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Smart Cities:

Beyond the Buzz

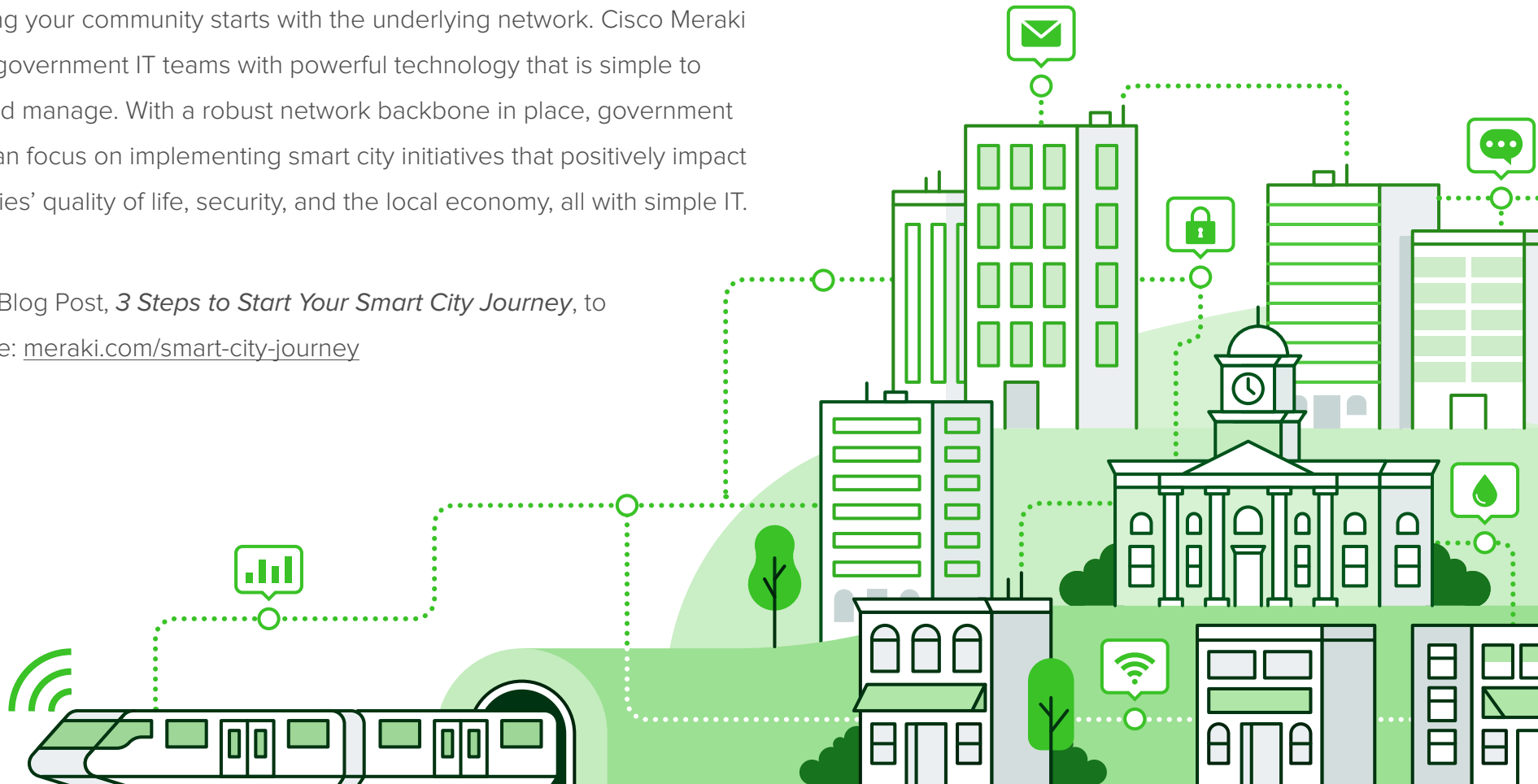
May 2019



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INFRASTRUCTURE

Tampa's Path to Smart City Status

The city's downtown will be ready for connected vehicles by 2020, and an advanced traffic management system will cover the entire city by 2023.

By Dave Nyczepir



The Tampa Hillsborough Expressway Authority is on pace to complete a \$40 million upgrade to its traffic management system that will pave the way for connected vehicles in downtown Tampa by 2020.

Tampa created its Smart Mobility Division to find a way to incorporate new technologies and use data better than its legacy systems, “powered by cutting-edge ‘80s technology,” would allow, said Vik Bihde, the smart mobility manager for Tampa.

Previously the chief traffic management engineer, Bihde oversees the city’s traffic signal system, deployment of intelligent transportation systems and streetlights, as well as event traffic management.

“We need to change our mindset as ... government agencies in recognizing that our roadways have shifted from brick and mortar to electrical to data infrastructure,” Bihde told *Route Fifty*.

In late May, the new Tampa Bay Smart Cities Alliance of public, private and academic stakeholders held its first workshop to identify regional priorities: an open data platform, mobility as a service and the advanced traffic management system.

A small mobility-as-a-service pilot will test an app allowing travelers to pay for trips using the various

transportation modes available in Tampa, including the Downtowner shuttle, microtransit, water taxi, and ride hailing. Residents and visitors will be able to navigate the city easier, and there’s a payoff for the city too.

“We get great data about what people are doing, rather than what people say,” Bihde said.

Hillsborough County voters in November approved a one-cent sales tax increase to fund transportation improvements, with 57 percent in favor of the initiative. The resulting funds will be spent on fiber and broadband wireless connectivity with high-resolution controllers that transmit data 10 times per second—the standard for connected vehicle infrastructure. Connected vehicles, while not necessarily autonomous, communicate with the driver, other vehicles and roadside sensors to improve efficiency and safety.

Tampa will also add cameras at intersections to not only help city staff make decisions based on what they’re seeing but employ machine-learning, so the system itself can count cars and eventually manage autonomous vehicle activity around curbsides and loading zones. During special events, Bihde wants to shift from on-street parking to ride-hailing drop-offs and pickups.



Water-Taxi passes under the West Kennedy Street drawbridge in downtown Tampa FL (istock.com)



Tampa is looking to implement ride hauling drop-offs and pickups similar to Atlanta International Airport. (AP Photo/David Goldman)

New traffic signals and streetlights will be a “microcosm” of that broader effort, Bihde said.

Tampa Electric is embarking on a 5-year, LED streetlight upgrade program approved by the Public Services Commission earlier this year. A network logic controller monitors streetlight inventory, and additional sensors can be added to them to detect gunshots or monitor empty parking—30 percent of downtown congestion during special events being caused by drivers searching for spaces.

“Five years ago we’d only be thinking about how do we optimize our signal timing, how are we responding to calls,” Bihde said.

New traffic signals are being piloted at about 40 intersections downtown, about half of them. While the connected vehicle project downtown, including performance and evaluation, will wrap in 2020, the

advanced traffic management system won’t be deployed citywide until 2023.

Because Tampa is susceptible to climate change-related events, including hurricanes, the city is also exploring new ways to power its traffic lights.

Hurricane Irma was a floodless storm in Tampa, but the city still lost power for about a week—leading to economic losses and forcing police officers to do traffic control, when they were needed elsewhere after the disaster.

Solar panels that can be mounted on sidewalks are in their infancy, but if they can be developed to power signals with overnight backup and maintain surface friction for walking and biking, they could be a gamechanger, Bidhe said.

“We’re challenging the industry to come up with solutions,” he said. 🚗

INFRASTRUCTURE

Using Augmented Reality to 3D-Map Underground Infrastructure

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Several US Ignite cities like Burlington, Vermont are testing the tool to identify infrastructure like gas lines.

By Dave Nyczepir

Worker checking ventory (istockphoto.com)

Vermont's Dig Safe law requires anyone excavating on public or private property to provide 48 hours notice so utilities or municipalities can send workers out to mark underground infrastructure like a gas, water or sewer line. But, sometimes, facilities have long been abandoned and forgotten.

For example, when sewer lines are rerouted to a new bus station and workers hit an unmarked utility vault, it's "a very expensive surprise," said Dryver Huston, a mechanical engineering professor at the University of Vermont.

"These are the sorts of surprises that are routinely built into conventional projects because these things come up," Huston said. "If you could reduce that uncertainty, you can reduce contract costs and increase the speed of both the permitting and the construction process."

For two years, Huston has been developing a way to ease collection and presentation of underground mapping data by integrating geophysical sensors—ground-penetrating radar and acoustic and magnetic devices—with augmented reality.

Traditional means of subsurface infrastructure mapping are "tedious" because knowing one's location is key for the instruments to work better than your average GPS system, Huston said. Linking the sensors with a Unity-based video gaming system allows for 3D imaging that will help workers on site, as well as those viewing remotely.

Burlington, Vermont is one of US Ignite's **Smart Gigabit Communities**, developing apps to address its information technology challenges. Huston's project is now part of that effort by the non-profit group that promotes smart city technologies.

"There was a real opportunity when we started looking at the augmented reality and high-speed networking that could really improve this mapping," Huston said. "US Ignite was there to help move things along."

Huston obtained a research grant and partnered with Vermont Gas Systems to test the unnamed tool in Burlington while it continues to be refined.

That way Huston can test the technology against known information about underground infrastructure in the city with the ultimate goal of perfecting a map of all the underground facilities in Burlington and then the state, said Adam Gero, engineering manager with Vermont Gas.


"We're hoping to get this technology as good or better than current methods," Gero said.

Streets in dense city centers are often full of intertwined infrastructure, including wooden pipes and things thrown in as fill, that clutter the public right of way. Huston said his tool will locate everything faster, and "you don't need to be an expert to look and understand the data."

Chattanooga, Tennessee is another US Ignite city working with Huston to link his tool to its high-speed networks for running smart city apps like AR. The project may also begin working with New York City later in 2019, Huston said.

Electric utilities and telecommunications companies could similarly use the tool, Huston said, as could larger cities dealing with subway tunnels.

Huston is also working on securing the data that his system gathers via encryption so it can't be broadcasted to the public.

"Some of this infrastructure has serious health and safety implications," Huston said. 

OPEN DATA

Mapping the Digital Curb

A data mobility company released an open-data initiative that maps the physical features of curbs in six cities, with the goal of reducing congestion and improving accessibility.

By Kate Elizabeth Queram

Some of the most in-demand real estate in cities sits on the side of busy streets.

It's the curb—where passengers hop in and out of Ubers, where Postmates drivers idle to deliver takeout to hungry customers and where dockless scooters and bikes get picked up and dropped off by commuters. But despite the rising street-side traffic, most cities don't have comprehensive maps showing the parking signs, fire hydrants or bus stops along their curbs.

Enter [Open Curbs](#), a new initiative from [Coord](#) that aims to create the “digital curb.” The project places a city's curbside data on a digital map, allowing officials, planners and business groups to visualize those assets—in some cases, for the first time.

“The first thing we observed when we started was that most cities don't have, or distribute publicly, a digital representation of their curbs and the things on those curbs,” said Stephen Smyth, CEO and co-founder of Coord, a spinoff of Sidewalk Labs, which is a subsidiary of Alphabet. “You might think that's obvious, but it's not. Some cities have pretty good information on that, but most do not.”

For now, the data covers six cities in both the United States and Europe—Denver, Los Angeles, San Francisco, Santa Monica, Calif., Paris and Milan—with more to come. Most of the information contained in the data sets came from the company's [Surveyor app](#), which uses augmented reality to help users catalog street signs and parking meters block by block. That technology is geared mostly toward professional users, including surveyors, while Open Curbs is accessible to everyone.

“Open Curbs is really the first batch of other users of the Surveyor tool choosing to release some of the collections they have made of this asset data, and joining forces,” Smyth said. “Our hope is to introduce the concept of the digital curb not just across America, but the world, and to provide a one-stop shop for not just folks in the industry—engineers, city agencies, mapping analysts—but also for community activists, nonprofits and researchers.”

The overarching goal is to improve accessibility across cities, starting at the curb. That can mean eliminating congestion from discarded scooters and bikes, or simply making curb rules easier for members of the public to access and understand.

“A lot of folks are not sure what the curb rules are,” Smyth said. “We regularly get requests for parking maps and things like that. Cities could post that on their websites or in their mobile app for residents, visitors and businesses.”

The data sets also have “analytical uses—being able to not just to view the regulations, but filter in different things, by type, duration and price,” he said. “Ultimately, the city managers are trying to understand supply and demand.”

The demand for curb real estate is particularly high in downtown Santa Monica, where scooters and ride-sharing companies fight for space with delivery vehicles and cars. Decisions about what goes where on each curb are made piecemeal, rather than holistically, resulting in a patchwork of uses that can be confusing for visitors and residents. “We wanted to have a real idea of what was out there, and we didn't have a map that told us what you can do in what




Detail of a curb map in Santa Monica (Courtesy of Coord)

space in our town,” said Hector Soliman-Valdez, mobility manager for [Downtown Santa Monica, Inc.](#), a nonprofit group that works with the city to manages the downtown area. “Our first step was trying to wrap our heads around all those different issues.”

The organization partnered with Coord to use the Surveyor app to map the downtown, then shared the data with the company as part of the Open Curbs project. The

result is a digital map of the downtown district that allows users to drill down to individual parking signs, fire hydrants and curb stencils. That’s useful for visitors, but also for city officials and business owners trying to navigate an increasingly congested—and important—space.

“It’s good to have,” Soliman-Valdez said, “and because we have it, we can look at it and say, ‘We can solve this problem by checking through the map.’” 

TRANSPORTATION

Using Data to Figure Out Where Transit Should Go

Fixed-route bus use, in particular, has seen steep declines in use while ride-sharing continues to grow in popularity, according to a new report.

By Dave Nyczepir

Shutterstock

Transit agencies must make better use of nontraditional data on consumer activity to combat declining ridership and effectively partner with the private sector to expand their transportation networks, according to a new KPMG report.

This means drilling down into information like cell phone data to figure out where people need to go and where they are starting out their trips. Ted Hamer, managing director of KPMG's infrastructure practice, said tapping into this kind of broader information can help with rethinking mobility.

So, if planners with a transit agency knows where people are generally going when they leave the Dallas/Fort Worth International Airport, they can specialize service to fulfill a need, he said.

Overall transit ridership dropped 5 percent in the last decade, fueled by reduced bus use, the professional services company reports.

Heavy rail, subway, commuter rail, and light rail use remains consistent if not increasing in major cities like Dallas because it avoids congestion and that's attractive to riders, Hamer said. But fixed-route bus schedules timed

The ability to get from point A to point B “cheaply and consistently” leads to greater economic success and equity.

Ted Hamer, managing director of KPMG’s infrastructure practice

for peak periods have led to widespread abandonment of transit even in cities like Denver, Houston and San Diego.

“That doesn’t often fit with the demographic of people who need transit to get to work,” Hamer told *Route Fifty*.

“[Accelerating Mobility](#)” lays out a number of reasons for this, including riders waiting 150 hours a year for transit, the \$90 billion backlog in unfunded U.S. infrastructure projects to maintain bus and rail systems, and the expected growth of the sharing economy to \$400 billion by 2025.

The convenience of ride-sharing as an alternative isn’t solely to blame because favorable interest rates and historically low gas prices have made car ownership easier, Hamer said. While this is true, the [Federal Reserve Bank of New York also recently reported](#) that a record number of people are three months behind on their car loans, which experts have called a troubling economic indicator.

Among U.S. commuters 85 percent do so by car, and 90 percent of them do so alone, according to the report.

Unless they adapt to customer needs, transit agencies will miss opportunities to partner with global companies developing transportation networks, private technology companies like Waze and Google Maps, and ride-hailing companies like Uber and Lyft.

“Five years ago—certainly 10 years ago—there were three or four major ways to get around the city,” Hamer said. “Today there’s more like 13 or 14.”

Car-sharing services like car2go and GM’s Maven, scooter services like Lime and Bird, and bike sharing have been added to the mix in recent years to where bus use is down 20 percent in Chicago and 15 percent in New York City. Only in cities like Columbus, Ohio, where the transit agency has rethought service, is bus use up, Hamer said.

The private sector is ready and willing to partner on first-mile, last-mile projects connecting riders to transit and funneling them into high-frequency corridors, Hamer said. Arlington, Texas and Cincinnati partnered with Uber pool to do just that.

“With the shifting landscape of technological transformation, these partnerships are going to be important to the public sector,” Hamer said. “We don’t think any of this is mutually exclusive.”

The ability to get from point A to point B “cheaply and consistently” leads to greater economic success and equity, Hamer said.

In Columbus, the Central Ohio Transit Authority developed a five-year strategic plan that requires consumer data be understood before a major project is undertaken. The end result is that the city is slowly enabling consumers unlimited choice in how they get around through carefully entered partnerships, Hamer said.

“Use competition to bring out the best in everybody,” he said. ☺

INFORMATION TECHNOLOGY

8 Things Governments Can Do to Use Disruptive Technology Better

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Making sure officials know what things like artificial intelligence do is a good starting point, according to a new report.

By Dave Nyczepir

The payoff of disruptive technologies is greater when state and local governments integrate them to work with each other and make sure top officials know what they do, according to a Deloitte Consulting report.

Disruptive technologies include cloud, analytics, cybersecurity, artificial intelligence, digital reality, and blockchain.

One way governments can integrate them is by optimizing supply chains through a combination of financial system upgrades, cloud computing, AI predictive modeling, and [blockchain](#) for tracking.

“Most state and local governments ... are still in the episodic stage, not necessarily working hard on a number of them,” Scott Buchholz, chief technology officer for the government and public services practice at Deloitte Consulting, told *Route Fifty*.

Leading agencies use AI in decision-making, deploying machine learning across core business practices like fraud detection to identify improper or wasteful spending, according to the [report](#).

But AI does little good if an agency fails to employ talent with the skills to use the technology.

“Some of the most successful organizations are taking time to train the mission leaders in what these technologies mean and what they can do,” Buchholz said. “We sometimes call it tech fluency.”

Once leaders, who often aren’t technologists, understand what’s possible, they “can distinguish fact from fiction,” he added.

One way to develop AI skills within an agency is to hire or borrow a small group of experienced IT professionals to train others within the outfit and grow collective expertise.

A pitfall governments need to be cognizant of with AI, more so than in the private sector, is the ethics of

employing the technology—an issue the CIO Strategy Council is tackling head-on in Canada, Buchholz said.

Another trend the report highlights is advanced broadband networking and fifth-generation wireless, or 5G, have governments eying new products and services like autonomous vehicles connected to smart transportation systems.

On a basic level, 5G promises gigabit-per-second connectivity with low latency for mobile devices, which could soon outpace home computers, Buchholz said.

“The last time connectivity expanded that much, we went from really crummy interfaces to apps and iPhones,” he said.

Expect a lot more devices collecting, providing and distributing data in the future, Buchholz added.

Better networking also means it will be easier to manage wide-area networks using software out of a data center. Previously, remote office setups required physical trips to install hardware, correct problems or make changes, but these things can be done remotely. That means better intranet across states, regions and municipalities, Buchholz said.

The most intelligent system interfaces rely on computer vision, conversational voice, auditory analytics, and augmented and virtual reality together for easy use, according to the report. For example, law enforcement agencies are beginning to look into facial recognition software for identifying suspects as it becomes simpler.

Chief information officers are increasingly concerned with personalizing experiences on products like apps to increase public engagement, according to the report.

“In the best cases, we’re seeing CIOs start to become key members of the leadership team,” Buchholz said. “Every government today is a technology organization, and the



A self-driving Nuro vehicle parks outside a Fry's supermarket, which is owned by Kroger, as part of a pilot program for grocery deliveries Thursday, Aug. 16, 2018, in Scottsdale, Arizona.

degree to which they realize that will help them along their journeys.”


The concept of agile development came about with the goal of bringing business and government together in a way that fulfilled mutual expectations. Once siloed, development and operations became DevOps to boost efficiency and speed up releases from daily or weekly to multiple times a day, Buchholz said.

But cybersecurity teams hadn't kept up, he added, making bringing them into the fold the logical next step.

DevSecOps strives to embed cybersecurity and privacy controls into information technology delivery models from the outset, according to the report. That way cyber and risk

management go from being compliance-based activities to an engineering task, Buchholz said.

Perhaps most importantly, a government's digital transformation should not be guided by a single disruptive technology but instead a repeatable framework, Buchholz said.

“There's some competition between governments; a certain amount of copying occurs,” Buchholz said. “The organizations that get started working across multiple trends and experimenting with AI in ethical, sensible applications ... will see their populations respond accordingly and positively.” 

DATA

Big Tech Must Help Cities Bridge The Divide

COMMENTARY | The two should view each other as “co-creators, sharing tools and information,” according to the head of Bloomberg Philanthropies’ What Works Cities.

By Simone Brody



A three million square foot former New York Port Authority building, purchased by Google in 2010. SEAN PAVONE / SHUTTERSTOCK.COM

You only need to open any major newspaper to see the latest rounds of clashes between tech companies and local governments. Whether it is the [sharing economy](#) or [tax subsidies](#), there are so many examples of technology leaders and their public sector counterparts failing to form meaningful and mutually beneficial partnerships.

As more local governments embrace data and digital innovation, you might imagine that tech companies would be jumping in as true thought partners. After all, such “smart city” partnerships can help make government more efficient, reduce inequities, and grow local economies, in turn driving markets and making cities better places to do business.

Plus, cities are customers, too, with needs for the products and services Big Tech sells. And supporting cities is good for a company’s brand, helping to build trust among companies, consumers, and communities.

But too many tech companies continue to view cities as obstacles to growing their consumer base, rather than vital partners in helping entire communities succeed. To make this reality more troubling, a false narrative persists that cities refuse to innovate. One digital rights advocate was even [quoted](#) recently as saying that some cities are just “too stupid or too lazy” to work with experts who can help them implement technology effectively.

Are cities too stupid to be “smart”?

Far from it. If anything, local government is on the cutting edge of innovation-driven public service. The people I work with in hundreds of local governments across the country are as whip-smart and as passionate about innovation and impact as the managing directors I worked with at Goldman Sachs. And when it comes to understanding the needs of their residents, cities are the experts.

What they are not is tech experts—and they can’t build smart cities alone. So how do we bridge the gap between cities and Big Tech? That necessarily begins by shifting the way they see each other. Both should view themselves—and begin to act—as co-creators, sharing tools and information to benefit both the double bottom line and a bigger share of residents.

Over the last couple of decades, cities have made a lot of progress in using technology to increase both efficiency and the quality of life—whether it’s finding new ways of tracking and reducing energy use, making city services more accessible, or increasing access to transportation and opportunity. More recently, innovations like using drones to monitor trash or streetlights to measure air pollution are making cities healthier.

The public-private bikeshare programs pioneered a decade ago were revolutionary, but we need partnerships that take on bigger problems, like making housing more affordable, not more out of reach, supporting families on the precipice of financial distress, and closing disparities in access to the digital opportunities that are vital for economic mobility in the 21st century. As the Amazon fallout showed, tech companies need to start thinking beyond jobs alone when they come to the negotiating table.

Can tech companies help cities overcome such challenges, and use technology in a more strategic, powerful way? Some are. In [San Jose](#), Facebook and Qualcomm are piloting a wireless tool called [Terragraph](#) to deliver high-quality internet to all city residents. In Seattle, Microsoft has just [pledged](#) \$500 million toward affordable housing for residents left behind in the city’s technology boom. We need more partnerships like these.

Tech companies also can use their enormous capacity to help cities test promising innovations before taking

Over the last couple of decades, cities have made a lot of progress in using technology to increase both efficiency and the quality of life—whether it’s finding new ways of tracking and reducing energy use, making city services more accessible, or increasing access to transportation and opportunity.


the best ideas to scale. In Kansas City, Missouri, a new [partnership with Bird](#), a scooter-share company, is helping the city collect concrete data to assess impact and develop sustainable policies. Shared mobility devices like scooters can provide last-mile mobility solutions to help residents without close access to public transportation reach jobs and services, and reduce reliance on energy-inefficient cars. It also benefits Bird by building demand for its products and trust in the community.

Tech companies and city governments also should explore ways of sharing data responsibly to improve public services. The same kinds of data that helps companies tailor their products to determine optimal pricing or grow their customer base can help cities determine how to improve access to transportation for low-income families, manage traffic congestion, and more. Through its [Connected Citizens Program](#), GPS navigation app Waze is sharing traffic data with local governments across

the country, enabling cities [like Louisville](#) to make more informed decisions about managing traffic and then assess whether interventions really work.

The concept of data sharing is not without controversy—and privacy and transparency are components of smart cities that can’t be ignored. But Big Tech is confronting the same issues in these and other contexts. Why not tackle them together?

The same goes for overcoming other persistent challenges, from supporting job creation to helping prepare local youth for the jobs of tomorrow, to name only two. These are goals worth working toward, together—expanding opportunity, improving economic mobility and laying a better foundation for both companies and communities to thrive and grow.

That should be good enough—and smart enough—for everyone. 

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