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DECODING THE FUTURE:

Creativity and Innovation in Smart Cities

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THE EXPERTS



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THE INTERVIEWS

The following responses have been lightly edited by GBC for brevity and clarity.

What are some of the key smart city goals or initiatives your organization has undertaken?

AT THOMPSON

Like most cities, we want to do more online and provide resources to people to make life more convenient. We also have a huge initiative around digital equity and inclusion in which we strive to help solve or bridge the digital divide here. We're doing everything from partnering with local libraries, to device giveaways, to helping with the lending initiative, to exploring how we can do our own version of an open access network. We don't want to be an internet service provider, but we do see a huge opportunity to help lay the groundwork. We're getting ready to hopefully award a bid in which we're going to sponsor the creation of an open access network where we would have four or more providers offer internet service to an area that is well known for having low broadband access and adoption. We're going to see how that may change the course of many people's lives.

JC COOLEY

Here in the city of Frisco we do what we call organic innovation. We take a backwards approach. First, we ask ourselves, "What makes us more efficient, productive and effective?" If the innovation helps us deliver a better citizen experience and internal experience with employees and city partners, then we're moving in the right direction. Secondly, we think about how we can be better. What fits our profile? We've seen quite a few different things, like Drive.ai autonomous vehicles. We were one of the first cities to be able to deploy that type of technology in our city streets. It was a very successful pilot. We're looking at whether we have the ability to deploy these types of

“Regardless of what agency or department our constituents are interacting with, we want to make sure that they have a consistent experience and that we’re protecting their digital rights.”

SANTI GARCES ESCOBAR



solutions, and how we can move from solution pilot to long-term service delivery.



ESCOBAR

Our goal is to be able to better connect the workforce and our constituents, to enable new possibilities to deliver great experiences, to make sure that things are run well, and to ensure that people are able to get the value from and participate in their government. We think about what we do relevant to smart cities in two parts. One, there's a family of things in the context of products and services that our department provides that enable the workforce and our constituents. One key element of that is data and the underlying resources that help us make sure that we are talking about the same thing.

The second broad area that we've been working on is governance and policies; starting to build the programs and the processes so that our approach to city technology is consistent in the service of our constituents. Regardless of what agency or department our constituents are interacting with, we want to make sure that they have a consistent experience and that we're protecting their digital rights, but also that we're leveraging our infrastructure. We manage and operate the city-wide fiber network that connects over 400 facilities. We're also charged with making sure that every resident, regardless of income, race, or immigration status, is connected to digital resources that might be helpful, including affordable connectivity, devices, or skills. As part of that

portfolio, we work very closely with the telecommunication companies that operate in Boston. We're in many ways the agency that acts as a regulator of those activities.



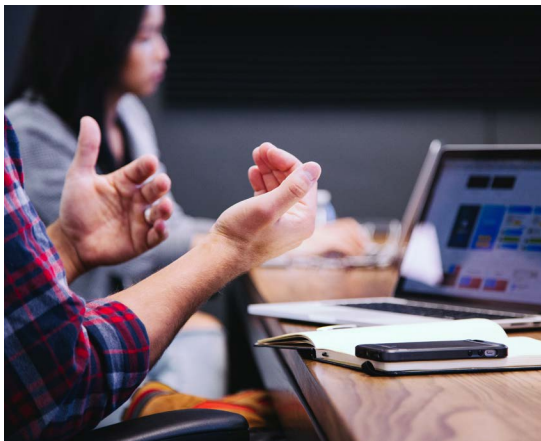
WHEELER

We had an executive order that established a Smart City advisory group, which was very diverse in terms of race and gender and connections across the city geographically. There were 14 core projects during the pandemic, and then we continued to do projects in the public realm. We had to do a little bit of pivoting during the pandemic, because we had to cut some budget and throw a bit of a wider net, so we looked at ideas around the circular economy, including something that has now been implemented in the SmartCity program with Permit Wizard. This is a way to give people a much better sense of the mechanics of the permitting system, the timeframes that are required, and help them through the process.

That was a little bit different than what we had thought we would be doing with the program, which would have been more play of place, or public realm type of work. We did eventually get back to that in the last few years, with implementations like SmartBlockPHL, which was sensor fusion work that has now been expanded to more blocks in Center City, and a smart loading program that has since been disbanded.

“Our practices of purchasing and legal approval have not evolved as quickly as technology has.”

JASON COOLEY



How have emerging technologies such as Internet of Things (IoT), artificial intelligence (AI), and cloud computing been integrated into your urban infrastructure and service delivery?

JC

COOLEY

The city of Frisco is one of the only cities in the country, actually in the world of cities our size, where we're actively doing full scale drone delivery for goods to individuals' houses. The app is very similar to Uber Eats or Favor. We can get you goods to your house within six minutes. That's fully through a partnership with Google Wing. This supports the idea of finding technology that fits our profile and giving individuals an opportunity to pilot. We really embrace the idea that the entire city has the internal skill sets for vendors to bring their technology, and, if it's fully vetted, we can implement that technology for the betterment of what we do on a daily basis.

MW

WHEELER

We launched what we called Pitching Pilot, where we would present a problem set or an idea, and then get responses back from solution partners that we could then evaluate and finance, typically with a budget around \$30,000 to \$35,000, with no commitment that we would then go into a real pilot phase. An internal working group would help us solicit those ideas, representing the departments that had already made investments in IoT types of solutions, including the health department, with air monitoring sensors, and our water department with sensors they were using to study, design, and evaluate the effectiveness or efficacy of green stormwater infrastructure, as well as our commerce department, which we knew would be important for both their connections to the startup community and their perspectives.

What challenges have you encountered during the implementation of your smart city initiatives, and how were they addressed?

JC

COOLEY

Our practices of purchasing and legal regulatory issues have not evolved as quickly as technology has. In many cases, some of our purchasing and procurement rules may be 40 or 50 years old. They are there for a reason, just to be clear. But at the same time, there's nowhere in our purchasing handbook that addresses how I can purchase augmented reality. What service does that fall under? Is it architectural services or is it traditional IT services? Is it infrastructure services? It's never been done before in municipal government so, in many cases, the easy answer is no. That's why so few have done it.

Funding is not issue, but getting things through the purchasing and legal process have continued to be a challenge. When I talk to my partners in other cities that operate in an innovation space, they say they are also experiencing the same obstacles. Solutions look like co-ops—coming together with a group of cities, or even as a state—to vet augmented reality services or driverless vehicle technology to do a direct contract, which takes a lot of effort.

MW

WHEELER

The challenge is inherent in a lot of innovation programs. We all want innovation to work very rapidly. We don't want the typical procurement and embedding processes to get in

the way and slow things down. We tried that initially: "Let's create this separately." We had rules that initiatives could not connect to the city network. We had our data privacy security rules about what information could be retained and what couldn't. We would give a project the same level of vetting as we did enterprise. That could cut down on the process, and run to execution very quickly, but that would only work in a proof of concept phase. When we got to Permit Wizard, for example, we tried that approach, but pilot meant ownership and investment by the city, which meant that it had to comply with our procurement rules.

Two different philosophies were at play. The first was that we are entirely responsible for a solution pit, so all of those support model pieces have to meet our NIST standards and IT control. There was an overall initiative on fueling our ability to review and approve processes, and to have a feedback mechanism to make sure that some of the changes we were asking for would get done. How do we compensate for things that the solution provider can't get done? Teams have to be a lot more flexible about getting to a place of "yes."

The other piece of that is that procurement is a difficult process. Philadelphia, like many cities, designed its procurement process to take on the least amount of risk, and assign the risk to the provider. When you have startups or very small IT companies, especially minority-owned, they don't have the capacity to take on that risk. It hasn't been lost on us. One of the first initiatives I had as CIO was to

pool business leaders and IT leaders together who were interested in helping us figure out how to more rapidly procure and decompress projects, so we could identify the risk, manage it, and do the project in smaller chunks. Our IT department was able to come up with a rubric for the procurement process that would put a solution through a set of questions, and categorize data ownership and distribution risk. We could get to a final score that everyone would understand and hopefully move some of the procurement across the board, not just for Smart City, but for IT in general.

How have you measured the impact and effectiveness of your smart city initiatives? What metrics or indicators do you use to evaluate the outcomes and ensure continuous improvement?

AT THOMPSON

We have a lot of metrics such as speed tests and partnering with the community to get feedback on speeds that people are experiencing. We also see if our citizens will disclose rates that they're paying, so that we can measure that impact. Once we do have this open access network up and running, can we show that we had an impact on the cost of the internet or the number of people that have signed up and taken advantage of it? We've also measured activity around the ACP, or the Affordable Connectivity Program. Detroit has the largest number of signups in the nation, and we're very proud of that, because that means we're taking advantage of it. We're at about 120,000 signups.

We're continuing to measure that success and want to see that grow.

MW WHEELER

In the chartering of the project, we determine how some outcomes are going to be measured. Because our team is small, they don't always get to do as much after-action measuring, or continuous measuring, as they'd like. In the proof of concept, we can measure if it met the goals or was effective. On the longer term projects, and their impacts on communities, it takes more time. SmartBlockPHL, for example, is taking more time to measure than we thought, because the data has to be operationalized to a much greater extent by the Office of Transportation and Infrastructure than our team had capacity for. With something like the loading zone pilot, we had immediate metrics on that because of the payments coming in. We knew the number of entities that were applying for those loading zone spots and the income they were generating.

What mechanisms have been put in place to involve citizens in decision-making processes and ensure that their needs and feedback are incorporated?

AT THOMPSON

Our Connect 313 partnership was one of the first places where we had residents saying they needed help with infrastructure and the internet. That's where we came up with this open access plan. The community helped establish it and then we took it and ran with it. During some of our device

“When cities have experienced many problems, it changes how rapidly they’re going to be able to implement and manage smart city solutions.”

MARK WHEELER



giveaways and tech hubs that put a foundation in areas of the city trying to promote education around technology, we’ll host community events to ask the public, “Is this helpful? Is this something you want to learn about?” With something like device giveaways, we partner with our city council or community groups and try to give to those that need it the most. We want our citizens to give us honest feedback and tell us if our solution is something that they thought was worthwhile.



ESCOBAR

Before deploying expansions of our free Wi-Fi, we procured some tools that allow us to do a mobile unit. We can prototype what it would be like expanding free Wi-Fi for a period of time and then evaluate the experience with commuters. We’ve been working with some of our summer fellows being able to do these pilots, and as we prepared for those pilots we engaged our equity cabinet. There’s a group at the city that includes representatives from a number of departments, including the Mayor’s Office of LGBTQ Advancement, the Mayor’s Office of Immigrant Advancement, the Office of Black Male Advancement, and the Office of Disability, which are a lot of the groups that tend to be particularly vulnerable to digital gaps. We also met with a couple of other groups and asked them if we were to provide free Wi-Fi to the public, where would those priority areas be. They came with a list and focused on areas that are epicenters of community experiences. That’s how we chose those candidate locations against which we will test the free Wi-Fi usage.

The other thing that we’ve been doing as part of the overall governance of our department is prototyping our Community Technology Coalition. This is a group of community-based organizations and other key people that are in this space. They represent different facets of the community—immigrants, elderly adults, and affordable housing providers to name a few. We asked

them to comment on what our priorities should be in the digital equity world, but also internal transformations within the department.

How have you addressed the issue of digital equity and inclusivity in your smart city initiatives? What steps have been taken to ensure that all segments of the population can benefit from the technological advancements and services provided?

MW

WHEELER

During the pandemic, we had to do a little bit of pivoting. The most successful [project] was GoodRoads, a unique way of looking at road condition evaluation, which we were then able to pair with what we call our stress index. We developed that back in 2016 as a way of looking at what we would now call inequity based on location mapping and a number of key indicators that would help us be able to always say, “If we work in these geographies, we are tackling multiple problems at once.” These are the chronically disadvantaged, low-income communities, unfortunately. A lot of that stuff continually met back to the same zip code.

GE

ESCOBAR

First and foremost, we’ve been trying to understand what the problem is, where it exists, and what are the tools and policies and programs that help support it. There’s also an unprecedented amount of federal and state resources going into some of our communities. We don’t want to wait to figure everything out so we’ve been trying to take advantage of these resources and then adapt. Last year we published an assessment on digital equity that focused on the city’s efforts

to close gaps in broadband affordability, devices, and skills. Based on that assessment, we’ve come up with a couple of core strategies. The city has had a free WiFi network called Wicked Free Wi-Fi for a number of years. But as we think about digital equity, free Wi-Fi is particularly useful for people that are already outside accessing the internet through a mobile device. Who are those users? We’ve hypothesized that they are people who have limited data plans. More than likely they’re commuters or people that are taking public transit.

What steps have you taken to address data privacy and security concerns in the context of smart city initiatives?

GE

ESCOBAR

In 2021, the City Council passed a surveillance technology ordinance that regulates how technologies that have an impact on privacy and residents are managed. We tend to be very careful to understand where technology falls within the ordinance. In some sense, that ordinance was part of the inspiration of trying to build this more robust governance and policy practice within the department.

“We want our citizens to give us honest feedback.”

ART THOMPSON

We have a data privacy policy in the city. In some sense, when we're designing something or collecting data or engaging with people, there's always a trade-off between risks and rewards. Navigating that in a way that's intentional is important so that we know how to manage the risk, but also how we can take advantage of the rewards. We're thinking a little bit more holistically about the experience of the constituent. If we're going to add technology, what is the benefit? What is the value? What's the problem that we're solving for our constituents? Do we understand the cost-benefit of the risks? Can we minimize the risk and can we follow privacy best practices? We want to focus foremost on the value and the experience of the constituent.

What lessons have you learned from your experience with smart city initiatives that you would like to share with other state and local government IT leaders? What advice would you give to those who are starting or planning to embark on similar projects?

AT THOMPSON

One, no one engagement is enough. When it comes to engaging residents, you may have to have three meetings opposed to one, just to get a real sense of what the community wants. But on the flip side, you can't always make everyone happy. It's a fine line to walk, but don't just give up on one attempt or two attempts. I really do think it needs to be a multi-tiered step approach to getting community buy-in. It's probably the most important thing we have in government. Two, hold your vendors accountable. Making sure that agreements and structure around how you're going

to partner and collaborate are key. You have to manage those expectations and when they aren't met, you need to make sure you're able to hold each other accountable. Finally, protecting data, protecting people and privacy has to continue to be at our forefront. It isn't something we should let people abuse.

JC COOLEY

First of all, making sure that the mayor and council have a full understanding of what innovation is. If you sat down all seven of your council members and said, "What does innovation look like to you?," you'll have seven different answers. But that doesn't mean you can't do it. It just means you need to clearly explain what you mean by innovation and may need to operate within specific parameters. I would also look at a cross-departmental team of partners in your city or organization, so you can flesh ideas out together. Secondly, knowing who your partners are in other cities. Our private sector vendors and partners aren't just talking to me – they're talking to my friends in Sugarland and Irving. There's no need for me to recreate the wheel. Knowing your players and partners goes a long way to being successful.

GE ESCOBAR

There's two pieces of the puzzle. Generally, I think of smart cities as applications where we're able to leverage sensors or some emerging technology to be able to detect or act in a way that wasn't possible with just human intervention. Especially early on in that journey, there's a lot of technical discovery that is happening. There's a lot of embracing of

possibilities. In some sense, it might feel at times like it's technology chasing after a problem. I think that's been the case. That's not always bad. I think to an extent that some of these things have created opportunities to experiment, to find things that are valuable. But I think that the part that needs to be clear is there's risks associated with that experimentation. The privacy, financial risk, and protecting the taxpayers and the residents from some of that risk is part of our function as public servants.

On the flip side, I think that there are some things that have matured and do seem to be valuable. More importantly, the response to specific business needs and business value needs to exist. Government hasn't always been particularly good about understanding its users. What are their needs? What are the pain points? It's not always technology, but sometimes technology can really alleviate those pain points. Understanding what the benefit is for the constituent, and being able to articulate it, gives a lot more insight into the kinds of projects that could be successful.

great many types of problems, both political and economic, it changes how rapidly they're going to be able to implement and manage an array of different Smart City solutions. Newer and smaller cities have had some greater flexibility, and maybe can work with the private sector a little bit faster on those things than we can, because our procurements take longer, and our ability to vet these things take longer. We have more "what ifs" to consider at a larger scale.

We have 32,000 employees in systems that have to serve 1.6 million people, many of whom are below the poverty line. That creates a completely different service delivery mechanism. We also have hundreds of languages spoken in Philadelphia. We concentrate on the top five to seven, but when it's an extremely important rollout, and we need everyone to get that communication, that's a significant investment and cost for translations. And AI, at this point, hasn't been there for us. We're probably getting to the point of reinterpreting that again, especially as AI becomes much more proficient. I think you'll see the whole field transform as all firms grow a little bit more. That's where I think it's really exciting.



WHEELER

My takeaway is based on the work, but also many conversations. I don't think Smart City is a bad term, but it is a very large umbrella. When cities have experienced a



INDUSTRY PERSPECTIVE

CHRISTIAN NASCIMENTO

Vice President, Product Management and Strategy, Comcast Business

What challenges do you see state and local governments facing in their Smart City development?

How do you think industry can help address these challenges?

Smart city innovations are a great opportunity for governments to try and make the lives of their citizens better. A smart city initiative works best when it takes advantage of rapidly evolving technology to bring products, services, and insights to citizens that live in specific geographic areas.

The primary challenge, in my opinion, is how vendors, partner communities, and government officials stay on the cutting edge of the latest technology. Secondly, state and local governments need to ensure they're implementing the technology and deploying it in a way that's digestible for the community. And finally, governments need to ensure they're not spending precious budget, tax dollars, and resources deploying technology that's going to become antiquated by the time they get it out the door.

If you're in the public sector, then you've got to make sure that you have transparency around how public dollars are being spent. That's where the challenge of scaling this comes into play. How do you go beyond identifying the technology? How do you rapidly deploy it while still being mindful of the necessary approvals and oversight?

One of the reasons why Comcast Business is such a good partner to cities and states is because we have the ability, scale, and resources to evaluate different technologies—whether it's a technology we've built or a technology built by a company we partner with. City and state governments have IT departments, broadband offices, and innovation offices, but they don't have the scale that a Fortune 30 company like Comcast has.

The reason being it's not their core attribute. Their core attribute is government and running governmental services. Partners like Comcast Business can alleviate some of the operational, technological, and valuation challenges faced by government agencies. We can let the government focus on what they're really good at, which is understanding how technology might fit in to the context of all the services they're providing to their residents.

In the context of Smart Cities, how do you perceive the role and significance of digital equity?

Digital equity is a core tenet of our business, and we're incredibly proud of the significant strides we've made in this space. [Lift Zones](#) was the idea that we could deploy our technology into locations that needed connectivity. We provided it first to students via supportive neighborhood locations like nonprofits, community centers, gyms and parks and recreation facilities, because schools were closed during the pandemic and kids needed a place to do their homework. But, as schools reopened, we shifted our focus to giving underserved families access to the Internet so they can fully participate in educational opportunities and the digital economy.

Considering digital equity within the framework of smart cities, if all services are accessible via the Internet, then you have to give your citizens the opportunity to connect. The democratization of digital access allows the sharing of information throughout an entire city or region, enabling people to gain insights into the happenings within the city and state. Internet access is a necessity for citizens, but achieving digital equity is paramount in making that a reality. This commitment is of great significance to us from a corporate responsibility standpoint.

What solutions does Comcast Business offer that can support smart city initiatives for state and local IT leaders?

Foundationally, we are a connectivity provider. Connectivity is the lifeblood of any smart solution—especially smart cities. A network of sensors and devices can't operate efficiently without having a strong foundation of connectivity powering them. When you have a trusted partner with the reach and scale to provide not only connectivity, but applications that layer on top of it, like motion or water sensors, then I think that can be quite impactful for a city. That's some of the value that Comcast Business brings to our customers.

We have the capability to provide the government with the necessary technology for their transition into a smart city, supply citizens with the products essential for informed consumerism, and assist underserved individuals in accessing services they might otherwise struggle to obtain independently. This is how we can make people's lives a little bit easier using technology. It's the opportunity to take some of the technology that we deploy in the private sector and customize it for use in the public sector.

ABOUT



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