IoT SPECIAL

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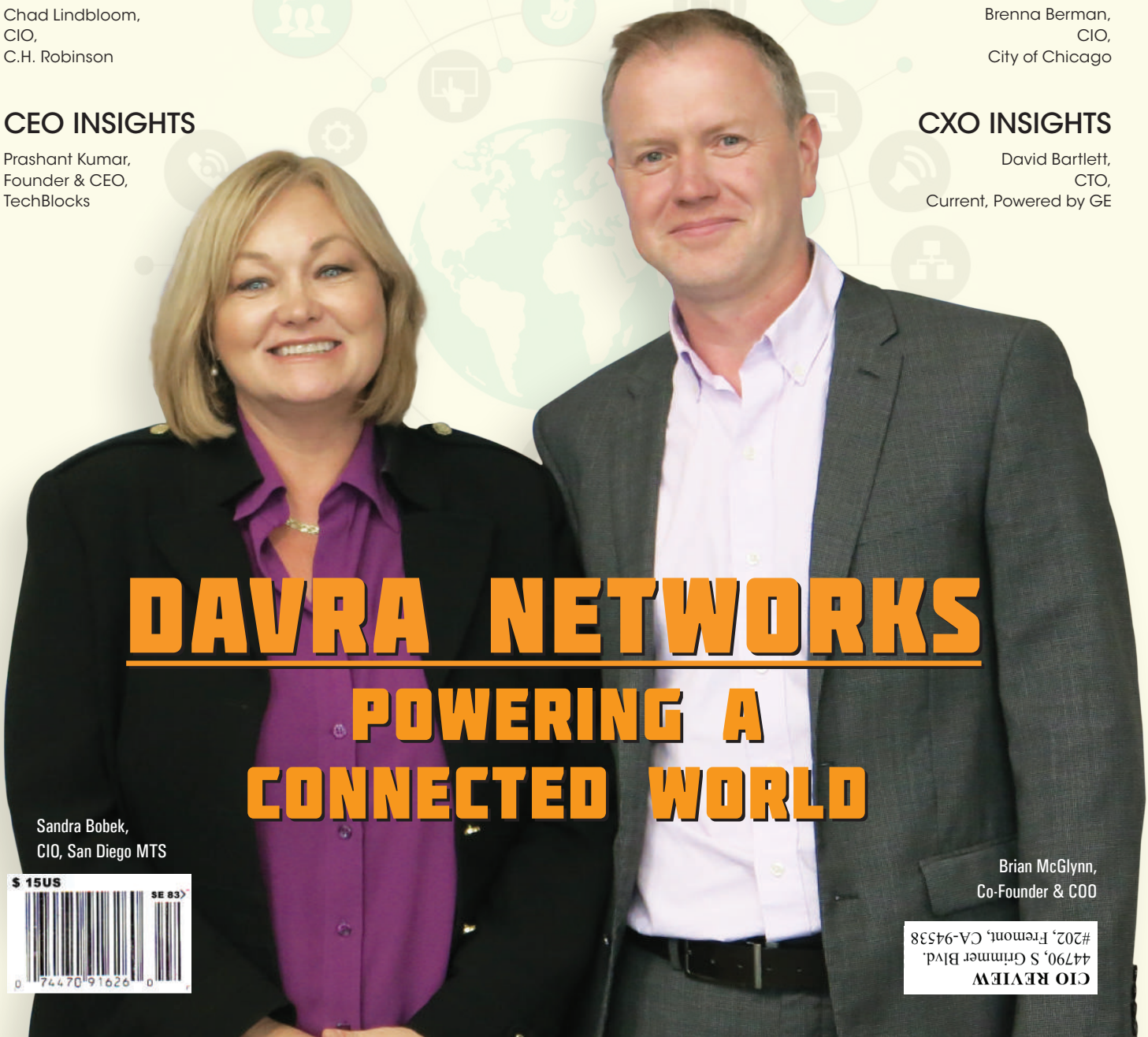

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Transforming the Future City

By Brenna Berman, CIO, City of Chicago

It is clear that the Internet of Things (IoT) is transforming every aspect of cities. From the many forms of transportation to devices used to maintain homes and offices to retail companies and industries that power economies to gadgets that keep people healthy, very few elements of daily life will be untouched. It is equally clear that these same connected technologies offer great opportunity to improve the management and provision of infrastructure and services to city residents.

To realize value from IoT technologies, cities must recognize the opportunities these technologies offer, address the barriers to implementation and decide where to start their IoT journey.

So, what are the opportunities offered by IoT technologies? The first is business model innovation by using connected devices and the data they produce to create value. In the private sector, this could mean enhancing customer experiences through a cloud-based software update based on data collected by a device about how customers have been using the device itself. For cities, this could mean altering how infrastructure is used to be more responsive to residents' needs. For example, a parking lot may not be full after 5pm. The lighting could be adjusted to a higher level some evenings to allow the lot to be used for sports like street hockey. The city could learn more about how the lot is used from smart lights themselves to be more responsive over time.

The second opportunity is applying real-time information to mission critical systems. When cities link sensors, secure networks and analytics platforms, they can understand the performance of infrastructure in meaningful ways and improve performance with better daily decision making and long-term planning. Chicago is doing this with its Green Infrastructure Pilot, launched with UI Labs earlier this year. This solution integrates sensors in Chicago's water system with the network and analytic processes to provide information about flooding and to evaluate solutions to the problem like bio-swales. This information will tell Chicago where the current water system is overwhelmed to support immediate action like more


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precise flood warnings and to influence long-term investment in upgrading the water system.

The third opportunity is data-information policy development. Connected devices collect an amount of data with a greater level of precision and diversity than cities have ever had before. This means policies can be more responsive and reflective of the true needs of residents, businesses and the environment. The ground-breaking Array of Things project is deploying 500 multi-sensor nodes across Chicago to collect data about the environment, infrastructure and activity of the city. That data will be used to inform all types of policies including the city's focus on reducing vehicular and pedestrian accidents to zero as part of the national Vision Zero program and to improve the health of youth by sharing air quality data with researchers studying adolescent asthma.

For all the opportunities offered by IoT, there are barriers that must be address to unlock the value of connected technologies. The first two barriers that cities must contend with are security along with trust and privacy. These barriers exist for private sector organizations too but present heightened concern for cities that are responsible for preserving the public good through the protection of public and personal data. For security, the more devices connected through the IoT, the more decentralized entry points for malware there are. This doesn't mean that cities should limit the use of these devices and thereby limit their value. Rather, cities, and their partners, must evaluate and implement different techniques for addressing IoT security issues.

With data collection and monitoring two of the main use cases for IoT, trust and privacy issues inevitably arise. This is especially true for cities that must maintain the public's trust. A privacy policy outlining how IoT projects will be governed and data protected can help to address privacy concerns. In Chicago, we developed our first such policy to support the Array of Things. The policy was drafted with input from national experts and we sought resident input through a public engagement process. The policy is available online and the project's adherence to the policy will be evaluated each year.

There are also barriers concerning complexity and compelling, realistic use cases. The IoT landscape is littered with multiple platforms, APIs, architectures protocols. This patchwork can lead cities to implementation complexity and integration challenges. Two emerging trends among US cities addressing this challenge are increased development using open source and the evolution of multi- city consortia such as the Civic Analytics Network and the Smart Cities Consortium.

While there are too many technical options, there are not enough real-life use cases of successful implementations. Here too, cities are stepping forward to fill the gap. Several US cities, including San Francisco, Washington, DC and Atlanta have opened their streets as urban labs. Chicago made this a core commitment its 2013 Tech Plan and has implemented policies and partnerships with researchers and corporations to allow for urban experimentation in the public way. This commitment has sparked several pilots focused on water management, way finding, urban sensing and underground mapping.

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Given this complex landscape of opportunities and challenges, how does a city begin? The first step is to align IoT initiatives with residents' needs and avoid building shiny tech solutions in search of a problem. It is critical to develop a nimble mindset to apply IoT technologies. Very few cities have green field opportunities but great value can be created when IoT solutions are developed for existing processes and systems. Finally, just start. The hardest thing for most cities is taking the first step but value and experience is created from even small pilots.

To make the most of IoT technologies, cities must thread the needle between opportunity and barriers to value of IoT technology. Initially, each city must choose a starting point that sets a foundation for future IoT implementations by aligning early projects with the strategic needs of residents. CR