

2017 TECH Smart Cities Innovation Accelerator at NYC

Developing an Actionable Strategic Plan for Your City

July 27–29, 2017



www.theinnovatorsforum.org



Convened by the Technology and Entrepreneurship Center at Harvard
Co-Hosted with the Office of the Chief Technology Officer of New York City



Contents

Panel: Digital Access and Equity3

Moving from The Dock to the City: Expanding Smart City Initiatives Beyond the Confines of Walls6

AWS for Smart, Connected and Sustainable Cities8

Building a Smart and Equitable City11

Laying the Groundwork for Innovation in Your City14

SmartATL Enterprise Data Platform16

How Connectivity Will Impact Mobility, Buildings, and Citizens Within the City18

How Orlando Is Using Smart Tech to Promote Branding20

Ford Mobility: Smart Vehicles in a Smart World22

Building the Urban Mobility Networks of Tomorrow24

Transportation and Technology Projects in Las Vegas26

Climate Action and Adaptation in Los Angeles and Beyond28

Incorporating Smart Cities Initiatives to Improve Resilience30

About the Strategic Innovation Summits and Symposia32

For the complete content, including videos and keynotes, please see:
theinnovatorsforum.org/smart-cities-innovation-accelerator-harvard-2017



Photo credit: Jason Hiner/TechRepublic

Panel: Digital Access and Equity

When it comes to digital access, there are two parts of the equation:

1. Does the infrastructure exist?
2. Can (and will) people actually access that infrastructure?

On the opening day of the 2017 Smart Cities Innovation Accelerator, we gathered for a session on Digital Access and Equity where panel and audience members discussed these ideas. Representatives from cities across the country chimed in to share which part of the access equation is a bigger issue, and how to overcome the challenges.

Setting up Infrastructure

Although panel and audience members felt confident that their cities had a high degree of digital access, most admitted that there are dead zones, pockets of (typically) low-income communities where broadband and Wi-Fi access is not available. One nugget gleaned from the session was the importance of not assuming universal connectivity, but rather measuring it scientifically. Only then can a city truly determine what percentage of its population is in the digital dark, and which areas need infrastructure improvement.

Just like all scientific studies, participants suggested that cities should start out by defining specifically what they mean by digital access. It's not just that people 'can' connect; true digital access must be defined in terms of its affordability, its quality (25 MHz or better, 100 MHz or better, etc.) and the availability of multiple choices.

As for measuring accessibility, some cities mentioned using data, such as broadband maps and information from the American Community Survey. Others talked about going out into the field—gathering tech carriers and engineers on rescue vehicles to travel the city, measure access, and pinpoint where gaps exist.

*“It becomes
this sort of
virtuous circle
where people
are able to get
other people
connected.”*

– NYC Panel Member

By identifying where the problem areas are (and how big of a problem accessibility is) the city can take steps to improve and establish infrastructure. Participants had several examples of how they have done this: adjusting antennas to improve signal, setting up free public Wi-Fi throughout the city, and working with providers to make home internet services more affordable. As one city representative mentioned, getting creative with vendors and internet service providers can allow cities to negotiate lower service fees and get donated components, service, support or architecture, thus cutting down costs to taxpayers.

Acceptance of Connectivity

The other side of the equation is whether people can (and will) access the digital world if connectivity is made available to them. Most city representatives agreed that this could be the trickier part of providing universal digital connectivity. Here are some reasons why they think this is a big problem and, how they are handling it.

- **Lack of Interest:** Some people just don't think that they need the internet; they don't see the value it provides and the benefits they could get from it. Cities facing this issue have held informational and training programs that stress the importance and benefits of the internet, such as the ability to search for jobs online, to find a better job and raise your income, to apply to schools, and to access city services.
- **Affordability:** Despite interest, the cost to obtain services may make it unaffordable to some households. Some city representatives mentioned targeting the affordability problem by setting up special low rates with internet providers (e.g., \$8.99/month for basic services). Although this can solve the affordability issue, there is still the problem of how to make more low-income communities aware of these programs so they can take advantage of them. Other cities are facing affordability issues by targeting kids from low-income households with programs that provide free devices and internet service.
- **Digital Literacy:** Even if a person is interested and can afford access, lack of knowledge may prevent them from utilizing services. There were many stories about cities that are tackling digital literacy problems with training programs at libraries and rec centers so city residents can understand how to use the internet and what the internet can do for them.
- **Language Barriers:** There are dozens of languages spoken in each major American city. Many people are non-native speakers or speak a different language than English, and this may make them hesitant about exploring and embracing the digital world. To address this issue, city officials have been mindful of holding training sessions in a variety of different languages, particularly the top languages used in the city.

By addressing these issues and targeting youth, cities are seeing a growing awareness and acceptance of digital connectivity in communities that have traditionally been a bit more resistant to technology. They have witnessed a snowball effect, where one person's interest spurs their community to adopt new technologies as well. For example, a kid who has received a free computer will make dad want to get online, which makes grandma want to get online, which makes neighbors come over to learn about it, and so on. Small-scale city efforts can balloon into a 'virtuous circle' where people want to experience the benefits of being online but also want to get online so they can connect to their social network.

"When you talk about digital inclusion, you've got to talk about the outcomes."

– Atlanta Panel Member

It's All About Outcomes

While discussion about infrastructure and access was the focus of the panel, one theme that came up repeatedly was the importance of outcomes. More specifically, while cities are striving for digital inclusion, they should constantly be asking and measuring whether these efforts make a positive difference in the city.

In one city program, 2000 kids received free internet service. A year later, the city is wondering what impacts the program had. By gathering metrics such as attendance records, grades, and so on, they can see if the program produced positive outcomes for individuals, families, and schools. If results are promising, this may lead to an awareness campaign so the city can reach the families they haven't connected with yet.

*"Technology is
a means to a
greater end."*

– NYC Panel Member

And the results of a digital inclusion project might not always be positive either. Panel and audience participants pointed out that technology can have good or bad outcomes, and even our efforts to close the digital divide can actually widen the gaps. For example, the public schools in many of the representative cities are starting to modernize the classroom by giving students devices to use for their coursework. Those students who do not have internet access at home are, in essence, abandoned after they leave the school, forced to find libraries or other free access sites in order to get and complete homework. When they walk in the door the next day at

school, they are already behind as compared to their classmates who have internet access in their own homes.

All the cities represented at the 2017 Smart Cities Innovation Accelerator are driven to close the digital divide and provide equitable access for their city residents. The overarching theme of this panel session was that in order for cities to do this, they must approach each project systematically: abandon all assumptions at the door; define key variables and goals; strategically plan their implementation; and last but not least, examine the data to evaluate their results and confirm that their project is producing positive outcomes.



Moving from The Dock to the City: Expanding Smart City Initiatives Beyond the Confines of Walls

Sol Salinas, Managing Director, Accenture Digital - Mobility, Global Lead, Accenture Smart Cities

Earlier in 2017, Accenture opened a state-of-the-art multidisciplinary research and incubation hub called The Dock in Dublin, Ireland. It is one of the most connected buildings on the planet. With approximately 10,000 sensors (computed to be more per square foot than any building on the globe), the building is intelligently connected to its people and things within its walls. Data from temperature, light, location, movement, and even its own weather station sensors, allows for the intuitive control and analysis of The Dock. The sensors facilitate the connection of employees and clients, and projects are underway to help The Dock learn occupant behavior and react to user feedback/preferences.

The Dock represents the great potential we have for creating a sentient city: a city that is as aware of its occupants as its occupants are aware of it—a city that feels and senses and is seamless with city residents. From our work on The Dock and smart city projects all over the world, we understand the promise of using IoT to better connect cities and inhabitants and the challenges we must overcome to get there.

Challenge 1: Technology Doesn't Guarantee Outcomes

San Jose, Costa Rica is a large city of about 600,000 people, scattered in the sprawling Costa Rican mountains. Traffic can be horrible, taking 2 hours to travel just 15 miles out of the city. There are very few traffic lights, signals, and street signs, plus the roads are narrow and lined on both sides with water crevasses that are about eight feet deep. There is no room for error as a driver, yet on a recent trip, I noticed that I didn't see any accidents at all during my two-week stay.

*“Technologies
in and of
themselves
don't deliver
outcomes.”*

– Sol Salinas
Managing Director,
Accenture Digital -
Mobility, Global Lead,
Accenture Smart Cities

Coming back home, I was driving from the BWI airport to Washington, D.C. and just five minutes into the commute, traffic came to a halt. The backup was caused by a fender bender on the four-lane highway of I-95. No accidents in Costa Rica for two weeks and I needed only five minutes in the U.S. to experience one.

This story demonstrates something we should be aware of when we approach technology and smart city ventures. Technologies in and of themselves don't deliver outcomes. Of course, this doesn't mean that we shouldn't aim for this goal, but we must remember that the technology makes no promises when it comes to outcomes.

Challenge 2: Prioritizing Use Cases

Today more and more things are connected through the use of sensors and technology, and that level of connection will only expand. Eventually, it will become a large cluster of connections, which brings up the challenge of how to organize it all. How do you decide which use case to move forward with? How do you choose to do this as opposed to that? At Accenture, we approach it similarly to how Abraham Maslow organized the hierarchy of needs.

In his pyramid-shaped diagram, Maslow prioritized the needs of human beings with the premise that needs have to be met on one level before a person can rise up to the next. His ordering was physiological, safety, social, esteem, and finally self-actualization. Achieve one level, and you are able to move up and work on the next.

At Accenture, we use a similar idea to help cities decide on what to address in their smart cities projects. Depending on the concerns of the particular city, they may focus on public safety, climate change, sustainability, or some other area where technology can improve the city. From that base, the city can move on to different levels and different issues.

Eventually, perhaps 5-10 years from now, we will see cities achieve self-actualization, which we define as a holistic system where each smart city project works together as a single organism. However, deciding what to start on, how to build upon that, and how to connect everything together are challenges that each city will have to address.

Challenge 3: Bringing Non-Tech People Into the Conversation

In identifying priorities and use cases, cities will face the challenge of bringing non-tech people into the conversation. Technologists can discuss sensors, routers, gateways, platformers, etc., but many important stakeholders do not speak this language. How do we expand the conversation to colleagues in other departments, those who work next to us in city government and specialize in different areas but also have a vested interest in smart cities projects?

At Accenture, we believe that the key is to not talk about the technologies right away. Bring in the bigger community of stakeholders and hold a discussion in plain English, so that everyone can understand and contribute. Technology can be brought in later, and at the right time. In the beginning, smart city projects should be approached as a group exercise where collective dialogue about the city's problems and priorities can be discussed among all vested parties.

Although these three things represent challenges that each city will face in their smart city ventures, the challenges are not insurmountable. As we have seen with The Dock, we do have the power to use sensors and technology to build intelligent, connected spaces. The next step in the journey is to take these ideas outside of the walls of a building and let them expand to fit the boundaries of cities, countries, and even one day, the world.

"I think many of you are beginning to see that this is not about one-off projects either, police projects or sustainability projects. It's about the holistic. It's about the horizontal analysis. It's the insights that come from doing all these things together and in sequence and in a methodological way. That is a smart city. That is a sentient city using smart technology."

— Sol Salinas
Managing Director, Accenture
Digital - Mobility, Global Lead,
Accenture Smart Cities



AWS for Smart, Connected and Sustainable Cities

Sri Elaprolu, Global Lead & Senior Manager, Amazon Web Services

Amazon Web Services (AWS) is a public cloud computing platform that launched in 2006 and started with just two services. In a little over a decade, it has grown to 100+ services with a million active customers worldwide including over 2,300 government customers, served from 16 different AWS regions around the globe. With benefits like cost savings, agility, enhanced security, and less downtime, it is a platform that more and more cities are turning in order to handle data in smart cities projects. Here is an overview of services offered, how the AWS IoT service works, and how some cities are using AWS today.

AWS Capabilities

AWS offers a broad set of global cloud-based products including compute, storage, databases, analytics, networking, mobile, developer tools, management tools, IoT, security, and enterprise applications. Customers can use these services to build agile, secure, and cost-effective solutions quickly. Customers also have the option to deploy solutions provided by our partners on top of AWS.

AWS platform includes many layers and can accommodate basic and complex needs. Service categories include IaaS, PaaS, and SaaS. The major service areas include:

- **Core Services:** Compute, storage, databases, networking, security, content delivery.
- **Platform Services:** Data analytics, streaming data, mobile, IoT, DevOps, app services, messaging, productivity and more.
- **Hybrid Services:** Private connectivity, Federation, Networking.
- **AI Services:** Voice, deep learning, machine learning, and more.

Because data security is of utmost concern, AWS provides many security tools and features for networking, encryption, identity & management, and compliance.

“The most important aspect of Smart City solutions is not the sensors on the ground; rather, it’s the data. The point of deploying sensors is to collect data. And why is data important? Because it’s the data that gives you insights into what is working or not working or needs to be changed. So that’s number one. Data is absolutely key. The AWS platform allows cities to collect, store, and analyze data at-scale, securely, and cost-effectively.”

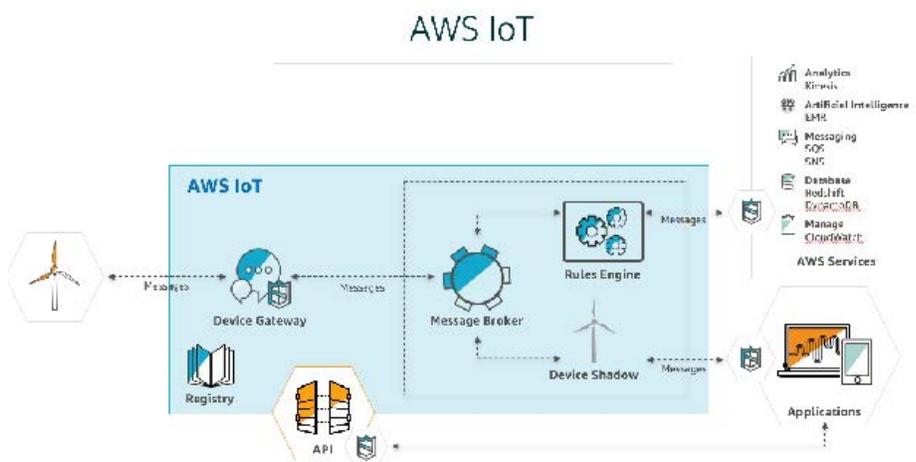
– Sri Elaprolu
Global Lead & Senior Manager,
Amazon Web Services

The AWS IoT Platform

Several Smart City solutions make use of the AWS IoT platform, which allows customers to gather and process data from simple systems to the most complex. Data comes into the platform via a secure channel; all traffic to and from AWS IoT service must be encrypted over Transport Layer Security (TLS). When data is received, the service checks to make sure it is coming from a trusted device based on an X.509 certificate that the service trusts. If both the device and service trust each other (mutual authentication), the connection attempt is accepted. Data then arrives at the Device Gateway which supports the pub/sub messaging pattern, enabling scalable, low-latency, and low-overhead communication.

Customers can use AWS IoT Rules Engine to configure logic they want to be applied on incoming data from sensors. As data arrives at AWS IoT Rules Engine, it is evaluated against pre-configured rules to determine if there is a match. For example, you may have a rule that when the temperature is over 80 degrees in a room, the AC should be turned on. If the device sends data that it is 85 degrees in the room, the system will send an instruction back to the real device in the physical world and instruct it to turn the AC unit on. This is an example of a simple rule, but you have the capability to do all sorts of complex rules based on your needs. You can also do complex processing like triggering real-time machine learning predict functions.

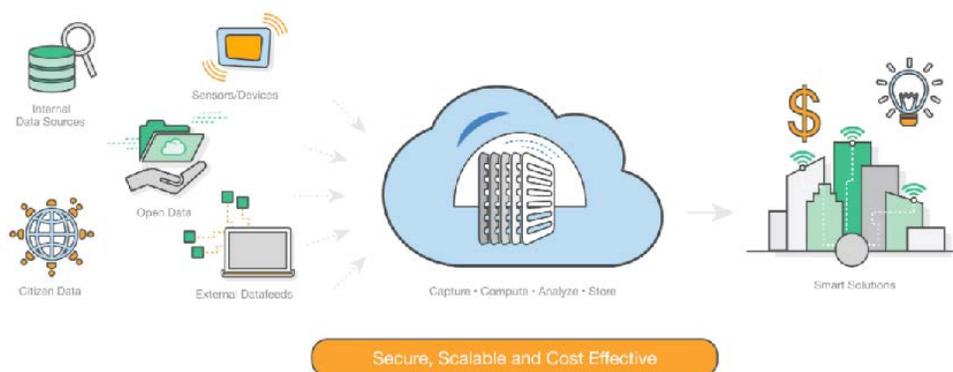
The Device Shadows enable cloud and mobile applications to easily interact with the connected devices registered in AWS IoT. A Device Shadow in AWS IoT contains properties of a connected device. Device shadow can be used to store and retrieve current state information for a device; this allows you to continue to work using the last known state that the device was in, should the connection to the device be temporarily lost. The device shadow can also trigger events to happen in the real world based on changes to the shadow state.



AWS in Action

AWS is currently being used as a scalable and secure platform for a number of smart cities projects like the ones in City of Newport (UK), Peterborough (UK), Denver, Iowa City, Virginia Beach, Los Angeles, Las Vegas, Utah, New York City, London, and Singapore. Here are some examples:

- Many governments deploy solutions on AWS for monitoring and detecting environmental and other conditions around the city, including air quality, water quality, water levels and pollutant detection/monitoring.
- Others use it to monitor transportation in their city, including solutions in London and Singapore. These large cities have multiple types of data sources above ground, below ground and in waterways. By using AWS, they can gather this data, analyze, and provide real-time insights to internal operations teams and citizens.
- Cities like Denver and Iowa City use the platform to assist with public safety. For example, if there is an accident on the streets, they can use real-time triggers in the solutions to alert fire and EMS while also sending alerts to traffic cameras and traffic signals upstream to start delaying traffic.
- Another option is to use the system to make data available to citizens. For example, Singapore has a map that brings in over 100 different data sources. Using a mobile device and location information, citizens can access specific data wherever they are in the city.



With smart cities projects, it is not just the sensors that are important, but also the data that is collected and the insights that the data can provide. Data can come in from any number of channels including sensors, internal data sources, external data feeds, data from citizens, and open data available from other systems and locations. AWS services provide the ability to safely gather incoming data from many sources, and then process it quickly. In doing so, the city gains real-time insights and can take appropriate actions based on what the data is telling them.



Building a Smart and Equitable City

Jeff S. Merritt, Director of Innovation, City of New York

Smart city projects in New York are first and foremost about the people—improving quality of life for the millions of residents, workers and visitors who come here to live, work, and play. Sure, the technology is great, and it is key to our mission, but it is not the end goal in itself. Our smart city journey begins by understanding the unique needs and pain points that New Yorkers face and acknowledging that technology is not always the answer; in fact, sometimes technology can be at the root of these problems. Though New York is unique in many aspects, we believe these lessons can be applied to smart city projects happening anywhere around the globe.

A Tale of Two Cities

There are almost 400,000 millionaires living in New York City, more than anywhere else in the world. And in midtown Manhattan, where many of these millionaires live and congregate, we can see the incredible potential of smart cities projects. Take Hudson Yards for example. This newest neighborhood in Manhattan is currently being constructed with state-of-the-art technological solutions: continuous access via wired and wireless broadband for any device, organic waste systems, a stormwater tank, and sensors that have the ability to monitor and react to traffic patterns, air quality, power demands, temperature, and pedestrian flow. A playground for the rich and famous, it shows that we can build the city of the future today.

Meanwhile, New York also includes neighborhoods like Brownsville, Brooklyn. This community has a higher concentration of public housing than anywhere else in North America. The life expectancy for people who were born and grew up in Brownsville is 11 years less than those who grew up in lower Manhattan. Consumer technologies such as OpenTable (an app for booking reservations) that were developed to make our lives easier have limited value in Brownsville because the neighborhood does not have sit-down restaurants with waiter service. In addition, the introduction of new technologies (such as installing free public Wi-Fi) can trigger fear and doubt in residents' minds. Are you capturing information about me? What is this really for?

“When a new technology is purchased and deployed by government, private sector or consumers, we are either exacerbating inequities or helping narrow them. There’s no other way around it; it is one or the other.”

– Jeff S. Merritt
Director of Innovation,
City of New York

This tale of two cities demonstrates a few important points that all smart city officials should consider. For one, when a new technology is purchased and deployed by government, the private sector, or consumers, we are either exacerbating inequities or helping narrow them. There’s no other way around it; it is one or the other.

Secondly, we must realize that, if things are left on their own, these projects will naturally migrate to wealthy, better-resourced areas where communities are actively embracing and seeking out new technologies. However, the role of government is to serve the people. To truly leverage the transformative power of technology, we (government) must focus our attention on the communities where needs—and resistance—are the greatest.

Building Trust in Brownsville

Launching smart city projects in communities like Brownsville is not easy, but we have been using a method that shows great promise. It involves getting the community involved and addressing issues head-on.

Before you can do that, a certain amount of planning must be done. We use a ‘smart city stack’ method that has several layers. The first three are the strategy layer (creating a citywide plan that establishes the long-term goals that define our vision for the smart city), the tactical layer (where IoT guidelines and policies help agencies understand how to responsibly deploy solutions), and the vendor engagement layer (where the potential products to use in our projects are sourced).

After these stages, you transition from planning into action, where technology gets tested and ideas are validated. At this stage, particularly in communities like Brownsville where there is a lack of trust in technology, community engagement is critical. We consider this to be both an investment in social infrastructure and a key part of the testing and validation process for new technologies. In designated “Neighborhood Innovation Labs” like Brownsville, this engagement process includes forming a local advisory board, empowering them with new capacities, and working side-by-side with them to create strategic priorities that will drive new technology deployments.

The community technology advisory board enables us to streamline the community engagement process while also ensuring that we reach all key stakeholder groups. In Brownsville, we partnered with key organizations and institutions in the area to curate a board that consisted of three types of people:

1. Community organizers who understand the urgent problems in the community and are willing to fight to solve them.
2. Place-makers who organize or manage public spaces and understand the role of public space and quality of life in these neighborhoods.
3. Entrepreneurs who are committed to growing the local economy and helping close the digital divide.

As we engaged neighborhood problem solvers in a series of discussions about the potential of new technologies to help improve urban life, it was immediately clear that the residents of Brownsville have a different experience with technology, largely based on encounters with law enforcement.



Brownsville is one of the most surveilled neighborhoods in New York City. This is both a result of persistent crime and the fact that Brownsville has some of the greatest concentrations of young people on probation or in detention centers. As a result, stories regarding innocent friends or family members who were targeted because of technology abound. Whether individual stories are true or not is not relevant here; the point is that these perceptions of technology (and its potential to be used illegally or unethically) mean that Brownsville residents are less likely to embrace smart city technologies that could actually benefit them.

Recognizing this foundational dilemma, our approach was to address the issue head-on, carefully, and repeatedly—not just in one meeting or behind closed doors—but throughout the curriculum. We brought in representatives from the New York Civil Liberties Union and invited leading security researchers to discuss technology from the standpoint of civil liberties/rights and the ethics of data collection. This actually inspired the group to draft a statement of principles that will guide the considerations for technology partnerships that were being proposed. The goal of this document would be to make sure that when technology is chosen, it adheres to specific ethical principles.

We believe that this investment in social infrastructure will not only accelerate the implementation of smart city projects in communities like Brownsville but also strengthen the way that we as a city evaluate and approach the deployment of new technologies. By addressing residents' fears and concerns and building trust by integrating these concerns into our review of new technologies, we believe that Brownsville can shift from a community that is pushing back against technology and falling behind to one that is embracing, adopting, and even demanding technology. Once again, technology can either exacerbate inequalities or narrow them. As public servants for the city of New York, we seek the latter.

“To truly leverage the transformative power of technology, we (government) must focus our attention on the communities where needs—and resistance—are the greatest.”

– Jeff S. Merritt
Director of Innovation, City
of New York



Photo credit: Jason Hiner/TechRepublic

Laying the Groundwork for Innovation in Your City

David Graham, Deputy Chief Operating Officer, City of San Diego

When we think of smart cities, we think about things like technology, IoT, pilots, and scaling. All of those things are important, of course, but in San Diego, we have come to realize that the ability to achieve transformative change depends on how you set up your organization and nurture the people inside it. Here are some of our thoughts on how to build a stronger environment for innovation.

4 Organizational Models

Innovation within the city is typically organized in one of four ways:

1. Centered around the mayor and the mayor's office.
2. Embedded in an organization where a CTO or CIO leads innovation efforts.
3. Innovation through consultancies/outsourcing.
4. A decentralized model without a lot of internal organization.

In San Diego, we use the decentralized model. We don't work in the mayor's office, but we do work across many different departments in the city government. Is this the 'right' way to do innovation? No, there is no one right way, and all the methods listed above can work. However, the main point is that you must understand what your model is and be intentional about choosing a model that will work for your city.

Getting Your Bureaucracy On Board

If you work specifically in the smart cities space, you likely see yourself as a future-thinking innovator who is pushing hard for positive changes in your city. But the city government bureaucracy is made up of many people who are doing the ground work each day, and they might not feel the same way. While we try hard to engage the public, to convince them and help them understand the

value our smart city efforts, we do not apply the same effort or strategy to the people in our own bureaucracy. This is something that can severely block digital transformation.

In every city government, there are colleagues who are ‘in the stone age’ and just don’t get it. It is our job to convince them that these projects make sense and that the goal of becoming a smarter city is worthwhile. There are evangelists like us in every city who are hungry for innovation, but that is not enough. To achieve digital transformation, we must start with organizational transformation—engaging people at all levels of the bureaucracy and convincing those on the ground to get hungry for innovation, too.

3 Impediments to Digital Transformation (And How to Push Through)

In our experience, there are three things in the bureaucracy that can slow progress toward digital transformation:

1. Fear

Some people may fear things that are new or fear what might happen if you try different ideas and they stall innovation within the bureaucracy. If this is happening, we recommend the ‘training wheels’ method. Start by replicating something. Do something that is safe and do it over and over again. You know what works, so try to tweak it and change it in order to explore it in a different manner. Eventually, you will feel safe to move more boldly into innovation. Once you learn how to ride the bike, you can take the training wheels off.

2. Funding

Lack of funds can also make transformation difficult. But the ‘secret’ is that cities always have money, even when they’re broke. Funding decisions just come down to prioritization. To make smart city projects a higher priority, try getting other departments within the city government involved. We have already mentioned the importance of getting the bureaucracy on board. If you do that—and encourage them to think about how they connect with your program and how it relates to what they’re doing—your projects and goals will become a higher priority to the city.

3. Failure

Failing can discourage people from continuing innovation efforts, and because of this, we seek to empower those in our organization through education. We created a management academy and an operational excellence academy that has thus far trained 200 people who are now skilled in pushing innovation into their specific departments and areas of expertise. Our programs use lean six sigma methodology and conclude with a graduation project that requires them to think of a real-world innovation project that we can implement in the city.

There are many people who are truly passionate about digital transformation and are driving innovation in the area of smart cities. However, you are not going to create the transformational change you are looking for unless you are thoughtful about the model you start with, get everyone in the bureaucracy involved, and push past the things that are blocking innovation.

“This is what will really drive the innovation transformation, the digital transformation in your city...putting that same effort into your own organizational transformational.”

– David Graham
Deputy Chief Operations Officer,
City of San Diego



Photo credit: Jason Hiner/TechRepublic

SmartATL Enterprise Data Platform

Samir Saini, Chief Information Officer, City of Atlanta

Data is the new oil, and cities that know how to extract it will be the smartest cities in the world. Of course, it's not just about the data—it's about how you can take incoming data and transform it into actionable insights that will improve the quality of life within your city.

To do this, you need a data platform. Atlanta recently put up an enterprise data platform for our city, and our experience can help other cities looking to do the same.

Data as a Means to Improve Quality of Life

The goal of gathering city data is to improve quality of life for city residents and visitors. This means that when you set up your platform, you must be conscious of the various ways you may be able to use that data to gain insights.

- **Descriptive Analytics:** Using data to know what happened and what is happening in your city.
- **Diagnostics:** Using data to understand why something happened.
- **Predictive:** Using data to predict what will happen in the future.
- **Prescriptive:** Using data to prescribe actual solutions that you can implement.

If your data platform can do all of these things, then you're a smart city.

"Data is the new oil, and cities that know how to responsibly extract and democratize it to "fuel" civic innovation and improve quality of life will be the smartest cities in the world."

—Samir Saini
Chief Information Officer,
City of Atlanta,

Building Your Platform for 5 Types of Customers

Once you build your data platform, you may wonder who your customers are—who will actually use the platform? We call these the five C's.

1. City

The platform will be used as an urban operating system to produce insights and improve the efficiency of government services.

2. Citizens

An open data platform allows citizens to explore city data, which drives transparency and improves trust in government.

3. Civic Tech & Business Communities

Information from specific data sets can help businesses grow within your city.

4. Community Impact District

CIDs are the eyes and the ears of what is happening in the community. They can use the data to monitor what is happening in their community and to produce solutions to community problems.

5. Colleges and Universities

Schools can use the data for research purposes, and you can also create a mutually beneficial relationship where you gain advanced science and data analytic services from the school.

My advice to cities interested in creating a data platform is to look at these five C's before and while you are building your platform. Think about how you could have this platform be shared across various entities because there are mutual benefits to be gained from each platform.

When you build the platform, also make sure that it can manage your IoT devices, manage information, store big data, conduct machine learning and advanced analytics, display dashboards and visualizations, and gain the intelligence you need. All that data is great, but it's what you do with it that really matters.

“My advice to those who are pursuing a plan to build a platform: look at the five C's, think about how you could have this platform be shared across various entities because there is obviously a benefit to each.”

– Samir Saini
Chief Information Officer,
City of Atlanta,





How Connectivity Will Impact Mobility, Buildings, and Citizens Within the City

Albert Seubers, Director, Global Strategy IT in Cities, Atos

Increased connectivity is taking over all aspects of our cities, including mobility, buildings, and even the citizens themselves. While it is hard to say exactly what the future will hold, we must begin planning today for the possibilities and challenges that lay ahead of us. Here are just a few of many things that city leaders should be thinking about as they build the smart cities of tomorrow.

Mobility

In the area of mobility, we currently face realities such as more cars on the streets, parking capacity, and congestion—realities which pose challenges such as how to improve air quality and how to encourage citizens to use more environmentally friendly modes of transportation. However, the connected cities of the future will face other challenges and possibilities too. For example:

- Cities may contemplate how connected communication could support the local economy. For example, with the ability of apps to re-route drivers or help them find parking spots, cities could spark the economy by providing alternative routes that pass by shopping centers or the restaurant district.
- Cities should think about how signage realities will change in the future. We have an abundance of street signs now, but in a connected world, the majority of signs will become unnecessary since navigation information will be presented directly to drivers on a central display. Cities should think about how to do this in a low-cost and environmentally friendly manner. Another area for exploration is how current commercial signage could be presented directly inside the car based on personal information about the car's occupants and even the conversation inside the vehicle.
- In the future, parking places will be used primarily for battery charging stations. Officials can, therefore, ponder issues such as healthier modes of transportation within inner cities and how parking spaces can be turned into green areas for citizens to enjoy.

Connected Buildings

Population growth is causing increased pressure on city infrastructure, but smart and connected buildings can answer these challenges. These connected buildings perform the same function as traditional buildings but are designed to maximize return on investment, flexibility, appeal, and security while lowering energy use and costs. For tomorrow's smart city, this means:

- 4D connected buildings will allow for flexible interiors that adapt and adjust to space usage changes that change during the day, week, month, or year.
- Visitors will be able to connect with the building when they enter. Through connective apps, they will know information about the location, facilities, emergency plans, and locations of colleagues, and the building itself will be able to adjust based on user preferences in lighting, heating, ventilation and so on. Further, instead of having to connect to each individual building, citizens may be able to create a profile that is accessible to any building they enter.
- In the home, connected appliances may be used to enhance safety through predictive analysis. For example, the system may detect deviations in energy usage from a dryer or oven, indicating that it is at risk of setting on fire, thus triggering it to alert 911 even before the smoke detector goes off.

Connected Citizen

When exploring the concept of the connected citizen, many discussions focus on how connectivity will impact day-to-day life. However, it is equally important to contemplate how connectivity will impact the citizen as a person. For example:

- eGovernment services (paying taxes, applying for permits, etc.), traffic flow programs, energy conservation programs, online communities, social media, and access to online education are all forms of connected citizenship that will become more powerful as the number of smartphones rises.
- The connected citizen is also the citizen who does not have a smartphone but needs assistance. In this area, connectivity may come through wearable devices, embedded sensors (such as in the steering wheel of a car), and even jewelry with devices inside.
- Data from devices can then be used to provide immediate and personalized responses in emergency situations, which will save money as well.

These are just a few possibilities to think about when considering how increased connectivity will impact mobility, buildings, and citizens within cities. In each of these areas, ensuring trust and security will also be paramount to success. By thoughtfully contemplating the universe of possibilities and use cases, we can build smart cities of the future that are secure, sustainable and smart.



How Orlando Is Using Smart Tech to Promote Branding

Charles Ramdatt, Director of Smart Cities & Special Projects, City of Orlando

In Orlando, we see smart cities initiatives as a valuable way to promote and enhance the Orlando brand. Although Orlando is a city of just over 275,000 people, we are part of a larger metropolitan area of about 3 million. We also have the 4.5 million Tampa/St. Petersburg metro area to the southwest and we are growing toward Daytona Beach (and vice versa). People as far as 70 miles away from us use the Orlando brand. It is also a brand that is known around the world. That brand is important to us, and we have been building it and protecting it with smart city projects since the 1990s.

Rescuing Orlando's Brand Image Using Technology

Orlando is a popular tourist destination, and we are home to the largest rental car market in the world. However, during the 1990s there were several instances of tourists getting lost in Florida that resulted in often very negative consequences. There were strong concerns that those instances could severely damage our brand, as we didn't want people around the world to mention stories like this when they heard the name Orlando. In response to those threats to our brand, we turned to technology.

We addressed the issue with an extensive partnership network to foster collaboration and problem-solving. We worked with the US DOT, Florida DOT, GM, AAA, the University of Central Florida, Avis Rental Car, and others. The result of our efforts was the development of a forerunner of the modern vehicle navigation system, aimed at keeping tourists safe when they rented cars and traveled the streets of Orlando.

The problem is that we didn't take this idea and run with it. We sat on our hands and let others develop further generations of the navigation system. We also didn't develop the tech ecosystem we needed to expand. In hindsight, we realize that part of being a smart city is creating that ecosystem and building on successful ideas, not just solving one problem and walking away.

“Part of being a smart city is building on those things and creating an eco-system and transferring that process to other things that are very important.”

–Charles Ramdatt

Director of Smart Cities & Special Projects, City of Orlando

Moving Boldly Into Smart City Projects

We have learned from our past mistakes as we have implemented new smart city initiatives. Some of our past and current projects include:

- Creating the Green Works Orlando plan to set and track sustainability goals.
- Working on other ITS projects including adaptive signal control, emergency vehicle pre-emption, traffic signal priority, and AVL.
- Building an open data policy.
- Installing smart parking meters and modernizing parking garages.
- Promoting and switching to more energy efficient technologies such as distributed generation (solar) and electric vehicles.
- Setting up a city-wide surveillance system and the IRIS police surveillance system.
- Establishing EDIS route optimization for emergency teams.

In addition to these and other efforts, we are currently working on four priorities:

1. Full Engagement of Our City Team

We have many team members who are doing smart things, but the problem is that they are working in silos and not coordinating their efforts. Instead of having our various departments compete, we'd like them to start collaborating so we can move forward, faster, together. We are looking at grouping departments, three at a time, so they can work together to solve problems in their specific areas by using the same technology or the same approach.

2. Partnerships for Education

In events like the recent Readiness Workshop conducted by the Smart Cities Council, we were able to work with elected officials, departmental representatives, neighboring jurisdictions, regional agencies and more, to discuss smart city planning and implementation. We recognize that we may be competing economically with some of these entities, but that we will get further together than we will separately.

3. Developing a Roadmap

In our roadmap, we see civic engagement as the highest priority. Once developed, we will make sure that the roadmap is reflected in our comprehensive plan, our land development code, our capital improvement plan, and operations and maintenance plans.

4. Partnerships for Product Development

We are also working on creating regional partnerships so we can work on new smart city initiatives. For example, we have developed the Central Florida Automated Vehicle Partnership (CFAVP), a network of partners working together to research and test automated vehicles. Our team was one of the winners in a recent US DOT competition in this area.

In Orlando, our mission is to be a great place to visit, live, work, play, and raise a family. We aim to ensure good environmental stewardship, attract the creative class, and promote economic development. Protecting and projecting our brand is a big part of that mission. Standing out as a leading smart city helps us retain that brand image and spread our message across the world.



Ford Mobility: Smart Vehicles in a Smart World

Rich Strader, Director, Enterprise & Emerging IT, Ford Motor Company

At Ford, we have seen a lot of industry and societal changes that will impact our company. Traditionally we have used a one-to-one model: we produce a vehicle, sell it to a customer, and it is used for that purpose. While we continue this core service, we are also acting upon the current market dynamics and expanding to complementary services, particularly in ways where we could partner with cities. While determining specific uses cases is an ongoing task, here is an overview of current global realities, trend predictions, and how Ford may be able to contribute to future smart cities.

4 Global Realities Impacting the Transportation Industry

Today several shifts are requiring the transportation industry to take action in order to serve consumers better.

1. Urbanization

Cities are currently growing at a faster rate than suburban areas. In fact, while 50 percent of the world's population lives in cities today, by 2050 that number is expected to grow to 60-70 percent.

2. Growth of the Middle Class

With growing wages, more and more people are able to afford transportation, whether it is a personal vehicle, a shared vehicle, or public transportation.

3. Concerns About Air Quality

Emissions regulations are starting to take effect in many cities, changing the way mobility is delivered.

4. Changing Attitudes

Younger generations have expressed different opinions about transportation, opting for shared ownership over private ownership.

Transportation Trends on the Horizon

From the current global realities, we extrapolate several predictions about what the future of transportation will look like. For example, in the next 5-10 years, we predict there will be:

- More electrified vehicles.
- The introduction of autonomous vehicles in the city (provided cities will accept it as a service). Ford is currently working on an SAE Level Four-capable vehicle right now where the driver is not engaged in operating the vehicle itself. Major auto competitors are at similar stages.
- The proliferation of connective vehicles and devices, plus an explosion of data. For example, we are currently collecting data on a million vehicles, but in just a few years it will be between 10-15 million.
- New infrastructure technology that will make it easier, safer, and more affordable to navigate the city.

Large-scale implementation of technologies like electrified and autonomous vehicles could have further consequences down the line, such as significant reductions in emissions and traffic accidents.

Using Transportation Data to Build Smarter Cities

At Ford, we see the potential for partnering with cities to offer services and share data they will need to make better decisions. We have a lot of data to offer, including:

- Sensor and camera data that detect surroundings including potholes, obstacles, and other aspects of the city environment, which may be useful in alerting cities about current problems that need to be addressed.
- Data about how vehicles are operating and how they need to be maintained, which could be useful for fleets, which are likely to expand as on-demand ridesharing becomes more and more popular.
- Information about driving patterns and driving habits that can pinpoint more specific patterns related to rush hour and traffic congestion.
- Spatial and temporal data that can be used to understand traffic accidents and other conditions in an effort to predict events or predict when things are going to break.
- Data about where vehicles go and where they stop and turn off, which can lead to inferences about how people travel and what their interests are.

At this point, there are several questions regarding how we capture and translate the data, how to make it useful to everyone who might have a stake in the information, how to ensure the data is secure, and how to manage the growing amount of data over time. By understanding the problems and priorities of cities, we seek to test out use cases and see how this valuable data can be put to work to help smart cities initiatives.

“Ford Smart Mobility...was intentionally built so that we would have a standalone company that would be able to work with cities and other organizations to set up these technological services and see what we can do to build transportation solutions that will fit for the future.”

—Rich Strader
Director, Enterprise & IT,
Ford Motor Company



Building the Urban Mobility Networks of Tomorrow

Julia Thayne, Director of Urban Development, Siemens

You don't have to be the CIO of a city to know that the transportation industry is changing and changing rapidly.

In the wake of transit agencies experiencing declining ridership; utilities losing revenue to energy efficiency; departments of transportation facing congested roadways; and urban residents suffering from poor air quality, the public sector is starting to join forces with Fortune 500 companies and their start-up partners to leverage technology and reimagine the future of urban mobility. To date, this cross-sector conversation has centered on how to use four streams of technologies (shared, connected, electric, and autonomous) to address four key concerns for cities (safety, air quality, congestion, and accessibility). Thus far, this cross-sector conversation has been mostly that – just a conversation.

Building the urban mobility networks of tomorrow will require conversation, and a lot of it. For example, electric utilities will have to learn about how people and goods move throughout the city so they know where to place electric vehicle chargers. Departments of transportation will have to understand the profit motivations of autonomous vehicle companies so they can provide access and manage congestion. Companies will have to set traditional business models aside so they can help transit agencies improve the way people move around the city.

Moreover, building the urban mobility networks of tomorrow will require collaboration among the actors mentioned above – partnerships that may (at first) feel unconventional, uncomfortable, and unfamiliar. In the process of innovating urban mobility, each of the standard

“Although re-making cities’ transportation networks to fit 21st century needs using 21st-century technologies will undoubtedly be a difficult endeavor, it is an imperative one.”

– Julia Thayne
Director of Urban Development, Siemens

steps of the city-making process, including design, planning, implementation, operation, and financing, will be challenged.

Siemens, a global infrastructure and technology company, has already started collaborating on some of these future mobility projects. For example, in Canada, the company is working with transit agencies to site eBus charging infrastructure and develop diagnostics for managing fleets of eBuses. In Tampa, FL, the company is helping the regional transportation authority to use connected vehicle technology to assist with transit signal priority and to alert drivers of pedestrians in their blind spots (among other use cases).

From these projects and others, it is clear that successful public-private collaboration requires:

- Secure data sharing, which should take place between the public and private sectors, across companies within the private sector, across city/county/regional agencies within the public sector, and across agencies and companies between the public and private sectors.
- Use cases, identified by the public sector and the public, with solutions (technologies, design, policies, etc.) implemented by the public and private sectors together.
- Flexibility in funding, financing, and procurement, with projects jointly funded or financed by public-private partnerships.
- A plan for scaling that will move short-term, smaller pilots to full-scale implementation (e.g., moving from one eBus to an entire eBus fleet).
- Alignment between a single project and the ecosystem of projects occurring within a city (e.g., how does an individual project on electric vehicle charging infrastructure fit into the city's larger, long-term plan for shared, electric, autonomous vehicles?).

Remaking city transportation networks to fit 21st-century needs using 21st-century technologies will be a difficult endeavor, but it is necessary. City CIOs/CTOs/CDOs can play essential roles in enabling public-private collaboration. By managing city IT systems, running pilot projects, and developing smart city plans, they are uniquely positioned to shape the development of the urban mobility networks of tomorrow.

*“You, as City
CIOs/CTOs/CDOs,
are uniquely
positioned to shape
the development
of the urban
mobility networks of
tomorrow.”*

*– Julia Thayne
Director of Urban
Development, Siemens*



Transportation and Technology Projects in Las Vegas

Joanna Wadsworth, Program Manager, City of Las Vegas

In Las Vegas, the downtown area has been designated as our Innovation District, an incubator for smart city technologies aimed at promoting and adopting new transportation infrastructure and mobility technologies. After looking at trends a year ago and conducting a study called the Mobility Master Plan, we recognized that we had to design mobility choices that work for our biggest future populations: retirees and the younger generation (as millennials have expressed an interest in ride-share and car-share options over the normal car-centric model). With a 26 percent population increase expected by 2025, these mobility challenges must be addressed right away. Establishing the Innovation District was a way for us to test our ideas and gather data.

The overarching goal of our smart cities venture is to create a safe, convenient transportation system that has mobility choices for visitors and residents. The official designation of Downtown Las Vegas as our ‘real life laboratory’ signified tremendous support from management; the mayor and city council support our ventures, and they are willing to provide financial backing for our projects. Here are a few pilots that we have run or which are currently underway.

8 Transportation Pilot Programs from Las Vegas

The following projects represent the range of mobility topics we have been testing in the Las Vegas Innovation District:

1. Strengthening Communication Systems

The city already has a robust fiber optic system focused on monitoring traffic, traffic signal coordination, CCTV camera surveillance, and other things. As part of our project, we are going to be deploying a second fiber optic network to focus on smart city sensors. We are also working to make a more robust public Wi-Fi as well as a private Wi-Fi system.

2. Smart City Sensor Solutions

In this project, we are deploying sensors in the field that will take away the manual work of counting and give us real-time

data on things like pedestrian traffic volume by time, day, and month. This eliminates manual work and helps us make better traffic engineering decisions because we have both real time and historical data on which to base those decisions.

3. Environmental Sensors

These sensors are helpful because they not only track environmental conditions but also give us data to evaluate programs. For example, we are currently adding trees and landscape to streets that are overwhelmingly city scape. These sensors will give us data to show actual (not just theoretical) benefits such as temperature and air quality improvements.

4. Smart Infrastructure

We are also testing a range of infrastructure; as we find use cases, we deploy the right sensor and evaluate the data. For example, we are looking into parking management solutions and are also using trash can sensors that will tell us when it is time to mobilize a crew for trash pickup.

5. Go Vegas App

The IT department is currently creating an app to put services and information at the fingertips of residents and visitors. A great aspect of this app is that it has been designed as a two-way communication system where we can also draw information from the people using the app. For example, we can learn things like where they are visiting and what services they are using.

6. Connected Corridors

In the Connected Corridors project, we are planning to install 24 DSRC radios within the Innovation District. This will allow us to test things such as AV communication, pedestrian safety, and traffic safety.

7. GENIVI Alliance Connected Car Pilot

Working together with the GENIVI Alliance, a non-profit organization, we are outfitting up to 100 city fleet vehicles with an interface server and a GPS unit. The device will provide information to the driver, including warnings for speeding, when a pedestrian is in the crosswalk, when they approach a bus stop or a bus is loading/unloading passengers, and alerts for traffic condition. This is also a two-way communication system, as the device will feed us information such as location, speed, and fluctuations in the driving of the car. This data can help us evaluate how roads are operating and if there are areas of the city that experience operating issues, such as slowdowns on a particular section of a road.

8. Navya ARMA Driverless Shuttle

The first pilot of our driverless shuttle has already been conducted and about 10,000 people road per vehicle. We are currently looking into a second pilot where the shuttle will also be connected to the traffic signals.

The pilots we have run so far have been fun and exciting. We carefully watch incoming data to evaluate the success of programs and to plan future pilots. The cumulative information will allow us to scale up and design the mobility options required to meet the needs of our future citizens and visitors. In our experience, technology is further along than we anticipated and the public is willing and looking forward to utilizing it.



Photo credit: Jason Hiner/TechRepublic

Climate Action and Adaptation in Los Angeles and Beyond

Jeanne Holm, Deputy Chief Information Officer, City of Los Angeles

Two main goals of the Paris climate agreement are to meet the 1.5 degree Celsius target and to create a 21st-century clean energy economy. Although the President is contemplating pulling out of this agreement, 379 cities (representing 68 million Americans) have announced that they will keep those commitments and work collectively to reduce greenhouse gasses regardless of whether the U.S. is part of the agreement or not.

Los Angeles is one of those cities. We are well aware of the impacts that climate change has on our environment and our residents. For example, Los Angeles, like other cities, has environmental shocks, some of which are exacerbated by climate change (such as severe weather, flooding, extreme heat and heat waves, and public health emergencies), as well as stresses (drought, high heat days, and sea level rise).

These disasters tend to exacerbate existing inequalities within our communities, causing previously disadvantaged populations to get absolutely and relatively worse off after these events. Our commitment to the climate agreement and to our vulnerable populations has led to several projects and advances in key environmental areas. Here we will review some of our 'wins' and discuss how smart city methods have played a role.

Making Advances in 6 Key Environmental Areas

In the spring of 2015, Mayor Eric Garcetti released the Sustainable City pLAn (<http://plan.lamayor.org/>), a roadmap for creating a more environmentally healthy, economically prosperous and equitable Los Angeles. In addition to that Plan, we have been working on a resilience strategy for the last year and a half in order to double down on our existing efforts. Our plan focuses on vision, outcome, strategy, and initiatives in 14 key areas. Here are some of the areas where we've made the biggest advances.

“In LA, innovation and open data is a team sport. The only way we are going to tackle some of these challenges around climate change is to get 4 million people working together.”

– Jeanne Holm
Deputy Chief Information Officer, City of Los Angeles

1. Local Water

LA is the most water efficient big city in the US. We have signed the most stringent water efficiency building codes of any big city, and aim to cut local water usage by 50 percent by 2025.

2. Local Solar

LA has installed the most solar power of any city in the US. We were also the first city to offer expedited online permitting for solar projects.

3. Energy Efficient

LA has the most ambitious energy and water efficiency law for existing buildings of any US city.

4. Green Jobs

In LA we have created 20,000 green jobs, the most of any city in the US.

5. Environmental Justice

LA was the first big city to require farmer's markets to accept EBT, as well as the first to roll out electric vehicle car share programs for low-income residents.

6. Urban Heat

LA is experimenting with cool roofs, cool pavement, planting trees and adding green infrastructure in an effort to reduce urban heat by 1.7 degrees by 2020.

Achieving Progress With the Help of Smart Cities Methods

Our environmental projects require recording, monitoring and analyzing data, and that's where our smart city efforts come in. These efforts are coordinated by a team that works together in an integrated and collaborative way to assist in projects around the environment, economy, equity, and resiliency. This includes:

- Determining what we care about and what we want to measure before beginning a pilot.
- Figuring out what kind of sensors to use to collect the data we need.
- Gathering the data then making it open on our open data portal (<https://data.lacity.org/>) and through APIs, push notifications, and alerts.
- Federating data and analysis across deployed sensors.
- Activating citizen scientists and neighborhood councils.
- Monitoring performance with a sustainability dashboard that allows us to track data such as local water use, water quality, and air pollution.
- Using data for prediction and creating tools that will help the public (such as an upcoming earthquake early warning system).

These efforts require many City departments working together, including our Sustainability Office, the Mayor's Office of Public Safety, the Mayor's Office of Budget and Innovation, and the Information Technology Agency. Taking a smart city approach to environmental goals has allowed Los Angeles to implement successful pilots and achieve measurable results. The pillars of our success are the smart use of technology, the careful collection and analysis of data, and the collaborative environment we have created in our City government.



Incorporating Smart Cities Initiatives to Improve Resilience

Kevin Burns, Chief Information Officer, City of Miami

Miami has been growing exponentially over the past years, and with sea levels rising, we know we have to act now to protect our growing population. What are we going to do in 5, 10, or 15 years when those water-front homes aren't homes anymore? How will we protect residents in areas that are susceptible to flooding and high tides? What can we do about our downtown buildings, such as one of our city hospitals, that could become inaccessible if sea levels rise substantially? These are the questions we are asking, and we are currently looking at smart city technologies to solve this and other challenges.

Identifying the Problem

As a water city, flooding is an issue in Miami. Unfortunately, there are several primary causes:

- Severe precipitation, especially in the summer.
- King Tides (when a full moon and high tide happen at the same time, causing even higher tides than normal).
- Storm surges (including hurricanes and tropical storms).
- Gradual sea level rise.

Each of these can be an issue, but problems get even worse when things happen together. Because of the inundation, we know we have to make adaptations and also improve infrastructure around the city to pump sea water as it comes in.

“We are looking at employing smart cities technologies and initiatives to solve this along with many other challenges that we have in this city.”

– Kevin Burns
Chief Information Officer,
City of Miami

Current Progress

Our first goal for exploring this problem is to understand exactly how certain sea level increases impact our city. To do this, we have been working with ESRI and its partner Fernleaf to perform 3D modeling that shows us how buildings are impacted. For example, we know that a 6-foot sea level increase would make one of our major hospitals pretty much inaccessible, and it is imperative that we understand and plan for this now since this level of sea level rise is expected to happen around 2040.

From there we took the models and put them into an interactive application online. This allows us to zoom in and see individual buildings in the city, and adjust the sea level to see how each would be impacted.

Future Plans

We have several plans to expand on the work we've already done with modeling:

- The next step is to put sensors on all the sea walls. We will put them out on buoys that are out in the bay so we can start collecting data and marry it together with our mapping data.
- Next, we can connect these sensors to electronic signage which will notify people who live in the areas when the tides are rising. For example, a resident may park the car in the driveway not knowing that a King Tide is going to happen, and their car may become flooded. The signs would alert residents in advance.
- The next step would be to go from an electronic sign to an app that people can download so that they get warnings via push notification when the sea level is going to rise.
- Finally, this data will also be brought to the planning department so they can work on zoning regulations and planning the city. The data will help guide decisions about changes we have to make to the downtown landscape in order to protect our residents.

Our work in this area has won us a Smart Cities Challenge Grant, and a spot in the 100 Resilient Cities network. Sea level rise is one of the most important issues for Miami, and thankfully smart city technology is helping us to address this issue head on.



About the Strategic Innovation Summits and Symposia

The Strategic Innovation Summit and Symposia series was convened to enable multi-disciplinary discussions of senior leaders on relevant topics of the year. Unlike conventional, discipline-specific conferences, where topical content is narrow and participants are generally from the same discipline, the Summits bring together people from many sectors. These include government, business, education, non-profit, and the arts and sciences.

The goal is to create and stimulate conversation that would normally not take place elsewhere, between senior leaders on important topics related to innovation and society.

The Summits and Symposia provide three important benefits to participants:

1. **Education** – As experts in their fields, participants learn from one another through interactive sessions and dedicated talks. These aim to educate, raise important questions, and present the latest data on trends and the current state of the Summit topic.
2. **Multi-disciplinary Engagement** – The Summits are sized such that even during the main session, a conversation can occur amongst all participants. Questions and answers are not only between the speakers, but also the participants. Facilitators and moderators from HBS, TECH, and other centers are brought in to ensure engagement and to be a catalyst for the conversation.
3. **Action** – The ultimate goal of the Summits is impact. For this to happen, action is a critical component. The summits dedicate approximately 25 percent of the time to action sessions with the participants. That format drives the discussion and ideas presented into an action set for both the participants and the broader community.

Attendance is by application only, and senior leaders from any discipline that is relevant to the topic are encouraged to apply. Summits are generally convened on the campus of Harvard University; however off-campus Summits do occur when the topic and location enhance the opportunity for conversation and engagement of the participants.

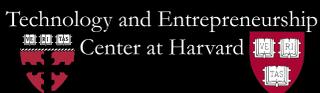
Topics are proposed by participants, senior leaders in industry and government, and the Fellows in TECH. Topics are chosen based upon relevance and potential for impact in a broad sense, to include economic, societal, and environmental benefits.

For more information about the Strategic Innovation Summit series, please contact the Program Chair, Dr. David S. Ricketts (ricketts@seas.harvard.edu).





Convened by:



The Technology and Entrepreneurship Center at Harvard (TECH)

hosts the 2016 Strategic Innovation Summit. TECH, part of the Harvard School of Engineering and Applied Sciences, is both a real and virtual space for students, faculty, alumni, and industry leaders to learn together, collaborate, and innovate. TECH enables this holistic exploration by sponsoring and supporting opportunities for the innovation community to gather and exchange knowledge via courses, study groups, mentorship relationships, innovation programs and special events. Find more information at www.tech.seas.harvard.edu

Sponsored by:



Produced in collaboration with Palisades Media Ventures

Program Contact Information

www.theinnovatorsforum.org

smartaccelerator2017@theinnovatorsforum.org

Palisades Media Ventures: Ilana.Golant@palisadesmv.com