of these marginalized areas would likely be in those central clusters, not in the de-industrialized neighborhoods themselves.

Smart city initiatives in cities like Philadelphia used information technology in novel ways to address inequality (Shelton et al., 2015): the pervasive accessibility to information a smartphone offers was seen to connect across distance and access issues for neighborhoods where social services had been cut. Smart city policy solutions offered cost-cutting means of providing services in a neoliberal governance climate, services that also offered the potential to promote the city as innovative, an example of the entrepreneurial city (Harvey, 1989). The de-industrialization of the urban economy hollowed out neighborhoods designed around nearby jobs in manufacturing. Perpetually shrinking state and municipal budgets cut services such as education and public transportation. In the rhetoric of the smart city, wireless, ubiquitous computing offered the potential to connect residents to digitized information that could take the place of these civic services formerly found in physical locations, such as what Digital On-Ramps proposed, to move educational services from schools and community centers to a digital application.

IBM's policymaking in Philadelphia: crafting a smart approach to workforce education

In November 2010, IBM announced the Smarter Cities Challenge, stating that they would provide approximately $400,000 of consultation services each to 100 cities worldwide (Fishkind, 2010). The press release from the Challenge's kickoff stated:

> IBM's consultants and technology specialists will help municipalities analyze and prioritize their needs, review strengths and weaknesses, and learn from the successful strategies used by other cities. After studying the role that intelligent technology might play in uniting and advancing different aspects of city life, IBM will recommend concrete strategies designed to help make regions healthier, safer, smarter, more prosperous, and attractive to current and prospective residents and businesses. (Fishkind, 2010)

IBM's statement reinforces the perceived benefit of smart city initiatives for solving urban problems through technological solutions that have wide-ranging application between cities around the world. This description of smart city consultation held a vision of sharing policy strategies that used responsive and adaptive information technologies to improve on urban issues for "current and prospective residents and businesses". Explicit in this presentation of the smart city was that technology could improve nearly every aspect of urban life: health, safety, education, and general prosperity. (Fishkind, 2010). How these aspects were defined and measured remained ambiguous; the ambiguity allowed them to remain all-encompassing. For the Challenge, Philadelphia requested IBM's expertise implementing a workforce education portal that would link unemployed or underemployed residents to online, easily accessible training modules for work in emerging industries of the globalized economy. The city was part of the initial 2011 round of IBM's consultation event (IBM, 2011).

Six months earlier, Philadelphia hosted an IBM-sponsored event that Mayor Nutter presented at the "Greater Philadelphia Smarter Cities Forum". This one-day forum at the downtown National Constitution Center offered "nearly 150 local academic, business, and government leaders [an opportunity] to share ideas on how to revitalize the local economy, retain the viability of Philadelphia and the role technology will play in the city's

future" (Rowinski, 2010), indicating that Mayor Nutter's office and IBM were at least considering these topics before the city's participation in the Challenge was made public.

Also around this time, Philadelphia's Business Services division launched a city branding, promotional campaign titled "Philadelphia: Smart City, Smart Choice" (Philadelphia Business Services, 2009) that portrayed the city as an emerging hub of new, globally relevant enterprise. While outside the bounds of this essay to cover in detail, this promotional effort was indicative of the work Philadelphia's city government did to embrace the smart city concept. Attracting global enterprise through smart city branding was important to the city.

In an opinion piece for IBM's "Citizen IBM" corporate citizenship blog, Mayor Nutter stated that over one-third of the city's population was unqualified for jobs in the information-heavy globalized industries, which would negatively "impact [the] jobs and companies that we attract to Philadelphia, limiting the potential growth for our local economy" (Nutter, 2012b). This lack of a trained, literate workforce for entry-level jobs was damaging to the city's ability to maintain its competitive potential in the global economy, a belief IBM reiterated in their Philadelphia policy document (IBM, 2011, p. 7). This vision of the smart city foregrounds economic growth, relying on the promotional capacity of the policies to draw enterprise to the city, enterprise that in turn could potentially employ city residents. The topics the smart city planning sought out in Philadelphia were economic: to increase the city's general capacity to attract and retain enterprise and to grow the knowledge of entry-level workers.

IBM's team of consultants came to Philadelphia in October 2011 (IBM, 2011, p. 122). They interviewed 66 individuals from 38 organizations representing "city government, private sector employers, universities and colleges, schools and community-based organizations". From these interviews, the consultants chose "to view the Digital On-Ramps stakeholders in three groupings: citizens, providers, and employers". A primary need for the long-term success of Digital On-Ramps was identified in the imperative to foster "collaborative relationships" between these organizations, since without that the potential of the project was negated (IBM, 2011, p. 21). Digital On-Ramps needed users, identified through nongovernmental service providers, education consultants, and other groups, to provide the content and guide the learning process. Additionally, Digital On-Ramps needed economic development advocates to connect potential employers into the mix.

The consultant's findings were published as an executive summary and a full report in December 2011. The takeaway recommendations were to use the smart city initiative as the impetus to create an umbrella organization to guide the city's interest in creating an "anytime, anywhere" online learning platform for new workforce education and training (IBM, 2011). In turn, Digital On-Ramps would also act to highlight digital inclusion efforts to enterprise that could employ program participants. After this umbrella organization was created, Digital On-Ramps would then move to combat the city's systematic unemployment through a cloud computing, web-based, multiplatform and mobile application to teach these work-ready skills and to eventually add a social media-style component that would connect the participants directly to employers and work opportunities (City of Philadelphia, 2012; IBM, 2011). The next section discusses Digital On-Ramps from policy initiative to pilot as a means of unpacking the outcomes of Philadelphia's engagement with the smart city concept.

Implementing Digital On-Ramps: Software applications for a smart city

A constellation of policy actors brought Digital On-Ramps from initiative to pilot. The organizations involved in the project included from Philadelphia Academies Inc. an

educational nonprofit whose president was the Mayor's wife, to the city's far-reaching general, digital, and workplace literacy organization, to digital inclusion and youth employment agencies, to IBM, and Drexel University (Drexel University Program Manager and Drexel University Senior Web Architect, 2013). Drexel University and Philadelphia Academies, Inc., were the two main planners of the initiative, the former overseeing the finances and the project as a whole and the latter providing the educational programming for the application and connecting to the public school students directly. Digital On-Ramps expected to complement existing workforce training efforts in the city such as community centers or schools, as well as public libraries and the Keyspot public computing centers established across much of the city as part of earlier work at digital inclusion and civic engagement (Drexel University Program Manager and Drexel University Senior Web Architect, 2013). Digital On-Ramps' planners hoped to make it easier for interested residents to access educational deliverables by enlisting smartphones and other Internet-enabled devices into the learning process, leading to a target of serving 175,000 residents and having 33,000 unemployed or underemployed residents find work by 2017 (Digital On-Ramps, n. d.).

By early 2012, $2 million in capital had been raised from John S. and Leigh Middleton, one of the Philadelphia Phillies baseball team owners (Hill, 2012; Key, 2012); IBM provided consulting services but not funding for project implementation, so this capital was crucial for moving forward. Additionally, a project lead was hired to bring the full, citywide system online. Three "early action projects" were implemented: "(1) development of the digital portfolio; (2) developing digital badges for 21st century skills and piloting badges as a core component of Digital On-Ramps' credentialing system; and (3) piloting the use of predictive analytics to determine which learners would best be served by Digital On-Ramps and to make matches between learners and educational and career pathways" (Director of Fund Development, Philadelphia Academies, Inc. 2013). How these three action projects were implemented is detailed below.

The primary effort of the Digital On-Ramps' planners was to create an easy-to-use software application through which the early action projects could be accomplished. This application (commonly called an "app") would take work-ready lesson plans from Philadelphia Academies, Inc. and other sources of learning material including the Mayor's Commission on Literacy and turn paper-based lessons into online learning modules in the form of "badges". These "digital badges" were at the center of a system where "kids would earn skill points in twenty-first century skills through doing workshops and college readiness [exercises]" (Business Development Manger, Urban Affairs Coalition 2013). The idea for the badges came from a project developed by Mozilla, the creator of the Firefox Internet web browser. Mozilla's Open Badges campaign crafted a free, open-source software package around which content creators like Philadelphia Academies, Inc. could mold educational lessons into a cohesive set of skills recognizable by educators and private industry. The MacArthur Foundation initially funded Mozilla's campaign in 2011, with the intent to create a platform that would "provide any organization the basic building blocks they need to offer badges in a standard, interoperable manner" (Surman, 2011). In essence, Mozilla's Open Badges functioned as the platform that Digital On-Ramps built their online portal on, although the application was coded and maintained by a third-party software developer, not on the steering committee, nor Mozilla. The thinking behind badging the learning activities was to create a means of "gamifying" the educational experience (Director of Fund Development, Philadelphia Academies, Inc., 2013), creating a "currency" (Business Development Manager, Urban Affairs Coalition, 2013) where students could earn badges certified and vouched for—if

not designed outright—by Digital On-Ramps, that in turn employers and colleges could use to filter students into the community college system or entry-level jobs. Learning via this application was intended to be fun, engaging, and realistic to the time-constraints of youth, as they go about their daily lives.

Digital On-Ramps described the potential impact on their website as follows: "Digital connectivity changes everything: By making education and workforce resources available whenever and wherever, and actively engaging Philadelphia's young people and adults in digital technology to build their workforce skills—we can change our future" (Digital On-Ramps, 2013). As described by the Business Development Manager at the Urban Affairs Coalition (2013), the rationale for the "anytime, anywhere learning" was multiple: by having the app function on mobile devices, the intent was to make the application easy to use and to implement the gaming aspects, although what this meant in practice was unclear. A larger motivation for the "anytime, anywhere learning" was because:

> a lot of times students will have to drop out of school or drop out of a program, not because of academic reasons but because of social reasons. Either they are moving around, they have to take care of a parent, they get in the foster system, they change schools all the time, they get lost in the system. (Business Development Manager, Urban Affairs Coalition, 2013)

The ability to come back to a program meant that the student would not have to re-start the work from the beginning and to continue the work from home, assuming they had access to a computing device that could connect to the application. Making the application mobile meant that the content created around learning through badge-earning meant that, because of cloud-computing storage of the participants' data, a lesson could be started on a desktop computer, continued on an Internet-enabled smartphone, and finished back on a desktop computer. There was no paper to lose, and if a participant moved to another address, they would not have to update the application. This mobility of data and connectivity via systems of wireless, ubiquitous connection provided by the mobile Internet, and cellular data was central to the logic of the smart city in use for the initiative: the educational ambitions could overcome the spatial distance between interested residents and the locations of workforce training, which could have been far apart. In this vision of the smart city, the potential of digital connection would overcome the splintering characteristics of the contemporary, post-industrial metropolis. On top of this general use of smart city thinking, IBM's predictive analytic software would be applied to figure out who the users might be, how to best reach those users, and also to identify users having issues with the application, at which point the application could "have the innate knowledge to know someone is struggling and to take them back and relearn it, or relearn it in a different way, to something more visual rather than text heavy. It is a way to flip around the learning style, [to try] to adapt to the way people learn…" (Director, School Initiatives, Philadelphia Academies, Inc., 2013; IBM, 2011, p. 30). Algorithmic methods of analysis and learning would teach the application how to interact with participants without requiring the active, immediate input of the planners and technocrats involved in the project.

There were no particular areas of the city focused for potential outreach from Digital On-Ramps, but the civic-minded partner organizations had populations and neighborhoods they already worked with; this was reflected in the locations of the four high schools that participated in the pilot, all located in formerly industrial, inner-city neighborhoods (Drexel University Program Manager and Drexel University Senior Web Architect, 2013). The pilot ran in the spring semester, from January to May 2013, at

four public schools located in northeast, northwest, west, and south Philadelphia: Lincoln High School, Parkway West High School, Roxborough High School, and Furness High School (DOR4PAI 2013). Over 500 youth in the tenth grade at these schools expressed interest in the project, a number that was seen by Digital On-Ramps staff as a major success in proving the potential of the digital badging for workforce education (Digital On-Ramps and Data Specialist, Philadelphia Academies, Inc., 2014).

By the time of the pilot, Digital On-Ramps' steering committee had not identified existing or near-future jobs that the program would specifically train for. As such, a staff member at the Urban Affairs Coalition described Digital On-Ramps goal at the time of the pilot as not "defining a twenty-first century job as much as defining twenty-first century skills, which [were] creativity, collaboration, teamwork, leadership, and problem solving" (Business Development Manager, Urban Affairs Coalition, 2013). The same staff member elaborated that for participants to become competitive in the job market, Digital On-Ramps would also provide trainings on topics like food safety for industrial kitchens, in addition to lessons on commercial-grade photocopier and printer use. For target skills that the badge-based learning would train for, the Business Development Manager at Urban Affairs Coalition offered the following comment (2013): "I see in the future where Ricoh or Xerox maybe have a touchscreen emulator for their copy machines, where kids can learn and practice how to use high-end copy machines and printers, then get a badge in that, and so when they walk onto the job they know how to use those systems". In this vision, training for a photocopier would be a smart city skill. The technological potential of the smart city was manifest in entry-level skills to operate a very established piece of office equipment, turning digital files into photocopied or printed materials. In the smart city, these introductory skill-sets that, traditionally, the employer would train for on the job, were learned on the participants' own time in order to position the individual as desirable to the potential employer.

When asked if there had been a discussion about the specific industry Digital On-Ramps would train for, the planners answered that advanced manufacturing was the target for the pilot, but the staff had no definition of that industry nor examples of existing companies working in the field in the city (Drexel University Program Manager and Drexel University Senior Web Architect, 2013). When pressed on the issue, Drexel University's mid-level staff deferred to their supervisor, who as a member of the steering committee stated the project leaders also had no working definition of the industry (personal communication between Drexel University Program Manager and author 2013).

Advanced manufacturing was a new industry and as such perhaps difficult to define. The push for this enterprise stems from efforts of the United States' federal government to reinvigorate the manufacturing capabilities of the US by fostering business that centers on a high-tech, precision, flexible and nimble production model, with the further ability to quickly adjust to changing demands and products (Science and Technology Policy Institute, 2010). This push to identify the country as an innovative location of advanced manufacturing occurred at roughly the same time that Digital On-Ramps was in the planning stage. Advanced manufacturing was an industry the "Philadelphia: Smart City, Smart Choice" branding campaign mentioned in their promotional material about the smart city economy (Philadelphia Business Services, 2009), which indicated that internal discussions had likely happened to align Digital On-Ramps' goals with the Mayor's overall economic development agenda. While outside the scope of this article, it is worth noting that the sort of manufacturing considered advanced in Philadelphia was largely locating at the city's periphery in new and emerging economic districts such as the public–private development the Philadelphia Navy Yard, far from the de-industrialized

neighborhoods Digital On-Ramps targeted for outreach, and geared to middle-class automobile commuters more than public transit users. How to connect participants from these inner-city neighborhoods to potential employers at the city's fringe was not part of the smart city policy IBM provided (2011), indicating larger governance and planning challenges around transitioning to a globalized economy such as re-routing public transit and transportation in general to bring workers to jobs in different areas of the city, challenges that could not be met by a software application and a smartphone.

Piloting Digital On-Ramps

Prior to detailing the pilot itself, it is important to provide some context around public education in Philadelphia. The recent history of public education in Philadelphia has been a series of stumbles and failures. Because of the effort to re-orient workforce education around the mobile Internet application by Digital On-Ramps, a not-insignificant contradiction existed of providing a technological solution in a failing public education setting. The public education system was built for a greater population in the city and the siting of schools reflected earlier neighborhood settlement and employment patterns. The schools were built where the manufacturing economy located; the schools did not move as that economy left and the neighborhoods' population declined. As industry left the city, the population shrunk significantly and the schools suffered. Urban schools in the mid-to-late twentieth century were a locus for the socio-economic problems the city faced. From the 1960s through the 1980s, the city lost 800,000 residents, industrial jobs dropped from 800,000 to 250,000, and business taxes remained high, hindering new industry from establishing within city boundaries (Christman & Rhodes, 2002, p. 11; Maranto, 2005, p. 155, citing).

With the transition to a knowledge and information economy in the 1990s, the city's financial base began to recover. Over this same period, the school district, constantly facing with shrinking student body and significant funding cuts, suffered from high dropout rates and the inability of students to meet "basic skill requirements" (Christman & Rhodes, 2002; Maranto, 2005, p. 155, citing). The schools were failing their students: the state would not increase spending on these schools and the city would not either. As Philadelphia's economy improved, its schools did not. For example, in 2012 and 2013, when Digital On-Ramps was planned then piloted, the district closed thirty schools total, in an attempt at closing a $300 million budget deficit (Jack & Sludden, 2013; Leblanc, 2013). These overarching uncertainties (such as, would the school a student finished the spring term at in June close before the start of the next school year in August) facing education in Philadelphia spoke to the need to provide innovative solutions that might engage students in relevant, marketable skill-sets, but they were also indicative of the extremely problematic assumption that an online learning platform could achieve some level of success, when the proverbial roof was figuratively or possibly literally collapsing on top of students. Mobile apps could not replace functional, well-funded classrooms.

Outcomes of the pilot

The following analysis of the pilot is synthesized from interviews with the Business Development Manager at the Urban Affairs Coalition in March 2013, during the pilot, and the Digital On-Ramps and Data Specialist at Philadelphia Academies, Inc. in January 2014, approximately seven months after the pilot ended. The pilot had problems, primarily stemming from miscommunication that was exacerbated by the online application's

out-of-the-area software provider. While over 500 youth signed up to participate in the pilot, viewed as a major success by everyone interviewed, the software was not up to par. Also, which organization was in charge of leading the youth through the application was unclear. Philadelphia Academies, Inc. staff implemented the pilot, but miscommunication between the high school teachers and the staff as to who would introduce the program and guide the youth through the trainings led to frustration on the part of the teachers. The teachers did not want the additional workload of both educating themselves on the software and then taking the time to train the youth, but Philadelphia Academies, Inc. did not provide Digital On-Ramps with staff to introduce the project to the youth either. While the entire discussion of the "anytime, anywhere" learning potential of Digital On-Ramps made it sound like the application would be useable anywhere a participant had a connection to the mobile Internet, during the pilot, the students accessed the application through desktop computers in their schools. Youth likely had an Internet-enabled smartphone, but they were not necessarily interested in doing what they perceived as schoolwork on their own time, nor did the youth necessarily pay for a data plan that would give them access to the mobile Internet, instead relying on free wireless Internet throughout the city (Digital On-Ramps Data Specialist, 2014).

Beyond the issue of accessing to the application only in a computer lab, the application itself did not work well, according to the Philadelphia Academies, Inc. Data Specialist (2014). The application relied on self-directed "sandbox"—as in play in the sandbox by yourself—activities that were not well integrated into the youth's overall school curricula. The program was not engaging and the incentive for participating was not clear; youth wanted to see something come out of their participation like a potential summertime internship related to the lessons they were learning. Furthermore, and foundational, the software provider could not manage the scope of the pilot. The provider was matched to Digital On-Ramps by a grant and the planners considered the company underqualified to achieve the capacity needed. An example of this lack on the part of the software provider was that the software platform did not allow the youth to reset her or his password automatically, requiring the participant to email the provider to get a password reset.

Overall, this "anytime-anywhere" learning application did not work well; the vision of a smart city approach to workforce education and overcoming low digital literacy in the process was overtaken by social and technical challenges, poor communication between planners and the teachers of involved student-participants, and general confusion about the curricula's "sandbox"-style lessons. After the pilot ended in May 2013, the software provider was removed and a replacement sought. Rather than fix a broken system, Digital On-Ramps decided to start over and look at different options. The digital badging concept was of interest to the pilot participants, and further rollout of the project was expected to start in late 2014 (Digital On-Ramps Data Specialist, Philadelphia Academies, Inc., 2014).

The grand vision that initiated Digital On-Ramps, for a first-of-its-kind mobile application that Philadelphia and IBM promoted, remained unmet. Work on Digital On-Ramps continued after the pilot ended and as of late 2014, the project transitioned to focus on building an online portfolio for city residents to hold their workforce education materials gleaned from online and classroom-based coursework, then connecting participants to employers through general counseling and interview preparation workshops (Digital On-Ramps, 2014). This shifted focus was much less driven by technological change and more geared to smaller, targeted achievements aligned with ongoing civic engagement and literacy efforts in the city. The primary impact of Digital On-Ramps was seen in its role to complement "physical learning communities and workforce training" as well as offering, through the application, the ability to provide information and data

portability for users. Additionally, the use of digital badges was seen as an innovative solution to certification of learning accomplishments. The collaborative nature of Digital On-Ramps' Steering Committee offered a "transformative partnership across several key stakeholders including the city", which was perceived as the primary reason the initiative had "moved to the pilot so quickly, in just over a year" (Director of Fund Development, Philadelphia Academies, Inc., 2013).

All this took "a potentially negative conversation that we have had over and over again in the media and education and [put] a positive spin on it and action behind it. . ." (Drexel University Program Manager and Drexel University Senior Web Architect, 2013). Perception of Philadelphia as an innovative place with a dynamic economy was crucial to maintaining forward momentum to turn the city into a vibrant node in the globalized economy, instead of a failed, nineteenth and twentieth century industrial power. When asked what the lasting impact of Digital On-Ramps might be, all of the staff saw success in the ongoing public–private collaboration between many agencies citywide. Working together strengthened interpersonal bonds between organizations that had in the past worked on similar issues in an isolated fashion, potentially replicating efforts all directed at the same general outcome: an improved workforce and a strong economy in Philadelphia. Due to the failure of the pilot, the ability of participants to secure employment, as the core goal of the initiative, went unmentioned in these remarks. The smart city employment solution was not met in the pilot, indicating that IBM's expert policy knowledge was insufficient to address Philadelphia's actually existing economic condition. Even as Mayor Nutter called Digital On-Ramps a success (2012a), the goals of the smart city remained unmet.

Conclusion

The smart city was largely an empty term, a vacant rhetorical device able to be filled with any number of comparable or conflicting definitions; all cities wanted to be perceived as "smart", since the corollary was to appear "dumb". With the widespread integration of ubiquitous, wireless and mobile information and communication technologies into nearly every aspect of contemporary urban life, the logic of smart city governance, functioning through digital connectivity, has been applied to solving, or improving on any number of urban issues, so much so that it was not feasible to pin down the term any further. As such, the rhetoric of smart city policymaking matters for how these initiatives are enrolled into larger and longer-term strategies of civic engagement, economic development, and urban change of all sorts. The presentation of benefit of the smart city must be tested against the actions that are implicit or explicit in these policies. Digital On-Ramps proposed building digital inclusion among marginalized Philadelphia residents by using the connective, information-providing potential of a smartphone. This informative potential would then train residents for jobs in globally oriented, information-focused industries. Although marketed as an inclusive operation, transforming marginalized, low-literacy residents into employable individuals, Digital On-Ramps was much more useful as a promotional vehicle to highlight the city's global competitiveness than to provide jobs for the people who might have participated in the program.

After the smart city hype died down, soon after IBM's report was released and long before the pilot occurred, after the bombastic fantasy of solving unemployment for 500,000 marginalized city residents faded (Nutter, 2012a), the success of the smart city initiative could be found in both economic promotion and strong collaboration between city offices and numerous nongovernmental organizations, but decidedly not in jobs

created for city residents in need. Long after Mayor Nutter declared Digital On-Ramps a successful project (2012a), the smartphone application and online portal remained works in progress. Digital On-Ramps did not represent a successful, functional initiative during the timeframe allotted during the planning process. This situation highlights the need to closely and critically interrogate the relationship between the rhetoric of the smart city and the consequences of these policies, especially their spatial unevenness in cities that adopted the policy strategy. Digital On-Ramps was ultimately an irrational, overly ambitious policy vision: a workforce education application could never, on its own, provide pathways for jobs for the 500,000 the Mayor claimed were in need of new skills (Nutter, 2012a).

The potential of Digital On-Ramps in particular and the smart city in general to enact significant and meaningful change to the endemic poverty, marginalization, and social polarization in Philadelphia was present, but the smart city discourse relied too much on the possibility of new industries locating in Philadelphia in the near future because of the presence of a trained workforce, than on providing jobs for residents in need. Highlighting the city's ability to train an entry-level workforce for twenty-first century industries signified that the city was welcoming of new, "smart" industries, but training residents for positions in fields that were not yet present in Philadelphia was problematic. Without a clear pathway to defined jobs, even the planners had difficulties explaining what Digital On-Ramps intended to do and how it would improve employment opportunity in the city. Here, the overarching logic of the smart city was to address urban problems through technological solutions, but what was constituted as an urban problem in this discourse was a sliver of larger matters, one that could possibly be "solved" through a technological fix. Rather than dealing with the qualitatively different problem of widespread post-industrial economic decline, inner city marginalization, and a lack of economic opportunities for hundreds of thousands of city residents, the smart city discourse reduced Philadelphia's recent past into one problem with a straightforward solution: online workforce education through a mobile application. More-so, as this never-fully-enacted workforce education solution morphed into an even simpler problem to solve: better and "smarter" collaboration between governmental, nongovernmental, and private partners. In order to spin the project's narrative in a positive light, the lack of results of Digital On-Ramps itself was sidestepped and the relationship building between partners became the project's success. Relationship building, however, did not provide jobs to the Philadelphians in need of Digital On-Ramps' services.

The a-spatiality of techno-utopian smart city policies did not take into consideration the material geography of longstanding urban problems, a geography that must be accounted for in order to overcome the legacy of inner city decline. High levels of personal mobility, likely in a private automobile, mattered immensely in this smart city vision. The advanced manufacturing industry and, in general, the new enterprise the smart city sought out was found in peripheral areas of the city, often far from public transit linkages based around industrial-era commuting patterns. A smartphone application could never transcend this locational transition of Philadelphia's economy away from the industrial areas into new, globally oriented zones.

In Philadelphia, resources were deployed on basis of a technocratic logic that masked inequality behind a curtain of perceived need, shifting the policy discussion toward technological solutions rather than actual change in the form of jobs or well-funded public schools. The divide between policy goals and outcomes, between rhetoric and reality, served to shift attention and resources away from addressing the actual

inequality—of failing schools and a lack of skills relevant to employers—towards solving problems through an unproven online and smartphone application

Keeping up in an atmosphere of fast policy transfer around the smart city concept necessitated a short timeframe for implementing Digital On-Ramps. Signaling an innovative, smart economic development milieu was perceived crucial in order to stand out from other cities enrolling in the smart city discourse. Philadelphia had to brand itself as smart before other, similar cities did. However, the same timeframe, paired with an untested online education concept, was in the end impossible to meet successfully. The entrenched urban problems, specifically failing public schools and the absence of pathways to employment, problems that the smart city policy sought to fix, could not be changed without investing in longer-term urban transformation.

The Philadelphia case highlights the smart city as an entrepreneurial governance strategy (Harvey, 1989; Hollands, 2008), one that fostered a rhetoric of economic change within an established, neoliberal governance climate that did not account for actually lessening the inequalities. There is a need in urban scholarship to closely examine relationship between the discourse and the material consequences: how it is applied to solving urban problems, for whom and for what areas, and, as such, how the policies may state one thing but actually do another. Digital On-Ramps represented a transfer of expectation around the city's responsibility to have a pre-trained workforce for new enterprise. In this case, the potential of a mobile learning application presented a strange twist in the neoliberal logic of workforce training: to create a new economy, Philadelphia first needed to prove it had innovative workers both for high-skill and entry-level positions. And yet, neither IBM nor Philadelphia promised to bring jobs to the city, let alone to the poor neighborhoods where Digital On-Ramps participants would likely live.

Given the ambitions of entrepreneurial urban governance perhaps Philadelphia actually succeeded in branding itself as a "smart city" to its intended, global audience. Perhaps success here is measured simply in keeping up with the global circulation of smart city policy discourse (Wiig, 2015), where a city must be perceived as smart at a particular period in time, just as earlier in the century it was important to be "creative" (Florida, 2002). What city marker comes next remains to be seen, but it is worth noting that Philadelphia has largely dropped the smart city term from its repertoire of promotional strategies.

Echoing Kitchin (2014a), scholars engaging the smart city need to move beyond critiquing IBM and the rest of the "urban intelligence industrial complex" (Hill, 2013) to consider why, how, and where cities have enrolled in smart city policymaking. Urban scholars must follow smart city initiatives into the city, beyond the policy discourse. Critically engaging with the smart city necessitates considering the longer process of technologically driven, entrepreneurial economic development as well as digitally driven civic engagement, looking past a policy's script and onto the actions circulating around the policy's implementation.

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