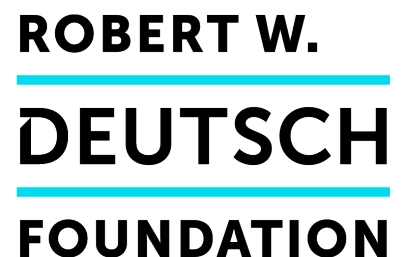# SMART CITIES AND DIGITAL EQUITY

Some Cities Have Found Ways to Pursue Both, but Federal Policy May Hinder Progress

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OVERVIEW

Cities across the United States are trying to become "smart cities," as they invest in digital technologies to help monitor the environment, enhance mobility, and improve the delivery of municipal services. Some of the technologies enabling the smart city, such as 5G wireless networks and autonomous vehicles, occupy the "**inflated expectations**" portion of the cycle of emerging technologies. This creates two kinds uncertainties for decision-makers: whether highly touted technologies will deliver as promised and how they impact values local policymakers are obliged to consider, such as equity and openness.

An examination of several cities which have sought to embrace smart city technology while keeping equity in the forefront shows that:

- **Planning makes a difference**: A number of cities have conducted planning exercises that explicitly takes equity into account for smart city investments. Often, this planning is part of years-long municipal investment in and attention to the local impacts of digital technology.

- **City leadership matters**: Cities that made the smart city-equity link often do so because elected officials make it a priority. This shows up in organizational charts, i.e., dedicated city staff whose jobs focuses on encouraging city departments to examine how smart city initiatives impact equity and can be vehicles to improve digital equity.

- **Community outreach can promote buy-in**: Many cities actively reach out to all segments of the community not just to educate them about smart city technologies, but to elicit feedback from citizens. By making the smart city dialogue a co-creative process, cities have a better chance of making sure the smart city is equitable.

- **Finding pressure points for fund-raising can bear fruit**: Cities need resources for digital inclusion and smart cities, and some places have raised funds for inclusion through local franchise agreements with cable and telecom companies for infrastructure buildout.

The last point comes with a red flag. The Federal Communications Commission (FCC) has constrained cities' ability to charge franchise fees for buildout of a key smart city technology – 5G wireless networks. Given that, and absent repeal of the FCC's rule, Congress should consider a

smart cities grant program that gives cities the resources to plan for digital inclusion as investments in smart cities continue to unfold. The recent introduction of the **Digital Equity Act** offers a potential vehicle for funding such a program.

SMART CITIES AND DIGITAL INCLUSION

City officials in the United States face a growing set of decisions that touch on digital infrastructure and fairness. Economic development, education, transportation, and public safety are the bread-and-butter of local policy decision-making, but these policy issues are intimately tied to the internet. A digitally-enabled "smart city" can help cities improve the delivery of city services, mobility of citizens, and other metrics pertaining to quality of life. A smart city does not come cheap. According to the **International Data Corporation,** cities worldwide will spend $81 billion in 2018, a figure forecast to nearly double to $158 billion by 2022.

As cities face smart city decisions, they face two cross-currents:

- **The enthusiasm for new technology may not completely align with the public interest**. Some cities may aim to be early adopters of new technology, both to stay on the cutting edge and to reap the benefits from smart city investments sooner rather than later. But this has the potential to be at odds with the obligation to serve all segments of the city. Some segments of the city – low-income or communities of color – will have fewer tech assets to use smart city technologies and particular concerns (e.g., surveillance) about them.

- **The inherently local nature of emerging smart city technology takes place as cities have less control over the rights-of-way for the deployment of this technology.** The onset of 5G wireless technology, which the communications industry is aggressively marketing, requires the installation of numerous antennas throughout a particular geography. But the Federal Communications Commission (FCC) has restricted, in the name of hastening 5G deployment, the authority of cities to negotiate terms of access to local rights-of-way for deployment.

I. Managing the Emergence of the Smart City

Smart city investments ask local officials to make technology procurement decisions on matters

that may be new to them and large in scope. City officials often have **basic technology issues** to deal with, such as software dating to the 1980s and the migration from mainframe computers to the cloud. A **2016 study of 65 cities** found that, while some larger cities have the resources to navigate "smart city" decisions, many mid-sized cities may not.

This brief seeks to examine how cities are addressing smart city decisions with a specific focus on how equity figures into cities' responses. It is based on conversations with a number of city officials and other stakeholders, but by no stretch represents a comprehensive overview of what cities in the United States are doing with respect to smart cities and equity. The cities highlighted below are outliers in the sense that they have had the capacity to consider smart city investments thoughtfully. They offer a number of lessons.

a. Planning and leadership

A number of cities have developed smart city plans with an explicit focus on the equity implications.

- Portland, Oregon offers perhaps a direct blueprint to link smart cities and equity. Its Smart City PDX initiative states as a guiding principle that "**Smart City PDX** is prioritizing projects that reduce inequities for people who have been left behind in our city, specifically people of color and people with disabilities." The Portland principles also call for meaningful engagement with community members as smart city projects are designed. Here the smart city/equity link is explicit because, in the minds of Portland's leaders, the purpose of smart city projects is to address inequity in the city. The Smart City PDX principles ask city officials to take a step back to look at equity implications of smart city and data initiatives. At the same time, the Smart City PDX blueprint has evolved in context of the city's significant capacity in thinking about digital inclusion. Portland's informal "digital inclusion network" gathers monthly the officials from libraries, community groups, the private sector, and the city to exchange information about digital inclusion activities.

- The City of Philadelphia has recently released a smart city roadmap, called the **SmartCityPHL Roadmap**, which aims to engage the public in the planning process as the city harnesses information technology to "support the economic, social, and environmental goals" of the community. Among its principles is equity and the Roadmap recognizes that many residents of Philadelphia have limited technology resources. The city released its roadmap in early 2019, but it builds on significant capacity the city has built over the years to confront digital equity issues.

Its **KEYSPOT** initiative, whose origins are in funding in 2010 from U.S. Commerce Department's Broadband Technology Opportunities Program (BTOP), continues with city funding today. It offers a network of more than 50 community-based digital access centers. The city's **Digital Literacy Alliance**, funded through franchise fees from Verizon and Comcast, gives grants for innovation in improving digital literacy.

- Austin, Texas has engaged in strategic planning on a number of dimensions of smart technologies and digital inclusion. The city has a **Digital Inclusion Strategic Plan** (adopted in 2014), which reports on city initiatives that have sought to improve digital equity. Austin also has a **Smart Mobility Roadmap** that uses network technology (with 5G cited as one tool) to develop the use of autonomous vehicles in a congested city. The Roadmap does have a focus on how new technology can help mobility for low-income residents in Austin's public housing units. As in the case of Philadelphia, Austin has developed capacity over the years in addressing digital inclusion. Since 2001, the city has funded the **Grants for Technology Opportunity Program** (GTOPs) giving approximately $150,000 annually in grants since 2001 to initiatives that have to match city funding. Additionally, the non-profit Austin FreeNet has operated since 1995 and received federal funding in 2010 from the BTOP program, as well as $180,000 per year under a contract from the City of Austin. The FreeNet has historically provided online access to those without and has recently begun to focus on digital skills training for the workforce.

> **Initiating smart-city planning exercises that explicitly take into account digital equity can have payoffs. However, their impact is buttressed by building internal staff expertise on smart cities and equity. Building this capacity may take time, but it makes a difference to have dedicated staff whose job is to look at smart city investments and digital equity in the same context.**

Planning is typically the result of strong city leadership on these issues, but not all such leadership results in the production of a plan. Louisville, Kentucky builds equity considerations into it smart city initiatives from the start. It starts from a premise that major city initiatives should take equity into account – an outgrowth of the mayor's pledge to make Louisville a "**compassionate city**." This means simply asking how a city action might impact equity – and this notion has filtered into smart city deci-

sions. The city has issued general obligation bonds to fund a fiber network in the city. In connection to that, there has been a conscious effort to make sure that the city's history of residential redlining in low-income neighborhood is not repeated with fiber deployment.

In Chattanooga, Tennessee, smart city and equity considerations are built into the organizational structure for smart city initiatives. The city has the Enterprise Center, a non-profit that is largely city-funded, that is central to the city's economic development program. Equity is an explicit part of this, as well as smart city initiatives that work off the city's fiber network. Within the Enterprise Center is Tech Goes Home, a program to bring internet access to low-income households. The Enterprise Center also has a dedicated staff position for work both on smart city and digital inclusion initiatives. But it is not just the juxtaposition of a digital equity undertaking in the Enterprise Center that makes the difference. By having the two housed under the same roof, it allows equity to be in the discussion about smart city projects that use the city-wide fiber network. A science, technology, math, and engineering (STEM) school in Chattanooga used the fiber network to use an advanced microscope at the University of Southern California. Rather than limit this to a STEM school, Chattanooga school officials extended it to schools in low-income neighborhoods. The fiber network enabled this, but thinking about the equity dimensions made it a reality.

For San Jose, California, the situation is similar to Louisville and Chattanooga in that San Jose tries to build in equity to its smart city undertakings. The city's 2016 **Smart City Vision** identifies five goals for the city to reach as it aims to make San Jose a city that uses connected-technologies to improve the quality of life. One of the goals is to become an inclusive city, which relies in part broadening access to digital infrastructure for all citizens and improving the population's levels of digital skills.

Smart City planning and equity do not always go together. The Obama Administration's **Smart City challenge** focused on applications for transportation and mobility within cities, but some places did address digital equity. Austin and Kansas City, for instance, proposed using kiosks placed in the city not just to notify citizens of mobility options, but also to transmit Wi-Fi signals and information about other internet access points (e.g., public libraries) to help those with limited access options. However, these sorts of digital equity proposals were more often the exception than the norm; such ideas appeared in only 9 of the 78 applications the U.S. Transportation Department received.

b. Community engagement

As cities embark on "smart" initiatives, public education efforts are a natural approach to get buy-in from citizens. The city of Chicago has been active in this area, holding meetings throughout the city, but with a special focus on low-income neighborhoods. Much of this involved Chicago's "**Array of Things**" initiative, which launched in 2016 and installed networked sensors throughout the city to collect data on environmental conditions and other urban activity. The data the city collects will eventually be made available to the public. In conducting public meetings, city officials were careful not to define public technology, but rather took a "bottom up" posture to eliciting people's views as they learned about Array of Things. The city also found that different neighborhoods had different perspectives on how the technology might promote inclusion. Some hoped the smart city infrastructure might help entrepreneurs start or grow businesses. Others focused more on how the library might use the technology for youth programs.

In Louisville, public engagement has been less about government-to-citizen outreach and more about outreach from government to neighborhood institutions. The notion is that, for communicating to low-income citizens in particular about discount internet offerings or emerging city tech applications, city government should coordinate closely with social workers to spread the word. As an already-trusted person in a low-income community, such a social worker can effectively reach out to citizens. Other anchor institutions – and public libraries come quickly to mind – can also serve the function of trusted intermediary for communication about city digital initiatives.

> **Outreach to educate citizens about smart cities applications can take two forms. One is through neighborhood meetings with citizens, with city representatives explaining projects and inviting input from people. The other is less direct, whereby city officials reach out to community institutions, such as neighborhood non-profits or libraries, about smart city initiatives. These trusted intermediaries then spread the word to citizens.**

In Philadelphia, community engagement has been built into how it has implemented several smart city projects. To improve mobility around Philadelphia, the city embarked on the Indigo Bike Share

program and urged the vendor to place bikes not just in tourist areas but low-income areas. However, use of the bike-share program was low in poorer neighborhoods and city officials sought to understand why. It turned out that some residents did not know how to ride bikes safely and lacked helmets, while others lacked credit cards for payments. The city worked with Indigo to create vouchers (available for purchase in community stores) for payment for those without credit cards and also provide safety training on bicycles. As an added bonus, city officials also encouraged low-income residents to use the bike-share program to travel to the city's KEYSPOT sites for online access and digital skills training.

Portland is building public engagement and education into its community needs assessment for the refranchising process for a cable operator. The needs assessment focuses not just on the cable dimension of community needs (e.g., the cable company providing data services for government or community institutions) but also on the broader needs of the community as the city contemplates smart city projects.

c. Find pressure points

One way to raise the resources to fund digital inclusion programs is to ask for something in return from vendors that want access to city rights-of-way for smart city investments. In Boston, the city's franchising agreement with Verizon allowed the city and the company to negotiate amendments to the agreement that brought digital inclusion funding to the city. This has resulted in a $1 million fund, to be allocated over eight years, for digital inclusion investments in the city. Verizon also committed to provide the city $4.7 million in hardware for smart city projects. Boston has also used the franchise agreement to hire a "digital inclusion fellow" who serves as an advocate for considering the equity implications of digital initiatives in the city.

In California, San Jose negotiated a **$24 million digital inclusion fund to be spent over 10 years** whose goal is to connect 95,000 city residents without broadband at home. This was a condition of granting carriers access to utility poles for 5G deployment and is part of San Jose's strategy to use public assets to promote digital inclusion. The city owns 67,000 street lights – a critical tool for rolling out small cells for smart city applications – but San Jose is also retrofitting them with LED lights equipped with Wi-Fi modems. The Wi-Fi provides 100 Mbps download speeds to the public, which, while not reaching into people's homes, helps with connectivity gaps in low-income neighborhoods. The city also has initiated a **pilot project** to provide free Wi-Fi to 6,000 low-income households in

the East Side Union School district.

In Philadelphia, the city's **Digital Literacy Alliance** grant program provides funds to improve online access for the city's poor residents. It was capitalized by Comcast and Verizon as part of franchise negotiations with each company. Much of this was the result of the work of the CAP **(Corporate Accountability Project) Comcast** in Philadelphia, led by the Media Mobilizing Project (MMP). During franchise negotiations, MMP led a campaign to bring community voices to the table to ensure that the Comcast franchise set aside funds for expanded free and affordable internet access. As noted, Portland is embarking on a cable refranchising process and it remains to be seen whether this may result in a dedicated digital inclusion fund.

II. 5G and Smart Cities

The smart city is a technology neutral concept, as smart city systems can run over fiber optic cables, 4G wireless signals, and even telephone lines. Yet there is no question that the next generation of wireless network technology – 5G – **offers opportunities** for smart city technologies. With faster speeds, better reliability, and more capacity than 4G networks, 5G has the potential to substantially improve the performance of smart city systems. These networks can be up **to 20 times faster** than today's 4G wireless networks, although those speeds may not be realized in the early iterations of 5G.

> **5G wireless technologies offers great promise for smart city applications. Whether 5G can improve digital equity is an open question. The high capital costs and uncertain business case for 5G suggests that "racing" to buildout as quickly as possible is likely to exacerbate digital inequality. Without proper planning at the local level, a 5G race can accelerate digital inequality within and across cities.**

5G has received fair criticism **for being hyped**, but it offers the potential to change how cities deliver services to citizens and how citizens engage with local governments. But the nature of 5G can places special pressures on localities. 5G will require **800,000 small cell sites**, more than twice the number (323,448) deployed at the end of 2017. This means deployment will be neighborhood-by-neighborhood, or even structure-by-structure.

Yet this build-out will unfold as the federal government has **undercut cities' authority** to make decisions about 5G deployment. The FCC has imposed a 60 day limit for cities to process applications for installations on existing city infrastructure and 90 days for applications involving installing a new utility pole. Cities typically need 120 days to process such applications. The FCC also capped what cities can charge for small cell deployment at $500 for the initial application for up to 5 cells and $270 annually for the right-of-way access fee per small cell. Those figures are less than cities usually charge. This revenue shortfall has consequences for cities. As noted, places such as San Jose, California and Philadelphia have funded city programs to **expand broadband access** for low-income citizens from rights-of-ways fees.

Additionally, the economics of 5G deployment suggests that "racing" to buildout as quickly as possible is likely to exacerbate digital inequality. The capital costs for 5G are large and there is **uncertainty** around whether a profitable business model exists. The likely – and for carriers rational – result is to deploy first in wealthy cities and wealthy parts of wealthy cities. In this way, a 5G "race" can accelerate digital inequality **within** and **across** cities. With the FCC removing a source of revenue that cities might use to correct that, federal policy toward cities adds insult as it worsens the injury of preemption.

III. Implications

As cities face decisions on how to make sure smart city investments can promote equity, the discussion above offers lessons on how they can do that.

Leadership and internal capacity: A number of places – Boston, Austin, Philadelphia, Chattanooga, Portland, San Jose, and Louisville come to mind – have devoted staff resources and development over time to help their city government have the capacity to make intelligent decisions about equity and being a smart city. It helps to have a person (or persons) whose job is to ask how a city technology decision impacts equity. Although funding for digital equity is important, in-house expertise is arguably a prerequisite for getting the most out of city funds connected to smart city projects. Such internal staff capacity can also allow cities to be forward-looking. In Portland, the city has developed **proposed privacy and information protection principles**, recognizing that data collection and its use can be a concern for all citizens, but especially marginalized communities.

Smart city planning grants: Cities have raised resources for digital inclusion through pressure

points relating to refranchising negotiations with carriers operating in their city. Philadelphia and Boston are two examples, and San Jose's fund specifically came about in 5G negotiations prior to FCC preemption. But municipal telecom and cable franchises often have 15 year time terms, meaning a city may not have an opportunity to negotiate for an inclusion fund for some time. Given that the FCC has taken away a tool cities have used to fund digital inclusion, Congress should consider a 5G grant program to enable cities to engage in planning for 5G that includes taking into account equity impacts. These planning grants should have a significant time-horizon for cities, as some cities may need to build internal expertise about smart cities

Procurement & Regulation: The Boston example shows how cities can raise resources as they procure hardware for smart cities. As Verizon granted the city a sum for smart city products, the city was also able to seed a digital inclusion fund and hire a digital inclusion fellow. New mobility products also can open up avenues to foster inclusion. In Philadelphia and Kansas City, the city encouraged bike share and scooter programs to provide services in low-income neighborhoods, not just higher-income or tourist areas. As the Philadelphia example discussed above shows, a focus on equity in developing regulations for new technology can lead down a path that promotes inclusion, as the bike share program encouraged low-income users to take advantage of KEYSPOT digital literacy services.

Benchmarks: As cities devote resources to smart cities and inclusion, defining and tracking benchmarks is important. The smart city itself is not always amenable to easy definition, nor is digital inclusion. However, as cities implement smart city projects, stakeholders should not just define goals, but also benchmarks along the way that signal progress.