Shaping the urban future with high-tech planning today

Building a SMART CITY

A slew of initiatives are taking place islandwide, the goal of which is to sharpen the Government's response to city issues and hence improve people's day-to-day lives.

TOWN PLANNING
What: A modelling system to simulate a city's built environment and its impact on the natural environment, people, resources and costs
Who: HDB, Electricite de France, Veolia
Uses: Among other things, show how different land uses affect amenities and transport networks; how to design new housing blocks to get ideal wind flow; where best to build cycling paths
Status: Research collaboration / prototype stage

WATER QUALITY AND LEAKS
What: A network of wireless sensors that monitors water quality and detects leaks in real time
Who: PUB, Singapore-MIT Alliance for Research and Technology, Visenti
Uses: Allows PUB to repair leaks faster and reduce water loss
Status: About 300 sensors installed by end-2015

ERP II
What: A satellite-based electronic road pricing (ERP) system that can use an on-board monitor to charge motorists according to distance travelled
Who: Land Transport Authority, IBM
Uses: This may replace the current system, which charges motorists each time they pass through an ERP gantry during certain times
Status: Feasibility being studied

SECURITY
What: A public-private Safe City Test Bed that produced, for example, a mobile app for commanders to track security forces in real time
Who: Economic Development Board, Ministry of Home Affairs, AGT International, Airbus Defence and Space, NCS, NEC Asia Pacific
Uses: Could help commanders respond to incidents more quickly and precisely
Status: Test bed completed

JURONG LAKE DISTRICT – 'SMART CITY'
What: A government vision for the area to use smart technologies such as driverless cars to improve liveability for residents
Who: Singapore Government, various partners
Uses: For now, driverless cars will ply the Chinese and Japanese Gardens later this year. Expected to be used at Jurong East MRT next year
Status: Ongoing

3D MAPPING
What: Mapping the country in 3D from the air by using light planes equipped with lasers and cameras
Who: Singapore Land Authority
Uses: PUB could use the map to model flood patterns, while the Civil Aviation Authority of Singapore could plan more efficient landing paths for planes
Status: Expected to be completed by 2016

DISEASE AND HYGIENE
What: Computer models that use sensors and mobile apps to help detect and forestall dengue and food poisoning outbreaks
Who: National Environment Agency (NEA), IBM
Uses: For example, if people complain on Facebook or Twitter of being sick after eating at a particular restaurant, the system would alert NEA officers
Status: Research collaboration

IMPROVING PUBLIC TRANSPORT
What: Analysing CCTV video feeds and anonymised location-based data from mobile subscribers to learn commuters' travel patterns
Who: Land Transport Authority, SMRT, StarHub, IBM
Uses: Help agencies respond better to unplanned incidents on the train and bus network, such as breakdowns or emergencies
Status: Research collaboration

PROTECTING THE SEA
What: Eight buoys along coastline with sensors that test waters for pollutants and send real-time updates wirelessly to the NEA
Who: National Environment Agency (NEA)
Uses: Early detection of oil or chemical spills
Status: In place

NOTE: Artist's impression
GRAPHICS: MIKE M DIZON and DAVID EE

The result should be a city that is more liveable and uses less resources, says MIT expert

David Ee

One day, you will be able to sit back and relax as a robot car weaves through rush-hour traffic and drives you to work.

It will even know of the jam along Lornie Road that it should avoid.

As you enjoy the view, sensors on your body will help you monitor your health. Tap on your phone, and it may even suggest that you avoid nasi lemak and have a low-salt lunch instead.

"Smart" technologies such as these that promise to change the face of urban life as you know it are already being imagined by researchers, businesses and governments.

Last week, the topic hogged discussions at the World Cities Summit.

Such mobile apps and driverless cars already exist. Other technologies involve using powerful computer analytics to crunch down and make sense of masses of data from sensors, such as tiny microchips, closed-circuit television cameras and mobile phones, and social media.

Experts said that behind the high-tech gizmos is an ability to improve people's day-to-day lives.

"The end result for people should be a city that is more liveable and uses less resources," said Professor Carlo Ratti, principal investigator at the Singapore-MIT Alliance for Research and Technology (Smart), and director of the SENSEable City Lab at the Massachusetts Institute of Technology (MIT).

Cities around the world are all readying plans to become smarter.

Smart benefits

"Think about how difficult it was just a few years ago to call a taxi. Think about how GrabTaxi makes it much easier. Multiply that for every dimension of your life and you will see an incredible change for citizens, for how efficiently a city runs."

PROFESSOR CARLO RATTI to people uncertain of a smart city's benefits, on the lesson to be gained from taxi-booking app GrabTaxi, which has been helping to connect taxi drivers and commuters here more easily

Britain's Smart London Plan envisions a future where the entire city's underground is 3D-mapped, reducing the need for noisy roadworks and excavations.

In Copenhagen, the Danish capital with one of the highest cycling rates in the world, a smart bicycle has been developed with sensors that send real-time information on air quality and traffic congestion to both riders and the authorities.

Brazilian city Rio de Janeiro is leading the way in some respects with its Operations Centre.

This helped it win the top honour at the Smart City Expo World Congress in Barcelona, Spain, last year, edging out cities like Berlin and Copenhagen.

Developed with technology firm IBM, the centre's smart map analyses – under one roof – data from about 30 government agencies. It gives officials a bird's-eye view of information such as video feeds from subway stations and weather predictions.

All this has already helped them to respond faster to city-wide problems such as floods or power failures – it lowered emergency response times by 30 per cent.

Singapore has also been no slouch in this area. In 2006, it launched its Intelligent Nation Masterplan, which aims to make the nation the world leader in harnessing infocomm technology for the economy and society.

The country already has 86 per cent smartphone penetration, placing it top in a global survey last year.

The Government's research cuts across all sectors, with a range of agencies all having a finger in the pie.

In April this year, the Singapore Land Authority sent two light planes into the sky to map the entire island's topography in 3D over 40 days, using lasers and high-resolution cameras.

The map is expected to be ready by 2016, and national water agency PUB could use it then to model flood patterns and better manage them. The Civil Aviation Authority of Singapore could also use it to plan more efficient landing paths for jumbo jets.

Meanwhile, driverless buggies will be given a test run in Jurong Lake District later this year.

Outbreaks of food poisoning could be nipped in the bud quicker in future too, if the National Environment Agency's research with IBM bears fruit. Their computer models would alert officers if people complained on social media of being sick after eating at a particular restaurant.

Smart technology could even make public flats more windy, and hence cooler.

Last Wednesday, the HDB unveiled a prototype of a city-modelling system it is working on with French energy firm Electricite de France and environmental services firm Veolia. It is expected to be ready by the end of the year.

The model simulates a city's sprawl and the impact on the environment, resources and people. Among other things, it could enable HDB to design new housing blocks for ideal wind flow and help it plan cycling paths.

In future, trains could run extra smoothly, police be deployed faster and water leaks repaired more promptly – all thanks to sensors and computers that assess where incidents happen and how to respond.

It all comes down to the gathering of facts, said IBM's general manager for Smarter Cities, Mr Michael Dixon.

"While for generations, people have used experience, good judgment, education and certainly advice in making decisions, we've now come to a point where the real decisions are being made based on facts."

Singapore, though, should not stand still but nurture its start-up and "hackathon culture" further, suggested Smart's Prof Ratti. This is so that smart technologies and apps are created not just by the Government and industry but by ordinary people too, he said.

Senior Minister of State for National Development Lee Yi Shyan said in Parliament two weeks ago that the Government would try to share more data, for example, through the Open Data initiative, to encourage citizens to do so.

The initiative aims to make public more government data to drive innovation. Since 2011, more than 130 apps have been created through this. These include The Great Singapore Rat Race, which visualises how starting pay varies with university and course of study.

Amid the worldwide clamour for smarter everything, there are also voices calling for some balance.

Professor Chan Heng Chee, chairman of the Lee Kuan Yew Centre for Innovative Cities at the Singapore University of Technology and Design, which researches cutting-edge urban solutions, told The Sunday Times that several delegates she spoke to at the World Cities Summit shared her view that smart technologies may in turn create unrealistic expectations of governments.

She said: "There are great strengths... but we should be careful that it does not create the expectation of instant response. I think governments all over may find that not so easy to fulfil."

Any smart-city approach must also be inclusive, said IBM's executive manager for Global Smarter Cities, Mr David Post.

"You have to get the vulnerable involved in the policy process," he said. "You can't solve inequality out of the box. You can put technology in place but... urban development is a human process."

Still, for people uncertain of its benefits, Prof Ratti chose to remind them of taxi-booking app GrabTaxi, which since last year has been helping to connect taxi drivers and commuters here more easily.

"Think about how difficult it was just a few years ago to call a taxi. Think about how GrabTaxi makes it much easier.

"Multiply that for every dimension of your life and you will see an incredible change for citizens, for how efficiently a city runs."

✉ davidee@sph.com.sg

New app tracks school bus attendance

Big convenience

"Each day I handle more than 100 phone calls from parents who ask me if their kid is on the bus, or why their kid is not home yet. If parents use the app too, it would really save time for us."

MS SUSAN LEE, a bus company owner who uses the app

Pearl Lee

Twice, Max Liu's forgetful ways caused panic in his home and at school.

The first time, he forgot to get on the school bus to go home. He was found playing in the garden of his school, Anglo-Chinese Primary. He was seven.

The second time, just months later, he got on the bus when he had been told his mother would take him home.

Today, the nine-year-old's absence or presence on the school bus is easy to detect, thanks to a smartphone app called BusBuzz.

The two incidents, which saw the school's teachers joining in the frantic search, drove Max's father, Mr Henry Low, 40, to develop the app that lets school bus drivers and parents track whether their children are on board.

"Miscommunication and misinformation between parents and the drivers are more common than we think, but it is something parents don't think about until it happens to them," said Mr Low, a former product marketing manager.

The app took eight months to develop, with help from his Shanghai-based business partner. The app runs on iPhone and Android mobile devices, with one version for drivers and another for parents.

This is how it works: It generates a daily attendance sheet based on the children's bus schedules. The driver takes attendance by tapping against the child's name.

A notification is sent to his parent's phone instantly. Parents will also be notified if their child is not on the bus, or is on the bus when he is not supposed to be. This extra feature is a precaution.

"Drivers sometimes assume parents have gone to pick a child up when they don't see the child. Some parents don't have the habit of informing the drivers, too," said Mr Low, who studied business at the University of Tasmania and human factors engineering at Nanyang Technological University.

The app is available free on Apple and Google app stores. Users can also visit www.busbuzz.com to learn how to use the app.

Available in English, Chinese, Malay, Hindi and Thai, it has been downloaded by users in Singapore, Malaysia, Cambodia and Thailand, said Mr Low. There are plans to have it done in Tagalog and Japanese.

Some bus companies, like Century Bus Services, have started using the app. Said its owner, Ms Susan Lee: "My buses also ferry students from Johor Baru to Singapore schools and back.

"Each day I handle more than 100 phone calls from parents who ask me if their kid is on the bus, or why their kid is not home yet. If parents use the app too, it would really save time for us."

✉ leepearl@sph.com.sg

Mr Henry Low with son Max, who inspired his father to develop the BusBuzz smartphone app.
ST PHOTO: DESMOND LIM