Smart Cities, Livable Cities

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KEYWORDS

Digital Transformation, Internet of Things, Smart Cities, Connected Communities

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Harnessing the power of the internet for growing cities /// By the middle of this century, the number of people living in cities is projected to climb from four billion to more than six billion people (Figure 1). While Asian cities are at the center of this urban flux, urbanization is a truly global trend, affecting populations in developed and emerging regions across all continents. To keep up with the rapid influx of new city dwellers, the constraints on resources and budgets, the effects of climate change – both environmental and political – and other critical factors, city leaders are turning to technology. As other costs rise, digital technologies continue to become more powerful and less expensive. Faster, smaller and smarter devices are bringing together data in new ways. The connectivity of smart objects – and there may be as many as 75 billion connected devices, machines, processes and people by 2050 – is already beginning to demonstrate some tangible benefits.

One of the key challenges in many cities is providing safe drinking water. Other major issues in many cities across the developing world are traffic, parking, waste management, lighting, security, education and health care. Box 1 focuses on water management and shows how smart digital infrastructure can help to provide such vital services.

Cost savings plus greater quality of life /// Increasingly, the Internet of Things offers new ways to make our lives as citizens smarter, more efficient and more informed. At the same time, cost savings for government are possible. Connected infrastructure – from toll roads to parking spots, from streetlights to utility meters – delivers real-time ''actionable'' information around costs, conditions, usage and utilization

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to citizens and government alike. Citizens can find available parking immediately or reduce electricity use at home, while governments can allocate the right resources at the right time to a wider range of citizens. They can charge appropriate fees, deliver tailored services and manage public infrastructure while considering interdependencies.

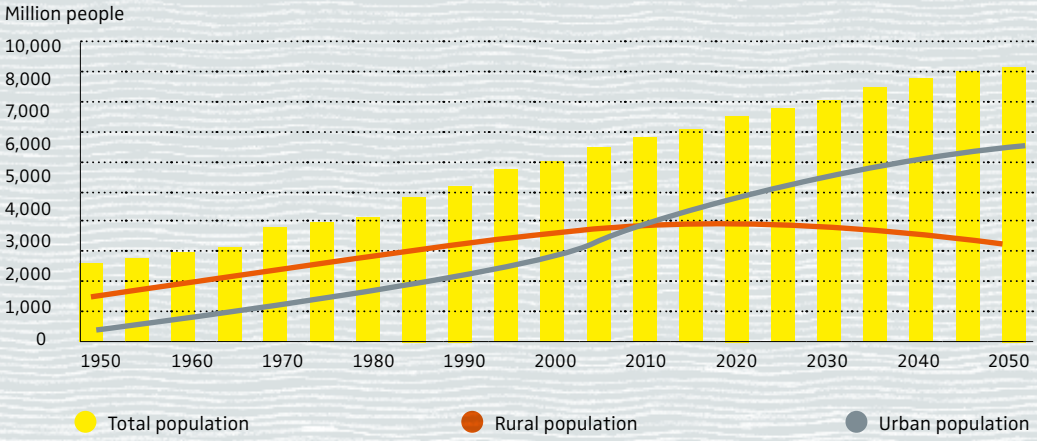
For connectivity to have impact, big data, devices and applications must seamlessly interact. Solutions must support and enhance those processes that connect citizens to the government by executing back-office actions like triggering alerts, creating service requests or producing utility bills based on real-time data from connected devices. The end result is improved efficiencies, more citizen engagement and ultimately the emergence of a truly smart public sector.

The synergistic value of digitalization in both the public and private sectors has been estimated at US$19 trillion over the next eight years – with US$4.6 trillion of that figure attributed specifically to public-sector activities. Already today, the real-world solutions and opportunities created by the exponential new combinations of hardware and mobile devices, software and applications, and the data and actionable information are visible.

From city basics to city experiences /// Creating a truly smart city is more than just installing a bunch of hardware and software and calling it a day. When it comes to creating sustainable smart cities, we have to understand what makes a city unique, what makes it tick and makes people want to be there. Therefore, becoming smart includes reinforcing and reflecting the city's uniqueness rather than permitting it to become impersonal, homogenized. New technology must not only increase efficiency but also help to enrich the livability of a city by providing a means for citizen engagement and a respect for resources, the environment and the nuances of a city's cultural identity – the stuff that makes it different from other cities.

FIGURE 1:

Population growth and urban sprawl



Source: Drawn from World Urbannization Prospects the 2011 Revision (UN 2012)

{*Box 1*}

SMART WATER: IMPROVING WATER SUPPLY AND QUALITY

Water is a critical concern for all humans. In Israel, water management is a matter of daily survival, and even Californians are affected by shortages during dry weather periods. But the challenges are particularly keen in the developing world where poor-quality water regularly results in illness and death: 443 million school days are lost each year due to water-related diseases and half of the world's hospital beds are filled with people suffering from a water-related disease. Water for People is a nongovernmental organization that helps people worldwide gain and keep access to clean water. Water for People's mobile-based program, called FLOW, allows individuals in developing nations to collect and share location data and photos of water testing and processing facilities in their regions. Data is gathered, analyzed and shared with investors, donors and other stakeholders in more than 300 organizations for field monitoring and for duplicating successes in other areas.

New applications are available or under development to address many water issues including consumption, quality, leakage and wastewater management. Many innovations rely on the use of myriad sensors, video and connections to mobile and satellite equipment. One application, for example, originally developed for NASA to test water quality for astronauts in space, has now come down to earth. mWater is a free system that leverages an open database, uses a mobile phone's built-in camera to capture microscopic images of water over time, and compares the image to a cloud database of images of colonies of coliform and E. coli bacteria grown on glass plates.

Smart water initiatives not only deliver more reliable benefits to citizens and cost savings and efficiencies to a city, they can also extend the information impact to other agencies and industries that rely on water – fire safety, parks and recreation, manufacturing and health care. Applications – current and upcoming – can harness integrated data to present unrealized relationships, resource patterns and opportunities for optimization and even additional revenue generation.

To successfully seize the opportunities associated with the current shifts and to anticipate what's coming, city leaders need to view challenges differently. Instead of addressing basic supply issues and the needs of different stakeholder groups – like citizens, tourists and companies – in silos, leaders need to recognize and address the interrelationship of all city challenges and their impact across all constituent groups in seeking solutions. The good news is that, increasingly, citizens and government recognize the need to get smarter about the coming challenges and the resources it will take to address them.

One city that is consistently listed among the smartest cities in the world is Barcelona, Spain, which has undertaken a number of smart city initiatives. (Box 2 presents a short overview of activities).

Opportunities for improvement and growth /// Effectively transforming challenges into positive results and new opportunities will take the combined efforts of governments, industry, academia and individual citizens with innovative ideas to make it a reality. It will take many layers of expertise. The growing urban services marketplace will welcome

{ *Box 2* }

SMART BARCELONA

The City of Barcelona saves over US $50 Million and creates 47,000 new jobs with smart city solutions.

Citizens are demanding more than ever from their cities. The Barcelona City Council wanted to revitalize the city, stimulate the economy and provide an even greater quality of life to attract businesses, residents and tourists. To earn a leading place on lists of the world's most livable cities, Barcelona was determined to reduce its carbon footprint and to be able to deliver government services at a lower cost. The City Council knew that technology could help achieve these goals. Being able to connect to a Wi-Fi network to work from a public park, receive timely updates on current traffic patterns and even reserve a parking spot from a smartphone had all become expected resident services. To make the vision real, the city needed three kinds of technology: a reliable, easy-to-manage Wi-Fi network; a way to track the location and movement of people and vehicles; and different kinds of connected sensors to capture data on the environment and the infrastructure. These capabilities are already becoming a reality for the citizens of Barcelona. The City partnered with Cisco to deploy a number of Smart+Connected™ solutions for parking, traffic, lighting and more. Today, in-ground and video-based parking sensors communicate with smartphones to help drivers quickly find parking spaces. Information about transportation, local commerce and city attractions can easily be accessed through mobile devices and touchscreen kiosks at bus stops and in other public areas, aiding commuters and shoppers and encouraging tourism. And with wireless sensors monitoring such things as street lighting and environmental conditions, the City can deliver many urban services more efficiently and at a lower cost.

many thousands of application developers – who will have the opportunity to harness data for needs that range from hyperlocal to hyperglobal and everything in between. The sensor development market will also continue to evolve – as devices get smaller and smarter. The energy storage industry is also evolving, creating batteries that will draw power from alternative sources and retain it longer.

It is a very exciting time. And, it's going to get even more exciting as time goes on.

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FURTHER READING

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