

DEVELOPING WORLD GETS CITY SMART

Smart healthcare. Smart sewers. Smart transport. Smart buildings. There are plenty of smart-city concepts, all centred around communication between electronic devices, and hailed as transforming how we will live our lives.

It's not just our devices being connected to everything around us, but also machines talking to machines. What if our cars told each other about the traffic ahead and adjusted their speeds autonomously? What if your washing machine notified you when the cycle was about to end? Or your heating system and lighting made suggestions on how to improve your energy efficiency?

Such smart technology is already beginning to make its mark in the developed world, but can it work in the developing world too? Can the rapidly growing cities of some of the world's poorest countries leapfrog traditional methods of urban planning and become smart cities, just like their telecoms leapfrogged fixed-line networks and went straight to mobile phones and broadband?

Planning in advance

Potentially, yes, says Chizuru Aoki, coordinator for climate change mitigation at the United Nations Development Programme, the Global Environment Facility (GEF). But to get there, cities must first look at how seemingly distinct sectors such as transport, energy efficiency and water provision interact, and then plan to

make them more interconnected.

By 2050, two-thirds of the globe's people are expected to live in cities, compared to just over half now. Smart technology could help cities better deal with the consequences of natural disasters. If sensors could flag up the onset of, for example, a tsunami in a poor coastal area and relay that information to other sectors that may be affected – such as transport because of likely congestion, the city as a whole may be better prepared.

But it needs to be thought through beforehand, says Aoki, and in a more joined-up fashion. So for smart urban management and a more common set of tools on planning that different cities can share, the GEF committed US\$100 million to its new Integrated Program on Sustainable Cities in September 2014, coinciding with the UN Climate Summit 2014.

City-wide management

Latin America and the Caribbean are two regions that could benefit from interconnectivity at a city level — after all, according to the UN, nearly 90 per cent of people living there will be in cities by 2050.

Rio de Janeiro in Brazil is a leader in smart city initiatives. After mudslides wreaked havoc in April 2010, the city's mayor decided to set up the Rio Operations Center (COR), with the help of technology giant IBM. The centre coordinates more than 30 municipal agencies, using sensors, satellites, cameras and

GPS systems to gather real-time information on traffic, weather, lighting, electricity use and other parameters.

The information is then used to manage transport flow with the help of computerised traffic lights, to reroute cars around accidents and congested areas, and help emergency services navigate effectively.

But it's not only about traffic — the city uses sensor data to make sure waste is picked up efficiently, and to provide extreme-weather warnings with the help of Facebook, Twitter and SMS messages to mobiles. “[It’s] really a very smart way to manage a city. You get real data from past events, so you can predict future events,” says Mauricio Bouskela of the Inter-American Development Bank (IDB). Slums aren't being forgotten either. Sirens remotely controlled by the centre have recently been installed in Rio's poorest communities, to help guide people in crises and tell them where to take shelter when rainfall reaches critical levels, says Pedro Junqueira, who heads COR.

From streetlights to sewers

Besides Rio, IBM has some 2,500 smart cities projects around the globe — it has even trademarked the term “smarter cities”. Other technology firms such as Siemens, Intel, Microsoft and Cisco are all busy developing and selling software to address various city problems, from air pollution to overflowing sewers and water leaks.

Other cities appear to be following Rio's lead.

With backing from the IDB, six cities across Brazil, Colombia, Jamaica and Uruguay are aiming to establish similar data control centres. They will be set up in several phases, Bouskela says, with the launch of the first small pilot expected in mid-2015.

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Pieter van Heyningen, Stellenbosch Innovation District

Besides control centres, there are also more and more smartphone apps such as mobile banking, e-commerce, mobile payments, web development and e-learning aimed at helping particularly disadvantaged people, he adds.

For example, the hugely successful M-PESA mobile money service has given slum dwellers in Nairobi, Kenya, a virtual place to keep their cash, safe from events such as slum fires and helping them to save money and time on travelling to banks.

This has also led to initiatives such as a link-up with water-pump provider Grundfos Lifelink to provide communities with water paid for through M-PESA, and NGOs making social payments to slum residents.

China and India are also at the forefront of the smart-city transformation. In China,

the world's largest carbon dioxide emitter, the GEF has had discussions with the government about potential intelligent transport programmes that use low-carbon logistics centres to coordinate traffic. For instance, a logistics centre in a port city could track optimal routes for freight shipments using data from sensors to reduce congestion, says Xiaomei Tan, a climate change specialist at the GEF.

Africa is going smart too. The South African town of Stellenbosch is turning its Stellenbosch Innovation District (SID) into an “innovation hub” with projects such as smart shacks with solar charging for mobile phones. The project is in its early days, but Pieter van Heyningen, programme manager for SID, is already planning to take the concept to other parts of Africa.

“Poorer people in South Africa are poor because there's a lack of opportunities,” says [Pieter] van Heyningen. “There need to be programmes that can link to ICT or link to clean technology or housing solutions or food solutions that are going to distinguish them from the other poor people and create value in society.”

From the ground up

For many poorer nations, one big obstacle for ‘going smart’ is funding. But it doesn't always have to involve costly government strategies to collect big data — regular people can also contribute, says Victor Mulas, a communications policy expert at the World Bank Group. One way to do so is by using open-source apps on mobiles, which can provide fast and important feedback to the state for free.

In Maputo, Mozambique, the World Bank is trying to improve waste management with an initiative that uses crowdsourcing via mobile apps to gather input from citizens and waste collectors about the location of rubbish in the city. Launched in 2013, it seems to be bearing fruit — route mapping has improved, and more people are now dumping waste in appropriate places, says Mulas.

And in Nairobi, Kenya, one of the world's most congested cities, a project called Digital Matatus has used crowdsourcing to create a city transit map for bus and rail networks. "Data and maps do not lead to traffic decongestion on their own, but they are the first steps to better planning," says Jacqueline Klopp, a researcher at US-based Columbia University's Earth Institute, and a team leader on the project. Mobile technologies can help international collaboration, too. C40 Cities, a global network of megacities geared towards reducing greenhouse gas emissions, has recently launched an initiative for city officials in different countries to communicate on waste-management issues using the WhatsApp mobile chat app. So far, eight cities in developing countries, including Jakarta and Nairobi, are using it.

Environmental worries

But concerns about the environment often seem to lag behind other, more pressing, problems that smart city initiatives want to address. “From a sustainability perspective, [the environment] is almost an afterthought,” says Rashik Parmar, an engineer at IBM. In the case of Rio, for instance, the initial aim was to make sure that the 2014 World Cup and 2016 Olympics went ahead without floods and loss of life, he adds.

Yet, challenges in cities in developing countries often coincide with environmental issues — and smart-city planners are aware of this. Rio is now setting up a “resilience” plan for sustainable urban development which will also deal more directly with climate-change issues. And improving traffic systems there has already helped cut carbon dioxide emissions, says Parmar.

“The more cities grow, the more you need to rely on IT to understand and manage them,” says Bouskela. “It is impossible to manage this large amount of data without intelligence.”

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