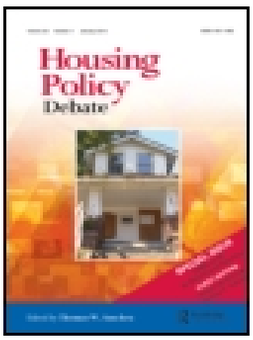

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Toward Engaged, Equitable, and Smart Communities: Lessons From West Baltimore

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ABSTRACT

Smart city investments are happening in many cities around the United States. All too often, however, smart city interventions are solutions in search of problems, rather than solutions that seek to meet the needs of cities and their most vulnerable residents. This study asks how the engagement of communities can help to improve smart city investments that aim to address the needs and concerns of low-income communities of color. Through focus groups and surveys in West Baltimore, Maryland, the research showed how smart city technologies can aid residents in navigating uneven regional geographies of opportunity, addressing the existing digital divide, and developing plans that leverage their creative problem-solving capacities and existing uses of technology to address critical community needs and priorities. The study reveals how engaging communities at the front end of planning switches the focus away from technology-driven solutions to more equitable, community-centered, and place-based smart city plans and investments.

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smart cities; Baltimore; community engagement; equity planning; community development

Smart city investments and planning are happening in many cities in the United States and around the world. Free public wireless internet (Wi-Fi), autonomous vehicles, web-based curricula, personal health monitors, and smart transit hubs have the potential to radically change how cities are organized and services are delivered. Cities large and small are increasingly utilizing technology to spur economic development, increase transit efficiency, improve educational outcomes, and increase access to social services, among other goals. By applying innovative information technologies (IT) such as wireless sensors and utilizing big data analytics, cities hope to more effectively and efficiently serve their residents.

All too often, however, smart city interventions are solutions in search of problems, rather than those that seek to meet the critical needs of residents, especially their most vulnerable (Kitchin, 2014). Relatedly, smart city interventions often pay little attention to the unique social and spatial conditions of neighborhoods, particularly those of low-income communities of color. Indeed, the adoption of new technologies has often created or exacerbated the digital divide and disparities in income and wealth across individuals and communities (Hollands, 2008; Townsend, 2013).

The extent to which smart city technologies can increase access to opportunity, enhance social mobility, and mitigate the digital divide is an important yet underexplored question. It is, however, of growing interest and importance to smart cities scholarship and practice. Scholars have increasingly called for a greater focus on social equity and justice, and the engagement of disadvantaged groups

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within smart city planning (De Filippi, 2015). Further, funders like the National Science Foundation have made social science research and community engagement pillars of their smart city investments.

This study asks how community engagement can improve smart city planning and investments aimed at addressing the needs and concerns of low-income communities of color and other disadvantaged groups and neighborhoods. It presents a case study of engaged smart city planning in West Baltimore, Maryland. In 2017 and 2018, researchers worked with community-based organizations to engage residents in West Baltimore about their neighborhood concerns and priorities, their technology use and access, and potential smart city solutions, including conducting 10 focus groups with 172 participants and administering 116 surveys.

The study found that community engagement was critical to advancing an equitable, community-centered and place-based smart city agenda that recognized existing social and spatial conditions as well as technology constraints. It underscored the need for smart city planners and policymakers to better deploy technology to aid low-income residents in navigating uneven regional geographies of opportunity; to close the existing digital divide by giving residents better access to reliable, affordable technologies; and to work closely with communities to develop plans that leverage residents' creative problem-solving capacities and existing uses of technology. Rather than private companies or city governments driving the problem definition and solution design, the study reveals how engaging communities at the front end of smart city planning switches the focus away from technology to community problem-solving using technology.

This study advances the smart city literature on effective planning and implementation strategies for the development and deployment of new urban infrastructure. It highlights the need for smart city interventions to recognize the diversity of low-income residents and neighborhoods, and to prioritize community needs and questions of equity and justice. It shows the value of community participation in ensuring not only that smart city solutions are viable, sustainable, and relevant to communities, but also that they help to close extant opportunity gaps rather than leave disadvantaged communities further behind.

Literature Review: Equity and Engagement in Smart City Planning

Smart city initiatives have sprung up across the globe. From Bangalore, India, to San Diego, California, cities have increasingly turned to new technologies and the companies that create them to address urban challenges (Hollands, 2008). Copenhagen, Boston, London, and Seoul are among the cities that have made notable investments (Smart Cities Index, 2017). In the United States, a few high-profile projects have dominated investments and planning. For example, Columbus, Ohio, leveraged a $50 million smart transportation bid into a strategic smart city plan funded by a $500 million public–private partnership (Maddox, 2017).

Smart city initiatives span a range of interventions and a myriad of working definitions (Chourabi et al., 2012; Hollands, 2008). Hollands (2008) noted that cities' attempts to jump on the "smart-label bandwagon" have led them to deem a range of different initiatives "smart"—from information technology, business innovation, and governance to sustainability efforts (p. 307). *Smart cities*, however, commonly refers to the integration of IT into urban infrastructure and services to optimize and increase their efficiency (Chourabi et al., 2012; Vanolo, 2016). As new technologies provide increasingly real-time, complex big data and advanced analytic capabilities, smart city leaders use these data to make more informed decisions (Chourabi et al., 2012). Townsend (2013, p. 15) defines smart cities as "places where information technology is combined with infrastructure, architecture, everyday objects, and even our bodies to address social, economic, and environmental problems." Paskaleva (2011) argues that smart city investments generally occur in six arenas: the economy, mobility, the natural environment, human or social capacity, urban environments, and governance.

Smart city infrastructural investments, such as streetlights, trash cans, and parking meters, collect data about users and uses that inform city management and planning across a range of different issue areas. San Francisco, California, for instance, piloted street sensors that provide real-time feedback to

the city and the public on available parking. Other municipalities have experimented with citywide wireless internet networks and grids. Such efforts require a heavy lift to build IT infrastructure and capacity and cross-agency data systems as well as train staff on new technologies (Chourabi et al., 2012). Many cities have also invested in civic technology, such as real-time bus data, open-source public records systems, and open data platforms to improve data sharing between government and the public and to increase government transparency (Viale Pereira, Cunha, Lampoltshammer, Parycek, & Testa, 2017). Much of the smart city literature has focused on these interventions—the extent to which cities have successfully implemented new technologies, how, and to what effect. Much less attention has focused on the processes by which smart city technologies are planned and implemented.

Given the complexity of smart city technologies, urban investments are often implemented through expert-led processes. Public–private partnerships are common, and private corporations and real estate developers typically lead the planning process (Kitchin, 2014). Echoing decades of positivist planning critics, various scholars have critiqued this model of planning as overly technocratic and top-down, and emphasized the need for citizen-focused and -engaged processes (Cardullo & Kitchin, 2019). Some have argued that governments should be more accountable to their publics, rather than to private companies. Without engagement, they argue, smart city investments can perpetuate social divisions and exacerbate existing urban inequalities (Eger, 2003; Townsend, 2013). When citizens are not included in their design, smart city interventions are also not particularly effective in meeting their goals or that of their ultimate beneficiaries—residents (De Filippi, 2015). Residents fail to understand and use smart city infrastructure, and urban environments further isolate citizens from the structures that govern them (De Filippi, 2015). Without a laser-like focus on the needs of and extensive engagement with low-income communities of color, even smart city projects designed to meet their needs often fail to do so. For instance, in Columbus, the city's smart transit system investments were initially cast largely as an effort to improve health care access for expectant women in underserved neighborhoods and reduce infant mortality rates. However, over a year after such investments began, many critics complained that the city was not delivering on its promise (Bliss, 2017).

Furthermore, even when citizens are engaged in smart city planning, the public and engagement are often viewed through market-based logics. Solutions that benefit private companies dominate (Cardullo & Kitchin, 2019; Kitchin, 2014). Smart city planning often regards residents as operating in a market, rather than a civic or political space, positioning municipal services as consumer products and residents as individual customers (Cardullo & Kitchin, 2019; Hollands, 2008). This approach reduces engagement to market research and hamstrings avenues for collective community action and voice (Cardullo & Kitchin, 2019; Vanolo, 2016). As in the modernist era of urban planning, city governments are increasingly reliant on ideals of technological modernism and technologists to solve urban issues (Datta, 2015; Vanolo, 2016).

Perhaps one reason why smart city interventions often overlook the value of community engagement is because they overlook the social and spatial context of cities and neighborhoods altogether (De Filippi, 2015). Smart city plans and interventions are often aspatial, one-size-fits-all solutions abstracted from the real context of communities (Kitchin, 2014). They tend to focus on technology innovations and solutions, without considering diverse social and spatial conditions or specific community-based problems and needs (Hollands, 2008). Although the smart city literature has evolved to include discussions about different metropolitan geographies, such as smart towns and smart smaller cities, it has still largely overlooked the diversity of urban neighborhoods (Lam & Givens, 2018).

Alternatively, scholars have argued that progressive smart cities start with people-centered processes and abandon the assumption that technology, particularly IT, can reshape and improve cities on its own (Coe, Paquet, & Roy, 2001; De Filippi, 2015; Hollands, 2008; Kitchin, 2019). If implemented purposefully, smart city technologies can empower and educate residents, involve them in discussions about their lives and environments, and directly address critical urban challenges and inequalities (Hollands, 2008; Trencher, 2019). This, however, requires attention to dynamics that create urban inequalities as well as smart citizens and communities whose residents are active participants in design and planning (Batty et al., 2012; De Oliveira, 2016; Kitchin, 2019). Engaged smart city planning and cities' efforts to create more

inclusive smart city policies, structures, and tools can meaningfully contribute to developing stronger, more inclusive and equitable communities (Eger, 2003; Hemment & Townsend, 2013).

While the smart city literature has begun to turn toward the possibilities of engaged, smart city planning, few studies have been grounded in the experiences of real neighborhoods, particularly low-income communities of color (Trencher, 2019). Notably, the smart city literature has largely been written by scholars of technology, not of urban planning, which has a long tradition of public participation and community engagement that underlie principles of urban equality and justice (Batty et al., 2012; Thompson, 2016). This case study of West Baltimore centers on efforts to engage residents to understand the limits of existing neighborhood technologies and to imagine the possibilities for smarter communities of engaged residents to inform the city's emerging technology and neighborhood plans. It highlights the centrality of democratic processes and attention to the diverse conditions, histories, and needs of communities in understanding the possibilities for more equitable outcomes for low-income communities of color in smart city planning and implementation. It argues that engagement is critical to identifying place-specific challenges and smart city interventions that lead to more equitable interventions for communities that are not often viewed as the primary audience for new technologies. Rather than companies or city government driving the problem definition and solution design, this article reveals how engaging disadvantaged communities at the front end of planning can open up possibilities that are specific to the needs of a community and contextualized within their neighborhood conditions, and ultimately benefit residents. Cities are not monoliths, nor are their neighborhoods' and residents' challenges, values, conditions, or needs. As cities become smarter, solutions must seek to understand and engage these differences if they are also to become more inclusive, equitable, and just.

Case Study Background: Uneven Development and Smart City Planning in Baltimore

Baltimore's history includes several smart city firsts. In 1996, it became the first city in the United States to use 311 technologies for nonemergency call service. In 1999, it became an early adopter of the CitiStat data-driven management system (City of Baltimore, 2018). However, disinvestment and decades of decentralized IT management led to a system that struggled to provide services (Perez & Rushing, 2007). A new era of investment accompanied Mayor Catherine Pugh's 2016 term, and in 2018 the city began making a wide variety of smart city investments to improve government efficiency and public safety. It launched the BMore Bright initiative to convert existing streetlights to LED lights. It also piloted a program to install smart nodes in streetlights that allow the real-time adjustment of lighting levels to save energy during nonpeak times. That same year, it deployed the first of 4,000 smart, compacting trash cans that were sensor-enabled to notify the city when they were full. The city also installed ShotSpotter, a technology that detects gunfire through receivers fixed to buildings and utility poles. Investments also made the city's water meters Wi-Fi capable and able to monitor data on usage. These investments were largely driven by private companies and city agencies with very little to no input from Baltimore residents.

Recognizing the need for a more comprehensive and engaged approach, the City of Baltimore released its *2018–2023 Inclusive Digital Transformation Strategic Plan* in 2018. The plan outlined five city priorities for technology investments: public safety, education and youth engagement, economic development and jobs, accountability and transparency, and overall quality of life (City of Baltimore, 2018). It also outlined plans to establish a centralized, high-level technology ecosystem to improve the public's experience with city government and increase community engagement around technology. This included efforts to create a website, improve their social media presence, lead listening tours throughout the city, and conduct community surveys. The plan emphasized the city's commitment to community engagement as a critical pillar to ensuring that all residents benefit from new investments, particularly low-income communities that lack adequate technology and other infrastructure.

Some of Baltimore's lowest income neighborhoods are in West Baltimore. While the city boasts one of the largest Black middle-class populations in the United States and average incomes higher than the national average, it remains one of the most racially and economically segregated cities in

the country (Bouie, 2015; Cassie, 2016). Although parts of the city have robust educational, employment, and other opportunities, many neighborhoods in West Baltimore fare worse than their higher income counterparts do in terms of key economic outcomes, such as education, employment, and child poverty (Berube & McDearman, 2015). These neighborhoods also have high levels of racial isolation and concentrated poverty.

Like most American cities, Baltimore's segregated landscape emerged out of legal and *de facto* policies and practices of racial discrimination (Berube & McDearman, 2015; Rothstein, 2017). In 1910, the city passed the nation's first residential segregation ordinance (Cassie, 2016; Power, 1983). After explicit mechanisms of racial segregation were ruled illegal, a host of private and public policies, such as redlining, blockbusting, and exclusionary zoning, helped to maintain the city's hard racial lines (Cassie, 2016). Beginning in the postwar period, widespread white flight out of the city and government investments in racially segregated public housing hardened the lines of racial segregation and concentrated poverty within Baltimore and across the region. In the 2005 *Thompson v. HUD* ruling, a federal district court found that the U.S. Department of Housing and Urban Development had contributed to the creation and maintenance of the city's racially segregated public housing, in violation of the 1968 Fair Housing Act. Between 1950 and 2000, Baltimore went from a population that was 25% African American to 65% (Bouie, 2015).

Neighborhoods in West Baltimore were among those hardest hit by the city's changing landscape. Throughout the 1930s, West Baltimore had many middle-class families and was home to famous jazz musicians such as Eubie Blake, prominent civil rights leaders such as Thurgood Marshall, and cultural institutions that continue to operate to this day (Cassie, 2016; Power, 1983). However, federal and city plans to construct highways and other major infrastructure projects through predominantly Black neighborhoods took a heavy toll. Between 1951 and 1971, nearly 75,000 residents in West Baltimore were displaced by urban renewal and other projects, 80% of whom were African American (Power, 1983). Ongoing disinvestment triggered families to leave the neighborhood. By the 1970s, many middle-class families had left for other parts of the city and region. The discriminatory siting of public housing in West Baltimore neighborhoods led to the further concentration of poverty and disadvantage (Cassie, 2016).

West Baltimore continues to struggle with high rates of unemployment, incarceration, violent crime, and infant mortality that are more than three times the national average (Bouie, 2015; Cassie, 2016). The Sandtown–Winchester neighborhood gained national attention as the home of Freddie Gray, a young Black man who died while in police custody in 2015. After the uprising in response to Gray's death, the area attracted some new investment. In 2015, led by the Mount Royal Community Development Corporation (CDC), the Maryland Institute College of Art, Coppin State University, the city, and local businesses launched Innovation Village, an initiative to attract start-ups and other businesses to the neighborhood (Cassie, 2016). As the city began to invest in a smarter West Baltimore, our team of researchers worked with residents to investigate how these and other technological investments could meet their needs and close the opportunity gaps that existed between their neighborhoods and others in the region.

Methods and Data

This study focuses on two neighborhoods in West Baltimore—Upton and Druid Heights (Figure 1). Two of the largest community-based organizations within these neighborhoods—Upton Planning Committee and Druid Heights Community CDC—served as partners for this project. Formed in 1971, the Upton Planning Committee (http://historicupton.com/uptonplanningcommittee/) strives to "make Upton of tomorrow a different place" by inspiring residents to take pride in their neighborhood and by renovating historic sites. The committee engages residents in city planning processes and manages 50 vacant lots, neighborhood design review processes for new development, and a Main Street program. Founded in 1974, Druid Heights CDC (http://druidheights.com/) promotes community development and resident empowerment through initiatives such as housing counseling for first-time homebuyers, reentry programs for exoffenders, youth afterschool

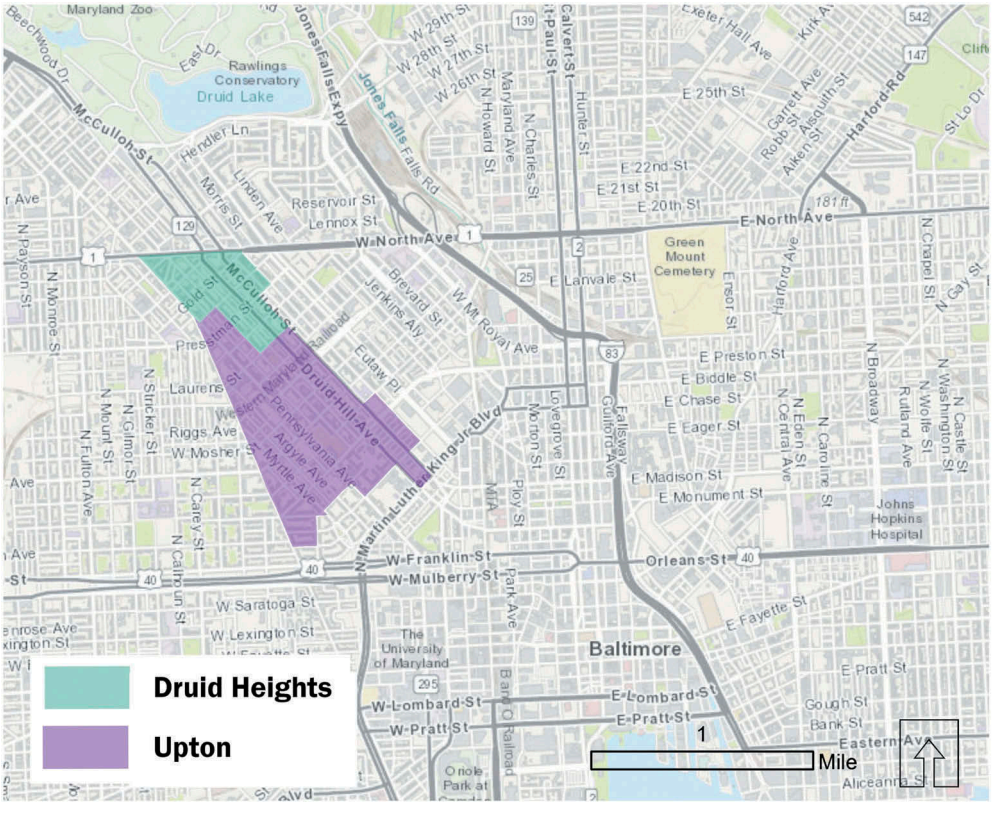

Figure 1. West Baltimore study area. Image by author. Data from Esri.

programs, a neighborhood computer lab, and the development of affordable and market-rate housing. Researchers also partnered with Mount Royal CDC. Established in 2013, Mount Royal CDC leads the Innovation Village project and works with residents in five West Baltimore neighborhoods, including Upton and Druid Heights, to create community and economic development opportunities.

Within these two neighborhoods, 92% of the residents are African American and education levels and incomes are low (see Table 1). Only 15.4% of those over the age of 25 have a bachelor's degree or higher. More than half of the residents have incomes at or below 149% of the federal poverty level. Only 18.5% of households own their homes. The median income ranges of the neighborhoods average $13,874, compared with $44,262 for the city. The neighborhoods' average unemployment rate of 15.6% is more than 50% higher than that of the city (U.S. Census Bureau, 2016).

Community-based partners identified locations to host focus groups, recruited diverse neighborhood residents, and helped to coordinate focus group logistics. Community partners recruited participants largely through their regular programs, such as community meetings and afterschool programs. To reach a diverse cross section of residents, partners also reached out to other neighborhood organizations that recruited participants through their ongoing programs. Between December 2017 and June 2018, an interdisciplinary team of researchers from the University of Maryland conducted the focus groups. Ten focus groups were conducted in two rounds. The first round of seven centered on identifying participants' neighborhood concerns, technology access and barriers, and ideas about how to address neighborhood challenges with technology. The second round included three focus groups to gather feedback from residents about specific smart city investments, including those already underway or on the horizon

Table 1. Demographics of the city of Baltimore, West Baltimore study area, and survey participants.

	Baltimore City	Study area[a]	Survey respondents
Total population	616,664	10,252	116
Age (%)			
Under 5 years	7	9	0
5 to 17 years	14	22	25
18 to 24 years	10	12	7
25 to 44 years	19	24	11
45 to 54 years	12	11	16
55 to 64 years	12	11	22
65 or older	13	10	10
Sex (%)			
Male	47	46	66
Female	53	54	33
Race and ethnicity (%)			
White alone	28	4	4
Black/African American alone	62	92	93
Asian alone	3	2	0
Hispanic or Latino origin (of any race)	5	1	1
Educational attainment (%)			
Less than high school graduate	15	26	10
High school graduate (includes equivalency)	30	33	58
Some college or associate degree	24	26	3
Bachelor's degree	17	9	9
Graduate or professional degree	14	6	10
Income ($)			
Median annual household income	47,350	13,874[b]	22,981[c]

Source: U.S. Census Bureau (2016).

Note. [a]For statistical purposes, the study area comprised four census tracts that approximate the border of the study area neighborhoods.

[b]This income represents the average of the median incomes from the four census tracts.

[c]The survey asked for monthly rather than annual income, which has been estimated based on reported monthly income. Only 48% of survey participants responded to this question.

in Baltimore. The latter included presentations about the findings of the first-round focus groups as well as presentations by representatives from the Baltimore City Office of Information and Technology and other project partners about smart city technologies currently being deployed in the neighborhood and across the city.

First-round focus groups were held at a local elementary and a high school (Furman Elementary School and Renaissance High School), a senior public housing building (McCulloh Homes), a neighborhood cultural center (Arch Social Club), a community development corporation (Druid Heights CDC), and a local recreation center (Robert C. Marshall Recreation Center). Community-based partners invited all first-round sites to participate in the second-round focus groups as well. Only three sites participated in the second round: Arch Social Club, Robert C. Marshall Recreation Center, and Renaissance Academy High School.

Most focus groups were structured as large group discussions. Based on the size of the group and participants' preferences, smaller breakout groups were sometimes conducted to discuss particular issues raised in the larger group. At each of the first-round focus groups, participants filled out a survey about their demographic characteristics, neighborhood challenges and priorities, and technology use and access. Focus groups were used to probe these issues more deeply. All participants received a $15 gift card to a neighborhood grocery store. Focus groups were recorded and transcribed. These transcripts were coded along with notes taken at the focus groups for themes regarding neighborhood challenges, concerns, and suggestions. A total of 172 people participated in the focus groups. This included 130 in first-round groups and 42 in second-round groups.

Researchers conducted surveys in six of the seven first-round focus groups.[1] They administered two survey iterations, the first of which they piloted with 82 adult respondents at four focus groups.

After analyzing the results, researchers revised the survey to clarify the questions and improve response rates. Many questions remained the same.[2] The second survey included separate versions for youths (under 18 years old) and adults. Participants in two focus groups completed the new survey, including 34 residents of whom 28 were youths.

Researchers collected demographic information on the 116 survey respondents, but not on focus group participants. The demographics of survey respondents closely matched those of the neighborhood on racial, age, and educational measures (see Table 1). However, differences were notable in income, gender, and neighborhood residence. The average annual income for survey participants was $22,981, compared with an average median household income of $13,874 within the study area. The majority (66%) of respondents were male, while in the study area 54% are female. Participants were also asked in what neighborhood they lived. Of the 89 respondents to this question, more than half named neighborhoods within the West Baltimore study area. Almost a third named neighborhoods in other parts of Baltimore, the majority of which were located just north of the study area. Eight percent of survey respondents lived outside of the City of Baltimore, but within the surrounding suburbs of Baltimore County.

Case Study Findings

This section presents key findings that emerged from the focus groups and surveys that can inform how community engagement can improve smart city planning and investments in disadvantaged neighborhoods. Three main themes emerged. First, in terms of current neighborhood problems and priorities, residents emphasized issues in navigating existing uneven regional geographies of opportunity. Many participants expressed deep concerns about the underdevelopment of West Baltimore neighborhoods, including the lack of jobs, educational opportunities, and safety as well as the need for better access to opportunities outside their neighborhood. Second, in terms of residents' current use of and access to technology, significant investments are needed to close the existing digital divide in the neighborhood by giving residents better access to reliable, affordable technologies. Finally, to develop potential smart city solutions that are effective and sustainable, planners and city officials must work more closely with communities, focus on critical community needs and priorities, and leverage residents' creative capacity and existing neighborhood assets. Participants foregrounded neighborhood-specific concerns and conditions that presented barriers to the effectiveness of existing and new technologies, while also highlighting opportunities for leveraging technology to advance a more equitable, community-centered smart city agenda in Baltimore.

Neighborhood Concerns and Priorities

Participants expressed concerns about the underdevelopment of West Baltimore neighborhoods, including a lack of local businesses, jobs, and quality educational opportunities. Residents repeatedly noted disparities between their neighborhood and others throughout the city and region. On several issues—from food and retail services to internet infrastructure and transportation—residents felt that they did not receive the same access to basic services and amenities as did residents of higher income neighborhoods. Although most believed that these amenities should be improved in the neighborhood, they also sought better ways to access opportunities outside the neighborhood (Figure 2).

A lack of job opportunities in West Baltimore was a common concern. This was particularly true for participants who had a history of substance abuse or a criminal record. They expressed frustration at not being given an opportunity to make a positive contribution to their community. As one participant explained:

> One of the main things that concerns most of us is jobs. A lot of times when we have a challenge like rehab or incarceration, we're competing with those that haven't been incarcerated. We have to be out here in the streets, because society is pushing us towards that direction. We want businesses to give us a second chance. We want

Figure 2. Neighborhood concerns expressed by participants in first-round focus groups. Drawing by Lucinda Levine.

them to hold certain spots for people that have gone through what we've gone through. They have an X on us before we even start.

Participants also felt that many residents lack the skills to find gainful employment and wanted more training and educational programs to help prepare residents for the workforce.

Participants were also frustrated by the lack of personal and community wealth and ownership. Several noted that few local businesses are owned by residents. "We don't own anything. We don't have anything like a coffee shop," explained one participant. "We have to leave the community to get a doughnut or coffee." Another remarked that he was not even able to "find a pack of paper for my

printer" in the neighborhood. Another added that with new neighborhood investment comes the fear of gentrification and displacement, but without property ownership, residents have little to gain. "We're building these parks and making them more beautiful," he explained, "But property values increase, and then we can't afford to stay. If we own things [businesses, homes, etc.] in the community, then we can benefit from increasing property values." Participants also noted common barriers to property ownership, including poor credit and a lack of access to capital. Many residents lack bank accounts and credit cards, which can serve as a barrier to using and navigating technology, such as retail websites.

Many participants were concerned about the limited opportunities for youths outside of the home, especially given neighborhood safety concerns. One explained, "A lot of kids don't have places to go. They've shut down a lot of programs." Others mentioned the recent closure of the Shake and Bake Center, a city-run recreation center that offered afterschool services. One participant was concerned with the long-term neighborhood impacts of youths' lack of opportunities. "If those kids don't have a place to go after school that leads to other issues in those communities. They turn to gangs and other things," he noted. In addition to a lack of afterschool options, participants discussed youths' limited social opportunities. One explained:

> Young people, they have no social life. They have nothing to do but stand on the corner. We have all these buildings. They could open up and be somewhere to socialize. All you see is a boy and girl hugged together, there's more to that. That's what they need to have. They don't have it. Why don't you go inside and have a pizza party? On Friday night, they could watch movies. Not all young people are bad. They need something to be constructive with. Young people, six and seven, don't see older kids doing anything constructive, they're going to imitate what they see. They don't see anything positive. If they go to another neighborhood, people are playing softball. Here you don't see that. And I want to know why.

Youths further underscored a lack of neighborhood activities and amenities. One participant noted, "In the summertime, we go outside, but there's nothing to do."

Issues of safety and security, particularly violent crime, were also of major concern. When asked to identify the most important neighborhood services from a provided list, second-round survey respondents most frequently selected public safety and schools/education. When asked to identify three services they would like to see improved in the neighborhood, public safety was the most frequently selected answer. Youths complained of frequent school lockdowns and spoke of the need for better security measures. Seniors were particularly worried about security in and around their residences. Adults were concerned about children being outside after dark. Anxiety about neighborhood safety also drove particular engagements with technology. Participants, especially adults, expressed concerns about using technology outdoors or in public places, which they feared would make them the target of crime. One noted that larger technological devices, such as tablets or computers, were particularly difficult to conceal. "I carry my phone on my chest. I can't put a laptop there. It would be stolen. I don't like pulling my phone out in public, I don't want it to be stolen," she noted.

In addition to the many challenges in West Baltimore, residents also struggle to access opportunities outside the neighborhood, primarily because of a lack of quality, reliable transportation. Many participants said they felt stranded in their neighborhood with few resources and a lack of reliable transportation. Many relied on public transit, but complained that the system often did not go where they needed to go. Several noted transportation was a barrier to purchasing groceries outside of the neighborhood, but that the neighborhood lacked healthy food options and purchasing groceries at convenience stores was costly.

Many participants were frustrated by the city's redesign of the bus system. The service, they noted, was slow, unreliable, and indirect, and the new bus routes introduced in 2017 were confusing.[3] "It feels like you're stranded. A lot of times, I end up walking," explained one participant. Youths were particularly upset about a recent month-long closure of the subway, which increased their commute times to school. One parent said she had to find another way for her daughter to get to school. "I've stopped my daughter from taking the bus," she explained, "With the new bus system, [she would] have to take three to four buses. It would take over two hours."

Given the number of challenges facing West Baltimore residents, smart technologies may offer potential solutions. To be effective and sustainable, however, they must be responsive to residents' priorities for neighborhood improvement and aligned with the ways residents already access and use technology.

Technology Use and Access

Participants expressed difficulties in accessing basic, reliable technologies such as computers. Instead, most used their cell phones for everyday activities. Compounded by a lack of reliable, affordable internet service, many found creative ways to carry out mundane tasks, although in ways that sometimes increased the risks to personal data and safety.

Many West Baltimore homes do not have computers. Only 64% of first- and second-round survey respondents had regular access to a computer, and only 61% had regular access to a computer at home. By comparison, 67% of Baltimore residents have either a desktop or a laptop (U.S. Census Bureau, 2017). Instead, many West Baltimore residents use computers in publicly available spaces, including at schools and libraries. About two thirds of respondents accessed a computer primarily at the library (32%) or at school or work (34%; see Table 2). These places have limits on time, printing, and other functions that make them less reliable than home computers.

In part because of the lack of reliable computer access, most participants made use of their cell phones for everyday activities. Among first- and second-round survey respondents, 91% had a cell phone and 68% most often accessed the internet using their cell phones. Residents often perform tasks considered computer necessary, such as completing homework assignments or applying for jobs, on their phones. One participant described her cell phone as her literal lifeline after the death of her partner and the father of her children. "He was my backbone," she explained, "I used my phone to apply to jobs, find a house, and find a car. I didn't have any skills." Although many rely on their phones in these ways, only 72% of respondents had a monthly plan that included talk, text, and data, whereas 18% used prepaid plans, potentially limiting their ability to complete such tasks efficiently, if at all.

Many participants were frustrated with slow internet connections that make working remotely and doing other everyday activities challenging. About one fourth of second-round survey respondents (24%) agreed that their internet was too slow, and the same percentage agreed that their connection drops frequently or is unreliable. Youths in particular wanted faster, more reliable access. One adult mentioned slow connectivity as a primary source of stress when working from home. "I do mobile work, applications, helping people get services. Everything is online," she explained. "It takes me longer to get that done, because my connection is slow. Sometimes I have to reboot. There's nothing I can do about it. I still pay for the service!"

Some participants also feared that the lack of internet access and technology would hold West Baltimore back as technology advances, further exacerbating the digital divide. As one participant explained:

> If we don't rebuild these neighborhoods using the technology that's immediately available, we will in 10 years still be behind. The refrigerator will be talking to the dishwasher and we'll still be outside huddled outside the building trying to get a signal on our cricket phones.

Residents were concerned that the lack of technological infrastructure would exacerbate extant neighborhood disparities, including in the computer skills and technical training that residents needed to keep pace with the digital economy.

For many residents, the cost of internet service is unaffordable. Baltimore households that meet certain eligibility requirements qualify for low-cost monthly service through a local provider. Even so, participants expressed a need for more affordable options and free Wi-Fi hotspots throughout the city and neighborhood. Many participants without internet service sought out free Wi-Fi hotspots, but noted the limitations of these networks, such as their location, use, time, and registration requirements. Popular hotspots included the downtown area, in and around school buildings,

Table 2. West Baltimore survey results on participants' technology use and access (%).

Respondent has regular access to a computer (N = 99)	
Yes	54
Locations where respondents access a computer[a] (N = 101)	
Home	61
Library	32
School/work	34
Other	17
Device used most often by respondent to access the internet (N = 76)	
Laptop	17
Desktop	12
Cell phone	68
Tablet	3
Respondent has a cell phone (N = 106)	
Yes	91
Device respondent most often uses to access the internet (N = 76)	
Cell phone	68
Computer (desktop or laptop)	29
Tablet	3
Respondent's phone plan type[a] (N = 83)	
Talk/text/data for internet	72
Prepaid phone	18
Talk/phone only	4
Talk/text	4
Not sure	2
Respondent's internet is too slow[b] (N = 25)	
Agree	24
Disagree	76
Respondent's connection drops or is unreliable[b] (N = 25)	
Agree	24
Disagree	76

Note. N = total question respondents.
[a]Respondents were asked to choose all answers that apply.
[b]Second-round survey participants only. Other responses include first- and second-round participants.

malls, and chain stores like Starbucks and McDonald's. It is also common for residents to sit on the front stoops of homes that have Wi-Fi to access their networks. One participant, whose stoop was used as a free Wi-Fi spot, noted that she did not mind sharing with her neighbors, but eventually cut off access because it slowed down her service:

> I didn't mind, but if like everyone is using it, so, I was like, no let's cut it down, once you start using that one Wi-Fi starts slowing down and stuff. My son, he stays on the gaming system …. When there are too many people on it, it starts slowing down. So, if I'm on the laptop, she's on the laptop, and he's on the gaming system and everybody else is using it, it starts slowing the laptop.

Youths were particularly adept at navigating free Wi-Fi access barriers. One discussed the nuances of the city's emergency service, which provides internet for a limited time to a particular email address, but cannot be used again for a couple of months. To continue to use the service, the student changed his email address each time. Although participants desired additional free neighborhood Wi-Fi locations, they also noted related concerns, including the surveillance of their activities. While some saw it as a cost of using publicly accessible Wi-Fi, others worried that their data and presence in public spaces was being monitored. Youths said businesses were often hostile to their presence, including a local mall that enforces a curfew for youths without parents:

> Youth A: You can't even go downtown to the gallery to hang out. They took the food court out of the mall a year ago.
>
> Youth B: That was so disrespectful.
>
> Facilitator: Why?
>
> Youth A: Because that was the only spot in the mall. Don't you know how us young people are? We love to spend money and go to the mall and love to eat. This is the gallery. We can't eat and not sit down. They took the food court out of the gallery because of the simple fact that young people were going in and sitting down and chilling and making a whole bunch of ruckus, I don't understand …. The city has everything against the young people ever since. So, they will only let us in at certain times …. You have to have an adult go with you …. You can't go to the mall in the morning and you can't go after 5 pm. Once I stopped for food and went to Dunkin Donuts. She saw my backpack and said if you don't have an ID clarifying that you are 18, I can't serve you.

Particularly for Black West Baltimore youth, surveillance in neighborhood spaces was yet another reminder of the disparities between their lived experiences and that of other Baltimore residents. More broadly, for many participants, closing the existing digital divide with basic IT infrastructure and hardware was just as important as, if not more important than, introducing new neighborhood smart technology.

Potential Smart City Solutions

In discussing existing smart city technologies and the potential for new interventions, participants underscored the importance of working with the community, focusing on neighborhood needs and conditions, and concerns about the installation of and data collected by smart city technologies. In doing so, they raised critical considerations for the feasibility and long-term sustainability of technology interventions and creative solutions that could broaden their impact in disadvantaged communities.

Many residents felt that the process of problem-solving with the community was as important as the outcome of the planning process and could help to repair and build trust critical to the success of smart city interventions. "We complain, complain, complain. For the last 25 years. The more we complain the less we get," noted one participant. "Why are we not getting better? Five years ago, we had the same survey. But we still have not received anything. Every neighborhood around us is getting what we're asking for." Residents repeatedly mentioned the lack of trust they had in civic institutions, city government, and police that was born out of histories of neighborhood neglect and violence.

Participants also voiced various concerns about existing neighborhood technologies. For instance, while some felt that the CityWatch cameras, known colloquially as blue light cameras, that were introduced in 2005 downtown and in a number of high-crime areas, were useful in deterring and solving crime, others held serious doubts about their effectiveness.[4] Participants noted that data collected from cameras was not always used to solve crime, and were concerned about the types of data being collected and the community's limited access to the data. Others were concerned about excessive surveillance. One participant put it simply: "I don't like being watched."

Many held similar concerns about new smart technologies being considered or implemented by the city. Participants were concerned that ShotSpotter would oversurveil residents and not provide accurate data to police, and that the data would not be shared with the community. They also raised the issue of racial profiling. Participants worried that police would respond to ShotSpotter alerts by considering all area occupants as potential culprits. Some suggested that the technology would decrease resident involvement in community policing, as many residents already called the police when shots were fired. While many viewed smart trash cans as an opportunity to clean up the neighborhood, they suggested that the funds might be better used just to pick up the trash, as it was supposed to be, and were concerned about the potential loss of sanitation jobs. One argued:

> If they want to make a smart trash can that does all these things, this is exactly what we're talking about. It eliminates us from working. Why don't they take $40 million and get 80 trucks, and put six people on each truck and put 500 of us to work? And get us off the corner, instead of making a can that closes up by itself, and now we don't need the trash picked up. Everything they do is just cutting us right out.

Smart city technologies could exacerbate existing inequalities between West Baltimore and other neighborhoods by replacing the limited number of neighborhood jobs with new technology. Participants were also concerned that new technology, such as smart streetlights, would not be properly maintained, pointing out that the city has not maintained existing lights.

In thinking about technology that may be on the horizon, participants also offered critical insights about their utility and feasibility. For instance, several said they would not trust self-driving busses. Like all technology, it could be hacked. More importantly, bus drivers not only operate the bus, they also ensure the safety of and maintain order among passengers. One participant explained, "Without the bus driver, in case someone gets in an altercation, the public would have to stop the altercation."

Given the lack of reliable, affordable internet access, participants brainstormed locations that could serve as free Wi-Fi hotspots. Many favored indoor locations because, as one participant said, "inside is more secure." Some adults opposed any outdoor locations. One explained, "I don't feel safe outside at all." Many parents did not want to provide an incentive for kids to stay outdoors. "It would be nice if [the Wi-Fi] was inside," suggested one participant. "We don't want kids outside, day or night." However, others argued that outdoor locations were important for making Wi-Fi more widely accessible, and should be paired with initiatives to make public spaces more secure.

Participants also saw new smart technologies as opportunities to improve the neighborhood and close existing disparities between their neighborhood and others. Revitalized parks could have Wi-Fi hotspots or other technologies that draw residents out of their homes and activate public spaces. Recreation centers could be reopened and provide residents with access to computers and the internet, and training in technology-related skills and opportunities. Given residents' reliance on cell phones, mobile applications could help residents track neighborhood crime and safety, find jobs, and share information and resources. To fill the gap in local health food options, a grocery store delivery app could be developed.

Critically, participants saw the construction and maintenance of smart technology interventions as just as important as the technology itself. Participants wanted to be producers and facilitators of interventions as well as their users. They argued that new technology should provide residents with jobs and technology-related training. For example, residents could be trained and employed to install fiber optic cable to provide valuable skills and needed jobs.

Participants also underscored the importance of community ownership of technology and access to data. "As a community and as a people, we need to be able to decide for ourselves how we want to apply the technology and what we want to use it for," explained one participant. "We're not interested in it being used for further surveillance of us, or anything like that. We would like access to information, broadband technology, Wi-Fi technology, so we can be able to, as a community, have access to information." Many wanted better access to crime data collected from police and private surveillance cameras to allow the community to better track conditions and hold the police accountable. They argued that providing residents with this data would facilitate better community–police relations and develop more effective public safety solutions. Further, when neighborhood data are available to residents, they can better inform city officials and others about what is missing and can be improved.

Conclusion: Toward Smarter and More Equitable Communities

As Baltimore and many other cities around the United States and the world pursue smart city investments, this study points to ways that these investments can help close, rather than exacerbate, extant opportunity gaps for disadvantaged neighborhoods and move toward more equitable cities. As other scholars have argued, smart city infrastructure is no different from other public investments and should be held to similar standards of public accountability and transparency (De Filippi, 2015; Eger, 2003; Townsend, 2013). Contemporary requirements to engage residents in many urban planning

processes have emerged from decades of community activism and equity planning that has pushed against expert-driven, top-down, positivist planning and for greater community accountability. Many cities have yet to institutionalize engagement processes in smart city planning and implementation, but they should. Engagement ensures that smart city investments are effective and beneficial to communities, particularly to disadvantaged communities most in need of such investments. This research shows that engagement in disadvantaged communities must focus on identifying investments that meet communities' needs and priorities and take into consideration their place-specific conditions. For smart city investments to work *for* communities, rather than just *in* them, smart city planning must help to build and repair community trust, leverage existing neighborhood assets, facilitate residents' access and choice, and recognize the diversity within and between disadvantaged neighborhoods (Figure 3).

Figure 3. Possibilities for smart city technology integration in West Baltimore. Drawing by Lucinda Levine.

Although the study underscored particular issues, such as job access and public safety, that were of greatest concern to participants, it also exposed important considerations for interventions that sought to address these issues. Introducing ShotSpotter, for instance, in West Baltimore without taking into consideration residents' concerns around surveillance and broader questions regarding data access and transparency would likely lead to community complaints and disengagement as well as exacerbate the lack of trust between residents and the city. Participants wanted access to the data and were concerned about technology barriers that make access difficult, such as a lack of home computers and unreliable internet service. They also offered solutions to address these barriers that showed their sophisticated knowledge of technology, and their creativity in maximizing the limited technology they have. As cities invest in smart technologies, they must also invest in closing extant digital divides that limit access to technology and knowledge about its capacities, and seek to find solutions that build on and complement the ways in which communities already utilize technology. At the same time, they must invest in uncovering the human potential inherent within communities to come up with new solutions.

For residents to feel included and respected in planning smart cities, both the historical and contemporary ways that low-income communities of color are underdeveloped must be acknowledged, and their feedback must be sought and heard. Many low-income, predominantly African American neighborhoods like West Baltimore have been subject to decades of disinvestment, predation, violence, neglect, and broken promises by private developers and government officials, all of which underlies residents' lack of trust that any investment will come to fruition, let alone be designed with their best interests in mind. To begin to repair that trust, so-called experts, be they researchers, government agents, or smart city technologists, need to take a backseat to community leaders and build reciprocal relationships, in which community members and smart city planners and providers can learn from each other.

Such efforts must counter negative stereotypes about underdeveloped neighborhoods and emphasize an asset-based orientation that leverages residents' talents and creative solutions. Participants repeatedly expressed concerns about the negative ways that media and others outside their neighborhood portray the community. An asset-based orientation to neighborhood technology investments highlights a community's existing strengths and resources. It recognizes that like all neighborhoods, disadvantaged neighborhoods and the residents who live there have incredible talents, capabilities, and ideas for improvement.

Smart city interventions in disadvantaged neighborhoods should also seek to facilitate equity, access, and choice. Participants repeatedly noted the inequalities between their neighborhoods and wealthier neighborhoods throughout the city, and their lack of control over the few resources in their neighborhood. Interventions in underresourced and underdeveloped neighborhoods should seek to address inequalities and empower residents with greater choice and access to opportunities not available in their neighborhoods.

Finally, smart city solutions should recognize the diversity within communities, particularly disadvantaged neighborhoods. Our focus groups included youths, young adults, adults with and without children, and senior citizens. They came from a range of socioeconomic and educational backgrounds. Although there were many commonalities, each group voiced specific concerns that are important to consider in designing smart city investments. When possible, technologies should meet common needs across groups, but attention should also be paid to the limitations and opportunities that interventions provide for specific groups, especially the most vulnerable.

Smart city technologies hold great potential for helping to bridge, rather than exacerbate, the digital divide as well as the unequal distribution of educational, social, and economic opportunities across neighborhoods. Decades of community development scholarship and practice have shown that engaged planning produces better outcomes for disadvantaged and marginalized groups, who often lack voice and power over development processes within their neighborhoods. Engagement offers a path toward more equitable outcomes in smart city planning processes. It can shift the focus from technology innovation to questions about the lived experience of neighborhoods and the ways that cities deploy resources (smart or otherwise) in the service of equitable development. There is not

a smart city solution for every issue that disadvantaged communities face, nor can smart city interventions comprehensively address the complex social, economic, and other factors that contribute to many community problems. However, when embedded within larger engaged planning and community development processes that seek to meet critical community needs and attentive to the diversity of neighborhoods and residents, smart city interventions can help disadvantaged communities imagine and create better futures.

Notes

1. The only first-round focus group in which surveys were not collected was at the Robert C. Marshall Recreational Center. At the time that the focus group was conducted, the researchers' university Institutional Review Board had not yet approved conducting surveys with youths.
2. The second-round survey added questions about internet service reliability and residents' neighborhood priorities that were not contained in the first-round survey. It eliminated some transportation access questions, questions relating neighborhood priorities to technology access, and questions designed to help researchers identify effective online survey recruitment strategies. The most significant changes related to question phrasing, formatting, and order.
3. During the summer of 2017, the Maryland Transit Administration, the agency that manages Baltimore's public transportation, launched BaltimoreLink, a complete redesign of the city's public bus system. This was a year after Governor Larry Hogan decided not to fund what would have been Baltimore's first light-rail transit, the Red Line (Shaver, 2017).
4. Since 2005, the program has expanded to include privately owned cameras, when registered through Baltimore's CCTV program.

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References

Batty, M., Axhausen, K. W., Giannotti, F., Pozdnoukhov, A., Bazzani, A., Wachowicz, M., … Portugali, Y. (2012). Smart cities of the future. *The European Physical Journal Special Topics*, *214*(1), 481–518.

Berube, A., & McDearman, B. (2015, May 11). Good fortune, dire poverty, and inequality in Baltimore: An American story [blog]. Retrieved from https://www.brookings.edu/blog/the-avenue/2015/05/11/good-fortune-dire-poverty-and-inequality-in-baltimore-an-american-story/

Bliss, L. (2017, November 1). Who wins when a city gets smart? *Citylab*. Retrieved from https://www.citylab.com/transportation/2017/11/when-a-smart-city-doesnt-have-all-the-answers/542976/

Bouie, J. (2015, April 29). The deep, troubling roots of Baltimore's decline. *Slate*. Retrieved from https://slate.com/news-and-politics/2015/04/baltimores-failure-is-rooted-in-its-segregationist-past-the-citys-black-community-has-never-recovered.html

Cardullo, P., & Kitchin, R. (2019). Being a 'citizen'in the smart city: Up and down the scaffold of smart citizen participation in Dublin, Ireland. *GeoJournal*, *84*(1), 1–13.

Cassie, R. (2016, April). A tale of two cities. *Baltimore Magazine*. Retrieved from https://www.baltimoremagazine.com/2016/4/11/a-tale-of-two-cities-west-baltimore-before-after-freddie-gray

Chourabi, H., Nam, T., Walker, S., Gil-Garcia, J. R., Mellouli, S., Nahon, K., … Scholl, J. (2012). Understanding smart cities: An integrative framework. In *2012 45th Hawaii International Conference on System Sciences* (pp. 2289–2297). Maui, HI: IEEE.

City of Baltimore. (2018). *2018–2023 Inclusive digital transformation strategic plan*. Baltimore, MD: Baltimore City Information and Technology.

Coe, A., Paquet, G., & Roy, J. (2001). E-Governance and smart communities: A social learning challenge. *Social Science Computer Review*, *19*(1), 80–93.

Datta, A. (2015). New urban utopias of postcolonial India: 'Entrepreneurial urbanization' in Dholera Smart City, Gujarat. *Dialogues in Human Geography*, *5*(1), 3–22.

De Filippi, P. (2015). Community mesh networks: Citizens participation in the deployment of smart cities. In A. Vesco (Ed.), *Handbook of research on social, economic, and environmental sustainability in the development of smart cities* (pp. 298–314). Hershey, PA: IGI Global.

De Oliveira, À. D. (2016). The human smart cities manifesto: A global perspective. In G. Concilio & F. Rizzo (Eds.), *Human smart cities. Urban and landscape perspectives* (pp. 197–202). Switzerland: Springer Nature.

Eger, J. (2003). Smart communities: Becoming smart is not so much about developing technology as about engaging the body politic to reinvent governance in the digital age. *Urban Land*, *60*(1), 50–55.

Hemment, D., & Townsend, A. (2013). Here come the smart citizens. In D. Hemment & A. Townsend (Eds.), *Smart citizens* (pp. 1–4). Manchester: FutureEverything.

Hollands, R. G. (2008). Will the real smart city please stand up?: Intelligent, progressive or entrepreneurial? *City*, *12*(3), 303–320.

Kitchin, R. (2014). The real-time city? Big data and smart urbanism. *GeoJournal*, *79*(1), 1–14.

Kitchin, R. (2019). Reframing, reimagining and remaking smart cities. In C. Coletta, L. Evans, L. Heaphy, & R. Kitchen (Eds.), *Creating smart cities* (pp. 219–230). London: Routledge.

Lam, D., & Givens, J. (2018). Small and smart: Why and how smart city solutions can and should be adapted to the unique needs of smaller cities. *New Global Studies*, *12*(1), 21–36.

Maddox, T. (2017, May). How Columbus, Ohio parlayed $50 million into $500 million for a smart city transportation network. *TechRepublic*. Retrieved from https://www.techrepublic.com/article/how-columbus-ohio-parlayed-50-million-into-500-million-for-a-smart-city-transportation-network/

Paskaleva, K. (2011). The smart city: A nexus for open innovation? *Intelligent Buildings International*, *3*(3), 153–171.

Perez, T., & Rushing, R. (2007, April 23). *The Citistat model: How data-driven government can increase efficiency and effectiveness* [blog]. Center for American Progress. Retrieved from https://www.americanprogress.org/issues/general/reports/2007/04/23/2911/the-citistat-model-how-data-driven-government-can-increase-efficiency-and-effectiveness/

Power, G. (1983). Apartheid Baltimore style: The residential segregation ordinances of 1910–1913. *Maryland Law Review*, *42*(2), 43.

Rothstein, R. (2017). *The color of law*. New York, NY: W. W. Norton & Company.

Shaver, K. (2017, July 15). New bus system revives anger, frustration over lost light-rail in Baltimore. *Washington Post*, sec. Transportation.

Smart Cities Index. (2017). *EasyPark group*. Retrieved from https://easyparkgroup.com/smart-cities-index/.

Thompson, E. M. (2016). What makes a city 'smart'? *International Journal of Architectural Computing*, *14*(4), 358–371.

Townsend, A. M. (2013). *Smart cities: Big data, civic hackers, and the quest for a new utopia*. New York, NY: W. W. Norton & Company.

Trencher, G. (2019). Towards the smart city 2.0: Empirical evidence of using smartness as a tool for tackling social challenges. *Technological Forecasting and Social Change*, *142*, 117–128.

U.S. Census Bureau. (2016). 2012–2016 American Community Survey 5-year estimates. Retrieved from https://factfinder.census.gov/

U.S. Census Bureau. (2017). 2016–2017 American Community Survey 1-year estimates. Retrieved from https://factfinder.census.gov/

Vanolo, A. (2016). Is there anybody out there? The place and role of citizens in tomorrow's smart cities. *Futures*, *82* (September), 26–36.

Viale Pereira, G., Cunha, M. A., Lampoltshammer, T. J., Parycek, P., & Testa, M. G. (2017). Increasing collaboration and participation in smart city governance: A cross-, case analysis of smart city initiatives. *Information Technology for Development*, *23*(3), 526–553.