



Being smart about creating smart cities

Using technology to improve lives and keep cybersecurity in focus

When Columbus, Ohio, won the US Department of Transportation's Smart City Challenge in June, Transportation Secretary Anthony Foxx praised the city's plan for "putting people first."

While that achievement hardly seems exceptional—indeed, who else besides people (and maybe a few pets) regularly use transportation in the city—Foxx wasn't talking just about Columbus's proposal to move its citizens more quickly, efficiently, and cleanly. He was referring to a transportation vision that improves all aspects of people's lives.

The city's proposal—which won it \$40 million in federal seed money and a supplemental \$10 million from Vulcan, Inc.—has many elements of a transportation nerd's dream: autonomous shuttles, electric vehicle charging stations, traffic signals that communicate with cars, and an app that advises truck drivers how best to navigate city streets.

But what really won the government over was the city's emphasis on how smart transport technology can help solve other problems, specifically how it can improve the lives of more underprivileged citizens by increasing opportunities for jobs, education, and health care.

"Columbus proposed that transportation can be used to better connect lower-income communities to their city," says Steve Hamilton, senior manager at Deloitte Transactions and Business Analytics LLP.

"For example, they proposed ride-sharing as a public service to get people to jobs they might not otherwise be able to get to. They considered access to health care, getting underserved communities to the health care they need, focusing on issues like lowering the infant mortality rate." Using transportation as a means to connect all parts of a community is one innovative means to make a city more economically vibrant and inclusive, and ultimately competitive.

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Steve Hamilton
Deloitte Advisory senior manager
Deloitte Transactions and Business
Analytics LLP

“Bring people along”

Smart cities have officially become more than a sci-fi-like vision of the future. Whether it’s Singapore, Barcelona, or San Francisco, cities are incorporating smart technology into every fabric of urban life, from the dramatic (disaster preparedness) to the mundane (street lighting).

Transportation may be where city dwellers first see the largest impact on their day-to-day existence—for example, apps that help drivers avoid congestion and find parking. But few aspects of running a city will go untouched, and both citizens and the private sector stand to benefit in countless ways.

The Obama administration has invested \$160 million in federal research to leverage more than 25 new technologies that reduce traffic, fight crime, manage climate change, and improve the delivery of services. In all, the smart city market is predicted to be worth \$1.56 trillion by 2020, according to market research consultant Frost & Sullivan.

However, along with these benefits also come risks related to cybersecurity and privacy; technology outpacing policy; city

budget constraints that can bring projects to a halt; and the prospect of leaving entire segments of the population behind. These risks must and will be at the forefront of any smart city planning discussion, and companies have a unique opportunity to play an important role in providing solutions. Striking a balance is key. For leaders, it’s about consciously taking on strategic risks that will create value and managing those risks proactively. This is how risk can power a company’s and, in this case, a whole city’s performance.

“There are a lot of people right now who don’t have regular access to the Internet, and it’s based on economic level. So one of the issues cities have to address is: Are you going to bring people along or are you going to disenfranchise people?” says Michael Hostettler, managing director at Deloitte Transactions and Business Analytics LLP. “Because if the whole world requires you to have Internet access, and you can’t afford access or a laptop or a smartphone, where does that leave you? One solution has been for corporations to team with local governments to provide free Wi-Fi.”

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Cybersecurity is crucial

Of course, public-private partnerships are key to designing and developing the municipality of the future. The Columbus proposal included \$90 million in matching funds from private and institutional partners and add-on technology from the likes of Sidewalk Labs and Mobileye.

“Moreover, inclusion is not a one-way street. Because smart cities function via sensors, broadband use, and data sharing, accurate data collection is essential, and the more the better,” says Jim O’Gara, managing director at Deloitte Transactions and Business Analytics LLP.

“What city governments have realized, and what the private sector has understood since the beginning of the Internet revolution, is the value of data to the governments and the private sector for planning efficiency and the provision of targeted services,” O’Gara says. “This can benefit people living in underprivileged areas as much as or more than other communities.”

What your smart city can do

Smart technology makes city dwellers’ lives easier and their environment cleaner. Here are some smart city examples:

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What your smart city can do
Smart technology makes city dwellers' lives easier and their environment cleaner. Here are some smart city examples:

- Smart traffic**
Los Angeles, California
What: An app connects city commuters and drivers.
Feeling: Frustrated.
Realized commercial solution: Not in the plans.
Why the solution: An app can reduce traffic and increase road use, but it takes time and money to develop, which is not always a viable option for cities.
- Smart parking**
Barcelona, Spain
What: An app shows available parking spaces.
Feeling: Frustrated.
Realized commercial solution: Not in the plans.
Why the solution: An app can reduce traffic and increase road use, but it takes time and money to develop, which is not always a viable option for cities.
- Water conservation**
Tokyo, Japan
What: An app monitors water usage.
Feeling: Frustrated.
Realized commercial solution: Not in the plans.
Why the solution: An app can reduce water usage and increase efficiency, but it takes time and money to develop, which is not always a viable option for cities.
- Water desalination**
Israel
What: An app monitors water usage.
Feeling: Frustrated.
Realized commercial solution: Not in the plans.
Why the solution: An app can reduce water usage and increase efficiency, but it takes time and money to develop, which is not always a viable option for cities.
- Smart micro-grids**
Borrego Springs, California
What: An app monitors energy usage.
Feeling: Frustrated.
Realized commercial solution: Not in the plans.
Why the solution: An app can reduce energy usage and increase efficiency, but it takes time and money to develop, which is not always a viable option for cities.
- Green buildings**
Amsterdam (Deloitte Netherlands' 'The Edge' office building)
What: An app monitors energy usage.
Feeling: Frustrated.
Realized commercial solution: Not in the plans.
Why the solution: An app can reduce energy usage and increase efficiency, but it takes time and money to develop, which is not always a viable option for cities.

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With all this data collection, however, comes an enormous responsibility to maintain system security and keep citizens and their personal information safe. By now the story is well-known of the Argentine security analyst who hacked into the Washington, DC, traffic system as part of a nonprofit initiative seeking to expose vulnerabilities.

Connecting any system, asset, or device to the Internet introduces inherent risks, including data breaches, disruption of infrastructure, and threats to public safety. When connections span an entire city, infiltration by hackers or cyber terrorists could wreak even more havoc, making cybersecurity all the more crucial.

“Cybersecurity is a huge issue now and, as is often the case, this creates new business opportunities to identify, manage, and hopefully reduce that risk,” Hostettler says. “IT breaches are no longer just a kid in a basement hacking a server to impress his buddies. It’s now global terrorists who see the Internet as the ultimate weapon to destabilize local and national governments.

Making it better along the border: Smart technology project aims to connect cities in the US and Mexico

A border between two countries may represent a barrier. But for those who live and do business there, the possibility of great benefits also exists. Take, for example, the border between the US and Mexico, where the private sector and communities in both countries envision a frontier that, through smart technology, offers increased economic opportunity for citizens and companies alike.

An estimated \$1.4 billion of commerce and 1 million people cross the US-Mexican border daily to visit family and friends and attend school and work. However, this is only scratching the surface of economic possibility.

A joint effort by Deloitte and Cisco is exploring how smart cities can unlock economic potential, advancing mutual growth and the global competitiveness of North America. Dubbed the Cross Border Connected Cities concept or “SMART Border,” it aims to use technology, such as broadband, city Wi-Fi, and open data, along with enhanced governance and planning, to increase economic output, job creation, and quality of life for the citizens living in border communities.

At border twin cities like San Diego-Tijuana, El Paso-Ciudad Juárez, or Laredo-Nuevo Laredo, there are two worlds living side by side, interacting daily, but starkly unequal. US border cities’ per capita income and broadband access rates, for example, are substantially higher than their counterparts in Mexico.

“Generally, one community is wealthier than the other, and the services and amenities are better than on the other side,” says Jim O’Gara, managing director at Deloitte Transactions and Business Analytics LLP. “Then you go across the border and services and manufacturing costs are much lower. So the border is more of a

barrier than a benefit, and what we aim to do is unlock the border dividend. The fact that you have this diversity is actually an opportunity, and there are examples globally of places that have exploited that opportunity.”

Although there has been some improvement, wait times for people and goods entering the United States continue to be a source of concern for industry and communities on both sides of the border. And the fact that cross-border economic development opportunities aren’t as fully exploited as they could be often puts pressure on already overburdened city infrastructure on the US side.

“The border is so important to getting our companies to run better. When there are delays at the border, we’re just not as competitive,” says Steve Hamilton, senior manager at Deloitte Transactions and Business Analytics LLP.

Indeed, the Cross Border Connected Cities concept grew out of the US-Mexico CEO Dialogue between US and Mexican business leaders as a counterpart to the High-Level Economic Dialogue between the federal governments. It’s something the private sector wants and, today, Deloitte is helping to catalyze buy-in around its adoption.

“This is the grandest scale of public-private partnership that you can think of because it’s federal-federal, state-state, local-local, with different regulations on either side of the border and different political and business actors,” Hamilton says. “The reality is we’re in a global economy with global supply chains. We have a business motive to do this. Industry says we need to do better, and both economies benefit.”

“So how do you deal with it all? If you look at governments, how they’re spending money, they’ve shifted funds from buying laptops and even building roads to buying cybersecurity services,” Hostettler says. “I think we’re seeing governments, federal and local, coming together with private industry in a more focused manner to come up with a solution.”

Human errors and delays

Intentional breaches are not the only threat. As governments and companies rush to meet the demand for smart city technology, there’s also the possibility of human error. Without a clear and comprehensive security strategy in place, a city could be left vulnerable to mistakes and liable for the cost of recovering from one.

To minimize the likelihood of human error, contractors must be properly vetted and public workers need significant training in how to monitor and manage smart software and assets. There also needs to be extensive coordination of various city agencies and resources, never an

easy feat for a government that lives by compartmentalization. A smart city should also operate with significant transparency, so that citizens understand how the information they provide is being used and protected.

“There needs to be a certain amount of access to the private information of a city’s citizens,” Hamilton says. “How is that information exchanged? How is it protected? How do the cities themselves know to partner and negotiate with the right firms, tech companies, and others? So I think that whole question of governance within a city, the institutions you set up to manage data sharing and privacy, and the alliance partners you work with, how you set up those relationships, are really fundamental to making and transforming these spaces.”

Governments are seldom known for their lightning speed either. So while technology charges ahead, city administrations risk falling behind in developing a regulatory

framework for their smart cities. Today’s leaders and lawmakers face the unenviable challenge of keeping up with a deluge of new technologies that were unimaginable a few decades ago. A lag in thoughtful policy development can stifle advancement and adoption, something city officials certainly don’t want to see happen on their watch.

“One of the bigger challenges of the smart city is getting the regulatory framework to match the technological ability, and there are going to be a lot of clashes along the way,” Hostettler says. “It will be critical to assure that the benefits that come from all of us being wired together don’t result in an unacceptable loss of personal rights and privacy.”

Five keys to a smart border

-  Ubiquitous broadband connectivity
-  Video surveillance
-  Traffic control sensors
-  Trusted traveler kiosks that allow expedited crossing for individuals
-  E-clearance stations for cargo carriers that enable the physical border to be pushed back along dedicated technology-enabled and -secured transportation corridors, freeing up previously unavailable development areas

“There will be trade-offs—in some instances it won’t be an easy conversation. And that’s where a firm like Deloitte can be a great partner. Deloitte is especially well-positioned because of our relationships with governments and the private sector, along with our knowledge of technology infrastructure. We see ourselves as having a role in the conversation, being trusted partners with city governments and the private sector as they try to navigate this road toward the smart cities.”

Innovative financing

While winning a healthy grant from the federal government like Columbus did is commendable, not every city or smart city project will have the same opportunity. Taxpayers seldom embrace expensive projects whose value they may not recognize, while cities also often face budget constraints. This makes innovative forms of financing—such as green or social impact bonds and pay-for-performance (P4P) payment models—as well as private sector financial involvement and investment extremely important.

“What we’re finding overall is that the ways of funding these things are changing,” O’Gara says. “You might have a Cisco and a city forming an alliance and pulling in other actors, maybe a Deloitte as a management consulting company, to pursue a certain goal. So, from communities using crowd-funding sources and sharing spaces as a way to encourage technology, to the Feds and city leaders, everybody’s looking for new ways to partner on funding.

“There’s also a certain movement of people wanting to invest, but to invest in a way that brings about social change and improvement. And when you bring in social impact investment, you eliminate a lot of the bureaucratic layers. For me, it’s easy to see that the funding is becoming as innovative as the technology and other aspects of smart cities.”

Smart cities have enormous potential to improve the lives of their citizens, as well as reduce waste and pollution on the massive scale needed to fight climate change and other environmental threats. Already

cities like Borrego Springs, California, are incorporating renewable energy micro-grids, which reduce greenhouse gas emissions and, because they function independently, don’t go down when the larger, traditional grid fails.



Cities like Tokyo are monitoring water flows using sensor technology and replacing and upgrading infrastructure to curb the loss of water due to leakage and theft. Cities like Amsterdam are hosting smart buildings—such as Deloitte’s “The Edge” offices—that use sensors to capture energy use data, which is analyzed to detect potential issues, predict upcoming maintenance, and optimize a building’s energy systems.

While companies should certainly be aware of the risks and the opportunities they present, we at Deloitte believe the smart city trend will, in the end, reduce existing risks to the planet and city dwellers, who are expected to make up roughly two-thirds of the world’s population by 2050.

Smart technology will decrease waste and human error, and the area of predictive analytics—based on the wide variety of data available—will identify threats sooner, so they can be mitigated in a more timely manner, whether they’re risks to transport systems, catastrophic climate events, or even crime or terrorism.

“These threats can be better managed

because we’ll know about them further out, and we’ll also be able to communicate to everyone in the system in a more direct and incisive way,” O’Gara says. “So one of the benefits of a smart city, the integration of these technologies, is that there will be an overall risk reduction.”

Opportunities, on the other hand, appear boundless.

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