

The Centre for Liveable Cities seeks to distil, create and share knowledge on liveable and sustainable cities. Our work spans four main areas, namely Research, Capability Development, Knowledge Platforms and Advisory. Through these efforts, we aim to inspire and give urban leaders and practitioners the knowledge and support they need to make cities more liveable and sustainable.

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URBAN SOLUTIONS

ISSUE 13 • JUL 2018

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Vivian Balakrishnan

Opinion

Geoffrey West

Essay

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URBAN
SOLUTIONS
ISSUE 13 • JUL 2018

URBAN SOLUTIONS is a bi-annual magazine published by the Centre for Liveable Cities. It aims to equip and inspire city leaders and allied professionals to make cities more liveable and sustainable.

Set up in 2008 by the Ministry of National Development and the Ministry of the Environment and Water Resources, the Centre for Liveable Cities (CLC) has as its mission “to distil, create and share knowledge on liveable and sustainable cities”. CLC’s work spans four main areas—Research, Capability Development, Knowledge Platforms, and Advisory. Through these activities, CLC hopes to provide urban leaders and practitioners with the knowledge and support needed to make our cities better. www.clc.gov.sg



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ISSN 2301-3540 (print)

ISSN 2301-3532 (e-version)

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E-version: <https://www.clc.gov.sg/research-publications/publications/urban-solutions>

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FROM THE EXECUTIVE DIRECTOR

Co-Creating Innovative Cities

How can governments, corporations and communities harness the power of innovation to co-create solutions that address pressing urban issues?

In conjunction with the 6th World Cities Summit taking place in Singapore from 8 to 12 July, *Urban Solutions* explores how innovation and collaboration can empower cities to become more liveable, sustainable and resilient.

In this issue, we hear from two influential figures who are leading plans for the next stage of urban development in their respective nations. Prime Minister Ranil Wickremesinghe shares Sri Lanka's Vision 2025 development plan and key projects such as the Western Region Megapolis, Colombo Port City and the Beira Lake transformation. Dr Vivian Balakrishnan, Singapore's Minister for Foreign Affairs and Minister-in-Charge of the Smart Nation Initiative, speaks about the progress of Singapore's Smart Nation plans and how people are at the heart of this digital transformation.

Is it possible to build cities that encourage innovation, collaboration and resilience? Professor Geoffrey West takes a big-picture view calling for a scientific theory that explains how cities grow, as a first step towards a systemic strategy for sustainability. Mina Zhan and Michael Koh share how business districts worldwide are evolving to meet the demands of businesses and workers who seek more attractive work-live-play-learn downtown spaces.

We highlight how cities are harnessing technology for smarter urban service delivery and management. Through the "Internet+" ecosystem comprising city governments, businesses and integrated platforms, Chinese cities are redefining modern living with more convenient urban services. In Singapore, the OneService@SG system helps public agencies offer coordinated services to citizens, while an intelligent transport management system ensures smooth traffic.

While city leaders and policymakers continue to take the lead in planning for and investing in urban development, how can they give citizens more say in developing their cities? We explore how Seoul, the 2018 Lee Kuan Yew World City Prize Laureate, made citizen participation a key part of its planning processes; while Hamburg, Kazan, Surabaya and Tokyo – recipients of the Lee Kuan Yew World City Prize Special Mentions – adopted innovative and collaborative approaches in their development strategies. Nairobi, Santiago, Raleigh and Singapore also offer examples of their flourishing community-led urban initiatives. In London, crowdfunding platform Spacehive empowers citizens and organisations to collaborate on urban regeneration projects.

Partnerships between leaders and communities, corporations and non-profit organisations are also growing. UN-Habitat Executive Director Maimunah Mohd Sharif shares the organisation's three-pronged approach of integrating urban planning and design, legislation and municipal finance when working with cities such as Banha and Nairobi. We also examine Andhra Pradesh's land pooling model, in which the state government worked with farmers to assemble land to develop the new state capital Amaravati.

I hope this issue inspires you to join forces with your communities, corporations and leaders to collaborate on creative solutions to the urban challenges that confront us all. I wish you an enjoyable read.

Khoo Teng Chye
Executive Director
Centre for Liveable Cities



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Ranil Wickremesinghe

Shaping the Hub of the Indian Ocean

Sri Lanka has been making strides towards its vision to become an attractive business hub in South Asia, with ongoing efforts to transform its capital Colombo and the surrounding region into a Megapolis. His Excellency, Prime Minister **Ranil Wickremesinghe** shares how his government works with the private sector to drive growth, while keeping citizens at the heart of progress.

Sri Lanka has developed rapidly in recent years, with Colombo leading the way. How do you ensure liveability for residents?

Colombo is the nation's commercial capital and an important shipping hub for a vibrant region of over 1.5 billion people in South Asia. It boasts a highly educated workforce, clean environment, modern cosmopolitan values, stable democratic governance and mature investor-friendly structures. A safe and liveable environment is central to everything we want to achieve as individuals and as a country.

Colombo must transform itself into a modern city with facilities similar to Singapore and Kuala Lumpur. This growth brings new challenges. The

“A safe and liveable environment is central to everything we want to achieve as individuals and as a country.”

Western Province, including Colombo District, houses more than 2.3 million of Sri Lanka's 22 million population. This necessitates housing and infrastructure development in an inclusive manner, for the people's benefit.

I believe that with growth and development, we need to ensure everyone benefits from our new-found prosperity. Development must be inclusive if we want to transform the lives of our people.

His Excellency, Prime Minister of Sri Lanka, Ranil Wickremesinghe.



01

We are committed to building a strong economy so we can deliver a radical housing programme to give people more homes. In Colombo, we launched a project this year to build 50,000 new homes for low-income families. We want to transform Colombo and provide proper housing with adequate facilities. Our aim is to relocate thousands of families presently living in shanties. So far, we have developed a number of projects and begun to rehouse families. Once the project is complete, our housing problems will be solved and the shanty dwellings can be removed, freeing up land for commercial use or future developments that can provide additional income for citizens.

We are investing heavily in major infrastructure projects to ease the strain on existing networks. Extensive public transport improvements include expanding the railway, introducing bus priority lanes and deploying advanced traffic management systems. There are plans to develop a Light Rail Transit system to ease congestion and improve passenger connectivity.

Measures to connect Colombo with major cities, villages and towns are underway, to keep Sri Lanka moving and open up new areas of our economy. Construction work on a new elevated highway from Kelaniya to Fort will begin soon.

In addition, internal waterways would be used for transportation, easing the burden on roads. Our goal is to equip our nation to meet 21st century demands by focusing on developing housing solutions, helping our people move freely, aiding our businesses and industries, and modernising our infrastructure. Our long term plans and development will continue till the end of next decade.

What role does the public sector play in Sri Lanka's economic development?

The public sector will uphold good governance as the regulator, facilitator and policy maker to facilitate the role of the market. The government and market are complementary, not substitutes. Our government values public sector employees so we have increased public sector salaries significantly and created a conducive work environment for them.

We have also worked to manage our economy. Trusted by the international community, our government has developed a strong economy where foreign companies want to invest. The progress we have made is evident in our growing trade ties with some of the world's most buoyant markets like Europe and Singapore. The impact on the people



02



03

has been remarkable. We have created more than 460,000 jobs and helped over 260,000 families secure homes. Only by sticking to our plan to strengthen our economy will we keep Sri Lanka on the path to a better future.

“The public sector will uphold good governance as the regulator, facilitator and policy maker to facilitate the role of the market. The government and market are complementary, not substitutes.”

What are Sri Lanka's business potential and advantages? What would you say to those who are keen to be part of the country's transformation?

Back in 1977, we were the first country in the region to implement an open economy policy. Since then, we have continued to place a strong emphasis on growing the private sector and protecting foreign investors. Now, our focus is on creating new opportunities for the private sector to thrive through trade, investment and macroeconomic policies.

A key advantage of doing business here is our fantastic geographic location and emergence as an important hub in the Indian Ocean. Moreover, Sri Lanka's international reputation stands strong and we enjoy friendly relations across the West and East.

- 01 As the capital of Sri Lanka and a shipping hub in South Asia, Colombo will further develop its housing and infrastructure to create a liveable environment for its people.
- 02 Vehicles and pedestrians on the busy streets of Kandy City, the second largest city in Sri Lanka.
- 03 Parts of the sea off Colombo's Galle Face Green are being reclaimed to build the Port City and new access routes to enhance the city's connectivity to other parts of Sri Lanka.

Creating a conducive business climate is a top priority for our government. There are 10 taskforces, each tackling a vital aspect of the World Bank's Doing Business indicators. Already, our Registrar of Companies has gone fully digital, cutting the time taken to register a new business from six days to just one. In a couple of months, the time needed to find land and register property will be halved from 51 to 26 days, and the procedures reduced from nine steps to two. The online portal for the Colombo Municipal area has also been launched. These will have strong benefits for urban sector investments.

Our Board of Investment just launched an online portal for investment facilitation and a Trade Information Portal will be introduced by July 2018. We are also introducing an Electronic National Single Window to link together dozens of state agencies dealing with international trade. An old Exchange Control Act was replaced with a more contemporary Exchange Management Act last year, and a new Income Tax Law was introduced in April 2018 with technical guidance from the International Monetary Fund. This provides a modern, stable and simple tax regime for investors.

These initiatives are complemented by comprehensive trade policy reforms, articulated in a New Trade Policy. In the recent budget, protectionist para-tariffs on over 1,200 items were removed, with the rest slated for removal this year and next year. To leverage on our location and expand market access, we are expanding our trade and investment links with a diverse set of countries—US, EU, India, China, Singapore, Japan and Thailand. We will also sign a number of free trade agreements, following one that was inked with Singapore in January 2018. To have established our first comprehensive agreement covering investment and services with Singapore—regarded as one of the most open and liberalised economies with high-quality institutions—is an important milestone for our country.

All these measures bring us closer to our goal to become an attractive place to do business in Asia, particularly the Indian Ocean region.

Could you share with us Sri Lanka's Vision 2025 and how you aim to achieve that?

Our vision is to make Sri Lanka a prosperous country by 2025. We will do so by transforming Sri Lanka into the hub of the Indian Ocean, with a knowledge-based and competitive social-market economy. We will generate economic growth with equity—our plan prioritises raising incomes, improving quality of life and ensuring housing, employment and education for all citizens.

One goal is to provide 13 years of free education to all, to put every student on the path to university. We will also take steps to increase enrolment in university programmes that will meet future job market demands.

Additionally, we will expand our vocational training opportunities, by working with the private sector to improve skills development and increase employment opportunities. We aim to create one million new jobs by 2025. As nearly 40% of Sri Lankans are vulnerably employed in informal sectors, we will make efforts to formalise these sectors by standardising occupations with internationally accepted certifications and licensing. This will improve employability in the long run. There are also plans to establish a retirement scheme for informal sector employees.

We want to ensure equal access to safe drinking water and sanitation for the entire population. We plan to improve access to water supply facilities in underserved areas and are exploring the possibility of expanding our current desalination projects.

We will position Sri Lanka as an export-oriented economic hub. Our strategic location makes us a strong logistical hub. Using public-private partnerships, the government will expand the port infrastructure to support further growth of transnational shipping across the region. We recognise that Sri Lanka has a domestic market of only 20 million consumers with a modest per capita

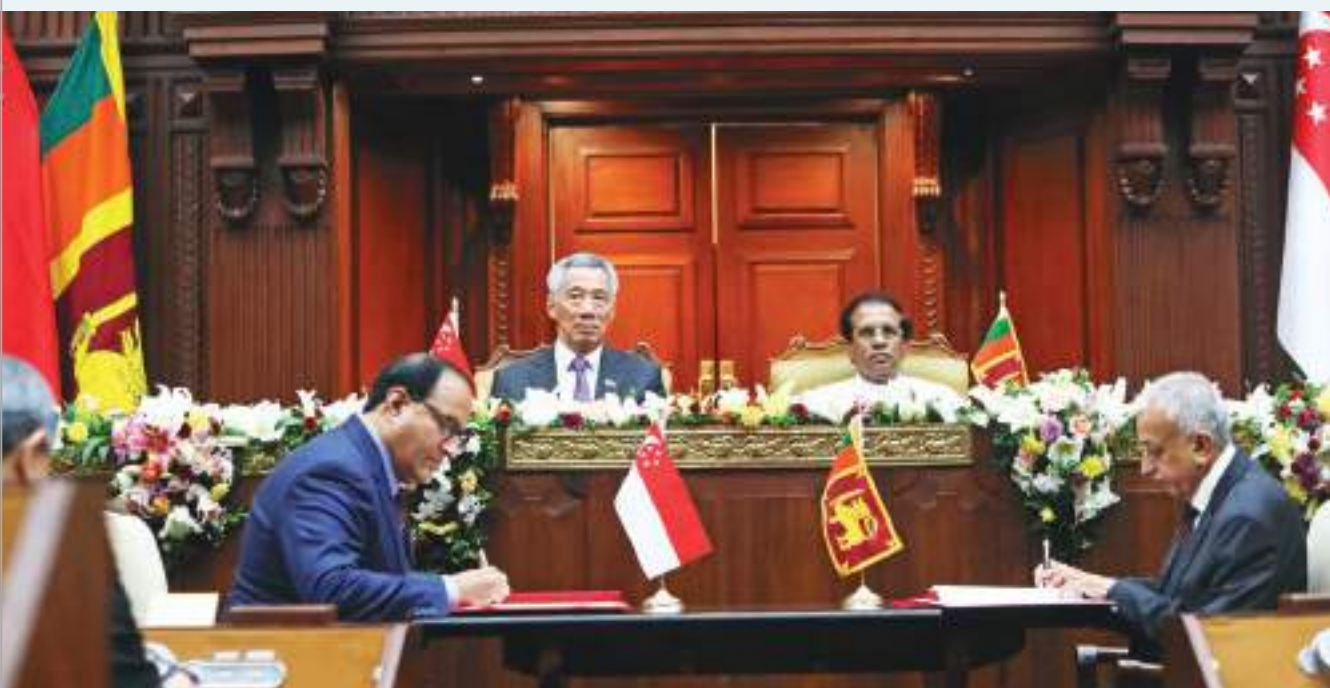
income. We must rely on external demand for sustained, high and long-term growth. Therefore, we will make Sri Lanka a platform for competitive value addition by securing opportunities for local businesses in global production networks. This outward-looking approach will increase the efficiency of the domestic economy, contributing to a better life for all Sri Lankans.

Looking at the next 50 years, we will continue to undertake huge efforts to build a strong economy in Sri Lanka.

The government unveiled the Western Region Megapolis Plan in 2016. What are the priority areas and how has the progress been so far?

The Western Region Megapolis Plan is a blueprint to transform the region to meet highest international standards through a series of large-scale projects. We will build a platform for growth that is consistent with social justice and in harmony with ecology. The plan has identified issues that should be prioritised, including traffic congestion, garbage disposal, housing for slum dwellers and adequate drinking water and sanitation facilities.

To position Sri Lanka as the hub of the Indian Ocean, we are focusing on four sectors—logistics, tourism, manufacturing and IT. Sri Lanka's tourism capacity is not fully exploited. The main tourist areas in the south and the Hill Country need better connectivity, with potential tourist sites to be opened in the southern resorts and Eastern Province. Sri Lanka also enjoys a niche market in manufacturing, and will focus on IT and knowledge in semi-automation. At the centre of these developments will be the Megapolis, which aims to be the largest city in the Indian Ocean, with fully developed infrastructure including two airports, two ports, and an offshore financial centre in the new Port City landfill.



01 Sri Lanka and Singapore signed a Free Trade Agreement in January 2018 to strengthen economic ties.

“We are transforming the metropolis into one of the world’s great engines of creativity, knowledge, innovation and prosperity, taking to improve the living conditions of our people.”

01



There has been steady progress, with most planned programmes ready for funding and strategic investment. The Port City reclamation site is approximately 80% complete. By the end of this year, we expect building work to commence on the Colombo Business District extension. With our bold aims, we are transforming the metropolis into one of the world’s great engines of creativity, knowledge, innovation and prosperity, taking a significant step to improve the living conditions of our people.

Singapore has trained over 200 Sri Lankan officials through the Temasek Foundation International Leaders in Urban Governance Programme. What has been helpful from this exchange of ideas?

This is a practitioner-oriented programme to share knowledge of the principles for high-density and high-liveability urban development. After attending various workshops, the participants applied key learnings to a cross-sectoral urban project.

With the support of Singapore’s urban practitioners from the CLC, Sri Lankan officials were able to draw on Singapore’s



02

past experiences, such as the cleanup of the Singapore River and downtown redevelopment, to develop a set of urban regeneration strategies that culminated in the Beira Lake Intervention Area Development Plan. This included detailed plans and strategies for cleaning, planning and execution to transform Beira Lake, a polluted waterbody in Colombo. The integrated plan aims to clear all the nearby slum dwellings to create a picturesque landscape for both locals and tourists. We expect the lake to become a scenic asset of Colombo by 2025. 🌐

- 01 An artist’s impression of the Colombo Port City, which is built on reclaimed land and is being developed into an offshore financial centre.
- 02 The Centre for Liveable Cities’ Executive Director, Khoo Teng Chye (in pink), accompanied His Excellency, Prime Minister of Sri Lanka, Ranil Wickremesinghe (in blue) on a Singapore River tour in July 2016.



Vivian Balakrishnan

A Smart Nation for the People

Dr Vivian Balakrishnan is Minister for Foreign Affairs and Minister-in-Charge of the Smart Nation Initiative. He tells CLC's Dr Limin Hee about the progress of Singapore's Smart Nation Initiative, and how people are at the heart of this transformation to harness digital technologies and become a more liveable and economically competitive city.

What are the priorities driving Singapore's journey towards a Smart Nation?

Smart Nation is really about our people. It's not about technology for technology's sake. It's about focusing on jobs, quality of life and the society. People shouldn't be reduced to anonymous digits in a highly structured, concrete jungle.

It has to be a whole of society endeavour, not just a government effort. But the government has a primary responsibility for certain things. First, digital infrastructure. This means making sure that mobile and broadband connectivity is pervasive with 100% coverage.

The next aspect is skills. We know jobs are being disrupted and there is anxiety about future job prospects. The key

solution is to make sure people have the relevant skills even as we restructure our economy. The SkillsFuture programme gives everyone an opportunity to retool, reskill, be more productive in our current jobs, and prepare us for the next job, because it is highly likely that in the future all of us will have two or three jobs in our lifetimes. The Committee on the Future Economy has at least 23 Industrial Transformation Maps to prepare enterprises and people for the next phase of development.

“(Smart Nation) is about focusing on jobs, quality of life and the society.”

Dr Vivian Balakrishnan, Minister for Foreign Affairs and Minister-in-Charge of the Smart Nation Initiative.

“The objective is to create an ecosystem where the private sector comes in, meshes government data and their own sources, and generates new, innovative services that meet the real needs of people, enhance the quality of life and create opportunities.”

The third is research and development. Governments need to work more closely with research institutions, universities and the private sector. So while the Singapore government is stepping up our investments in research—we’ve set aside S\$19 billion across the next five years—what we want is to catalyse even more research and development in the private sector.

The fourth area is that governments have to set standards. I believe in open data, open source and open standards. The current digital ecosystem is characterised by a few big companies, each trying to build a wall to guard its own ecosystem. Governments have a responsibility to define the rules, standards, and policies so that people will have choice and that the user content that is generated accrues value to the people rather than to the digital oligarchy. There should be an opportunity for whole-of-society collaboration to deal with the challenges of the future.

In Singapore, we have an open data website, Data.gov.sg. The prime minister has been pushing us to make data available to the public as much as possible. This engenders trust. We don’t just publish data; we also make it machine-readable. The objective is to create an ecosystem where the private sector comes in, meshes government data and their own sources, and generates new, innovative services that meet the real needs of people, enhance the quality of life and create opportunities.

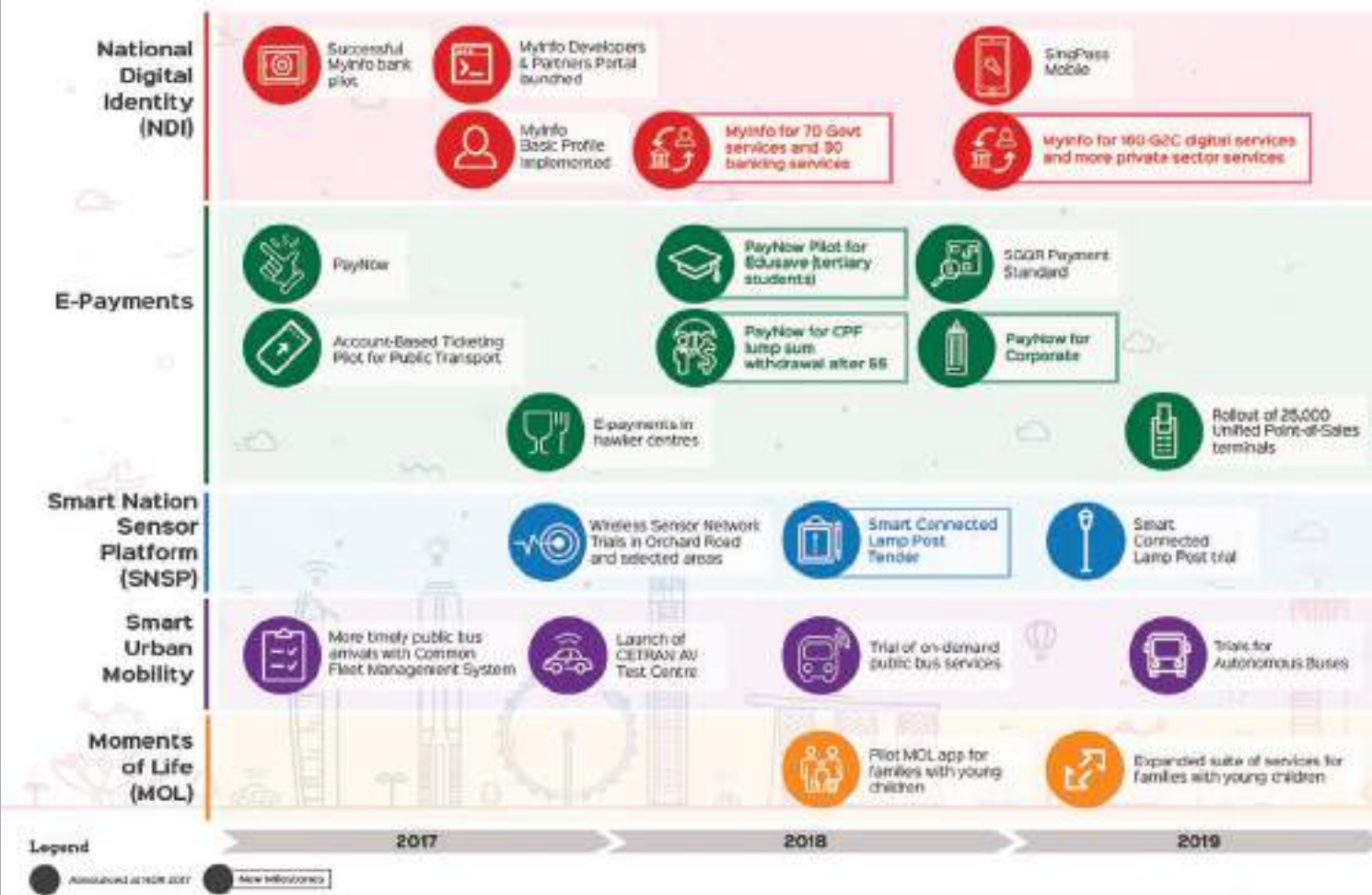
How much progress have we made in building a Smart Nation?

There’s a lot of ongoing work on what we call national platforms. One is on e-payments. The FAST (Fast And Secure Transfers) and PayNow systems allow me to transfer money to you instantly and with zero transaction cost using just your phone number. This was rolled out in 2017, and we are working on making the system available to companies as well as interoperable across borders.

In the next couple of months, we will have SingPass Mobile, which is a digital identity with not just a password and two-factor authentication, but also biometric authentication and PKI (Public Key Infrastructure) to enhance security and encryption. It will open up many possibilities in the future, even for digital contracts.

Achieving a revolution in both payments and identity will bring us to a situation where we can have cashless, paperless and presence-less transactions. This will save money for customers, reduce barriers to entry and transaction costs, and improve margins for businesses.

UPDATED MILESTONES FOR STRATEGIC NATIONAL PROJECTS





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We are also rolling out a national sensor platform. How do we maximise the utility from the huge amount of data on congestion, air and water quality, and videos, to make life safer and more convenient? We are exploring making every lamp post a “smart lamp post”, as part of a plug-and-play infrastructure with sensors and other smart devices, which will provide services to people. The data is anonymised to protect people’s privacy. At the same time, it will improve security and make it easier for the police or security agencies to respond quickly and effectively.

That is a lot to look forward to, but what about those who are not fluent with technology? How can our society continue to be inclusive even as we become smarter?

Firstly, there has to be 100% access to digital technology. This is where governments need to make sure that everyone has access to devices. Having said that, it’s not just about the device. The key thing is design—it needs to be intuitive to humans.



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“There has to be the human touch and an effort to reach out to people to give them confidence to use new technology.”

There has to be the human touch and an effort to reach out to people to give them confidence to use new technology. Everyone should have access to a digital concierge, at a community centre, school or library, which is someone who’ll say, “How can I help you, this is how you do it, let me hold your hand, literally, and help you”.

Another dimension that is especially applicable to us, and which makes us relevant to the rest of the world, is multilingualism. We have to make sure that all essential services work through all the official languages. As the government, we must be prepared to invest



03

in this so there will be no linguistic divide. A multilingual interface sends the signal that we are not going to allow any group to be left behind. Being able to roll out services in a multilingual way also makes us relevant to Southeast Asia and beyond.

Do you foresee changes in city planning, with the onset of new disruptive technologies like autonomous vehicles?

Fifty-two years ago, Mr Lee Kuan Yew [Singapore’s founding Prime Minister] said we did not want to be a concrete jungle even though we were going to be a metropolis in Southeast Asia. That paradigm of incorporating greenery, conserving nature and protecting our environment was ahead of his time.

Fast forward to today, it doesn’t matter how high-rise or how futuristic the city is—it has to work for human beings. I think it still has to be green and sustainable. Things need to be within walkable, convenient range. Schools, libraries, healthcare facilities, social amenities and our workplaces have to be nearby.

To me, the real value of autonomous vehicles is to make public transport more convenient, cost effective and efficient. But we don’t want a city where we’re all transported in pods and deposited in our destinations. There has to be walking, running, jogging, cycling. It doesn’t matter what your preference is, but the human body still needs the challenge of physical activity. There needs to be sufficient social interaction. In the end, it’s still about relating to people and focusing on them.

- 01 Participant learning how to transact digitally with her mobile phone at IMDA’s e-Payment Learning Journey.
- 02 In Code@SG movement, students learn coding and develop computational thinking at an early age through various enrichment programmes.
- 03 Student volunteers teach senior citizens IT skills through Intergenerational IT Bootcamp, which aims to bridge the digital divide and foster stronger bonds.



“In a paradoxical way, you need both high tech and high art.”

In light of smart technology, how do you envisage the future of work?

I have no doubt that work will be completely disrupted by technology. It has happened before. In 1870, about 80% of American jobs depended on agriculture. Today, it is less than 2%. The moment steam engines were invented, human labour and animal labour became commoditised, because the machines could work tirelessly at things which, in the past, only human and animal muscle could.

In this age of artificial intelligence, big data and pervasive sensors, many routine tasks which can be automated are at risk. What is left for human beings and human ingenuity? My sense is that jobs that depend on high touch, high art and creativity will require human beings.

In this digital age when everyone can produce movies and webpages, it's not so much about the technical details of whether you can write HTML, or understand the difference between RAW and TIFF images. The machines and post-production tools will change. But you need the artist with that eye for composition and beauty; you need the designer who can create a website that is compelling, and sends across emotionally resonant messages. In a paradoxical way, you need both high tech and high art.

In the area of medicine, there's no question that robotics can improve the accuracy of diagnosis and safety of medical procedures. But medicine is still a high touch field. You need to see the patient, understand the patient, have empathy and build trust with the patient. The doctor's job will be transformed, but human relations will still be needed.



- 01 Singapore's HDB towns are planned in close proximity to service amenities and adequate greenery, a vision put forth even in the early days of development, to ensure a highly liveable environment.
- 02 Community enjoying their morning at Car-Free Sunday SG, an initiative by the Urban Redevelopment Authority and partner agencies. Roads in the Civic District, Central Business District and Telok Ayer Conservation Area are closed for participants to enjoy public spaces and events, fostering social interaction and community spirit.

“It goes far beyond just technology and cities. It is about expanding opportunities by integrating every citizen of ASEAN and making sure that cutting-edge digital technologies are used to achieve that objective.”



02

Singapore chairs the Association of Southeast Asian Nations (ASEAN) this year, and has announced the formation of the ASEAN Smart Cities Network (ASCN). How does this collaboration contribute to the development of ASEAN cities and their people's aspirations?

At a global level, more than half the population lives in cities. This same phenomenon is occurring within ASEAN, and hence there is a focus establishing a network of cities where a couple of things can take place.

First, the exchange of ideas. We can look at how each country has deployed technology and learn from the successes and the failures, which are equally important. This helps us with our integration agenda for ASEAN. We want trade facilitation to have a single window, to have self-certification, and to make sure our payments, invoicing and trade systems interoperate. There's a very large field of collaboration to make ASEAN even more integrated with the use of digital technologies.

The size and diversity of ASEAN allows us to connect the consumer in Singapore seamlessly with the person who's producing the vegetables, rice or services. Similarly, it allows the smallest handicraft maker in any corner of ASEAN to gain access to a larger market of 630 million people seamlessly and at very low transaction costs.

This is an area worth focusing on, and it is why we have launched the ASCN. It goes far beyond just technology and cities. It is about expanding opportunities by integrating every citizen of ASEAN and making sure that cutting-edge digital technologies are used to achieve that objective. 🌐

Watch the interview here:



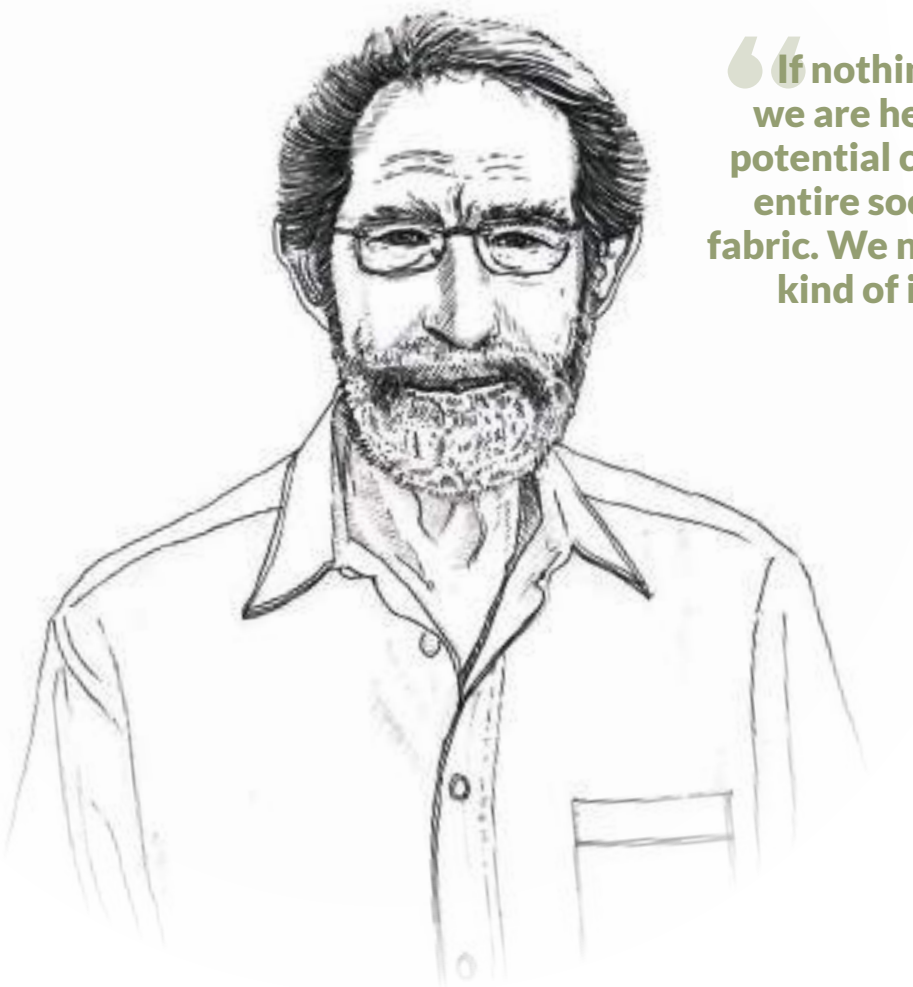
<https://youtu.be/qHvQXFJ4RFs>

- 01 Dr Vivian Balakrishnan visited Equator@TP, where Temasek Polytechnic students developed an app and ecosystem that brings local neighbourhood businesses online, and enables them to deliver faster. Deliveries can even be crowdsourced from the community.
- 02 During the first ASEAN Smart Cities Governance Workshop in May 2018, National Representatives and Chief Smart City Officers from 10 ASEAN Member States exchanged ideas and discussed action plans towards the common goal of smart and sustainable urbanisation.



Geoffrey West

The Science of Sustainable Cities



“If nothing changes, we are heading for...a potential collapse of the entire socioeconomic fabric. We need a different kind of innovation.”

Climate change and sustainability are complex problems linked to cities. **Prof Geoffrey West** calls for a scientific theory of cities—a mathematical framework that explains how cities grow—as a first step towards a systemic strategy for sustainability. A Distinguished Professor at the Santa Fe Institute, he authored *Scale: The Universal Laws of Growth, Innovation, Sustainability, and the Pace of Life in Organisms, Cities, Economies and Companies*.

Cities have a dual nature. On one hand, they are the origin of our major challenges and, on the other, the generator of creativity and ideas, and therefore the source of solutions. The future of humanity and the long-term sustainability of the planet are inextricably linked to the fate of our cities.

Developing a Science of Cities—a quantifiable framework based on universal principles to understand and predict how cities grow—is crucial for devising a strategy for long-term sustainability.

The first step towards the Science of Cities is to ask if cities are scaled versions of one another, in a similar way whales, elephants, giraffes, human beings and mice approximately are in biology. In terms of their measurable characteristics, are New York, Los Angeles, Chicago and Santa Fe scaled versions of one another? If so, is their relative scaling similar to how Tokyo, Osaka, Nagoya and Kyoto scale, despite their varying appearances and characters?

My research says yes.

Underlying the extraordinary complexity and diversity of cities is an approximate simplicity. As a city increases in size, all of its various socioeconomic metrics scale in the same way no matter where you are on the planet. Through analysing data from thousands of cities in different countries, I found that when the size of a city doubles, there is an approximate 15% increase in its socioeconomic outcomes—from income, wealth and number of patents, to crime rate and number of flu cases. This scaling law is valid across the globe, although cities have evolved independently.

How is this possible? It is due to the universality of social network structures that undergird all cities across the globe. Cities are, in essence, people, and to a large extent, people are pretty much the same all over the world in how they interact with one another and cluster to form communities.

This network principle and the resultant scaling laws imply a potentially huge consequence: cities will reach a finite time singularity—a point in time where the mathematical solution to the growth equation governing whatever is being considered (population, GDP and so on) becomes infinitely large. This kind of growth is unsustainable because it requires an ever-increasing supply of energy and resources in the future to maintain it. Left unchecked, the theory predicts that cities will eventually stagnate and collapse.

A major innovation resets the clock by changing the conditions under which the system operates. This happened during the Industrial Revolution, where unforeseen technological advances in agriculture disproved the 18th century Malthusian prediction that humans would be forced to return to subsistence-level conditions when population growth outpaced agricultural production. The discoveries of iron, steam, coal, computation and, most recently, digital information technology are among the major innovations that have fuelled our continued expansion.

Unfortunately, the theory, too, dictates that the time between successive cycles of paradigm-shifting innovations has to get shorter and shorter to sustain growth, based on our understanding of disruptive innovations in the past. Not only does the general pace of life inevitably quicken, we must also innovate at a faster and faster rate!

This is surely not sustainable. If nothing changes, we are heading for a major crash and a potential collapse of the entire socioeconomic fabric. We need a different kind of innovation.

When we think of innovation, we usually think of it in physical and technological terms, but some are more cultural. I would say that capitalism and entrepreneurship were part of a cultural change that has been a major driver for the success of cities, society and economies in the last 200 years.

“We need what I call a grand unified theory of sustainability—an integrated scientific framework to understand the relationship between human-engineered systems, both social and physical, and the natural environment.”

The time has come for a major non-technological, cultural change for us to avoid collapse. We need to rethink our relationship with society and move away from a more individualistic and narcissistic culture guided by greed, to become more connected with and concerned for others around us. We need to get to a stage of having more of, for want of a better word, a kind of spiritual and cultural well-being.

Existing strategies have, to a large extent, failed to come to terms with an essential feature of the long-term sustainability challenge—the pervasive interconnectedness and interdependency of energy, resources, and environmental, ecological, economic, social and political systems. Almost all existing approaches to global sustainability focus on relatively specific issues, such as the environmental consequences of energy sources, economic consequences of climate change, and social impact of future energy and environmental choices. While such focused studies are important and should be where we direct most of our research efforts, they are not sufficient. They concentrate on the trees and risk missing the forest.

It is time to recognise that a multidisciplinary, multinational initiative, guided by a broader and more integrated perspective, is needed to address sustainability and inform policy. We need what I call a grand unified theory of sustainability—an integrated scientific framework to understand the relationship between human-engineered systems, both social and physical, and the natural environment. It is time to initiate a massive international programme to address global sustainability in an integrated, systemic sense.

This means bringing together all the stakeholders—academics across different disciplines, politicians, policy makers, planners, architects and administrators—to not just have dialogues, but to work together. From the people making the decisions to those on the ground, there must be collaboration at all levels.

Otherwise, we are doomed to be dealing with more and more complex, unintended consequences. And some of these will lead to a situation that is no longer sustainable, nor tenable. ●



Community-Led Initiatives

By the People, For the People

Cities around the world champion the active involvement of citizens in urban design and rejuvenation projects. In this photo essay, **Martha Isaacs** and **Yuting Xu** examine successful community-led urban rejuvenation initiatives worldwide, and find out how residents have been proactively working with Non-Governmental Organisations (NGOs), governments, planners and architects to co-create their neighbourhoods and public spaces.



From Slum to Neighbourhood

Since the 2000s, residents in Kambi Moto, a village northeast of Nairobi, have worked closely with local trusts, NGOs and architects to upgrade their living environment in phases. Self-financed with community saving plans, the project involves residents in designing the new neighbourhood to preserve local culture, negotiating with the City Council for support, and reconstructing their own houses. Besides enjoying a safer neighbourhood with basic services and secure tenure, Kambi Moto residents also share their experiences with similar neighbourhoods to replicate the process.



Playing Well Together

The Adventure Playground @ Canberra is Singapore's first community playground that was conceptualised, designed and built with residents, under the Housing & Development Board's Build-A-Playground (BAP) initiative. Over 2,000 residents contributed to the theme, name, play components, colour scheme and floor design for the treehouse and *kelong* [Malay for 'fishing jetty'] inspired play space, which reflects Sembawang's heritage. BAP has been extended to four other housing towns, to give residents the opportunity to co-create communal spaces for better quality of life.



From Urban Scar to Popular Cycling Path

The shores of the once abandoned and polluted Mapocho River in Santiago, Chile, were reclaimed by bicycle advocates, NGOs and community members, and transformed into a cycling hotspot. Since 2011, annual cycling events have been organised by the community attracting over 30,000 people in 2015. The community's enthusiasm eventually attracted government funding for new cycling infrastructure along the river, due to be completed in 2019.



Participatory Planning for a Community Park

The masterplanning process for Dorothea Dix Park in Raleigh, North Carolina, has involved thousands of local residents in co-designing their community space and sharing their visions for the park through frequent community meetings, online forum discussions and walking tours with architects and planners. Currently in the planning phase, the private-public partnership project aims to achieve social inclusivity, with regular outdoor festivals and movie screenings, encouraging close interactions among residents and building a sense of place.



Sustainable Development for Cities

Transforming People's Lives, Leaving No One Behind

While cities are lauded as places of opportunity and engines of growth, they could create issues such as inequality and social exclusion if they are not well planned. **Maimunah Mohd Sharif**, Executive Director of the UN-Habitat, shares how the organisation works closely with developing cities to support them in achieving sustainable urban growth.

Cities are at the centre of economic growth worldwide, accounting for 80% of the global gross domestic product. Economies of scale and opportunities of agglomeration, realised by the concentration of people and economic activities, have the potential to transform cities into the loci of social progress and prosperity. However, if the process of urban development is not well planned, inequality and social exclusion are ever-present risks.

In fact, urban growth has become synonymous with slum growth in many

parts of the developing world. The multiplication of slums and informal settlements perpetuates disparities in opportunities especially for the poorest, exacerbating exclusion and poverty. This happens because cities are not expanding through a well-considered urban plan and land-use ordinance, but more frequently via informal land and housing developments that do not comply with official urban planning and management systems. This adversely impacts not just the people's lives, but also the sustainability of cities.



Maimunah Mohd Sharif is the United Nations Under-Secretary-General and Executive Director of UN-Habitat. Prior to her appointment in the UN-Habitat, she was the Mayor of the City Council of Penang Island. She championed Gender-Responsive Participatory Budgeting and Planning and was the first woman to be appointed as Seberang Perai Municipal Council President.



Village residents in Kilifi, Kenya were involved in the discussion for new maps that were produced after rounds of participatory mapping exercises.

“For 40 years, UN-Habitat has been helping cities to develop holistic and evidence-based policies for adequate housing provision and sustainable urbanisation, using baseline data and clear indicators to track their progress.”

To help cities become more sustainable, both socially and economically, the United Nations General Assembly set up the United Nations Human Settlements Programme (UN-Habitat) in 1978 with the goal of providing adequate shelter for all and promoting policies for sustainable human settlements. For 40 years, UN-Habitat has been helping cities to develop holistic and evidence-based policies for adequate housing provision and sustainable urbanisation, using baseline data and clear indicators to track their progress. These indicators include the Sustainable Development Goals (SDG) under the UN 2030 Agenda for Sustainable Development, particularly Goal 11 to “make cities and human settlements inclusive, safe, resilient and sustainable”. A detailed monitoring framework and accompanying tools such as the New Urban Agenda—an action-oriented document that provides guidelines and recommendations for sustainable development—enable local and national governments as well as other stakeholders to embark on a planned and sustainable path of urbanisation. The governments and private sector are encouraged to adopt these frameworks and guidelines in synergy with local and national policies.

Defining the Issues

One crucial part of the UN-Habitat’s work is studying and monitoring trends in global urbanisation and how cities and towns are growing, to gather data that sheds light

on the challenges at hand. The 2016 UN-Habitat Sample of 200 Cities revealed that unsustainable urbanisation triggers urban sprawls and low-density developments, resulting in high mobility costs and energy consumption. Cities consume over 70% of global energy production and contribute to about two-thirds of global greenhouse gas emissions.

Sample of 200 Cities also showed that homes and rental housing remain largely unaffordable, both in the developing and developed world, pushing those with low incomes towards slums and informal settlements. Today, some 1.6 billion people live in inadequate housing conditions globally, of which nearly one billion reside in slums and informal settlements, without access to basic services and security of tenure.

UN-Habitat’s data and research have also revealed that cities are consuming more land than needed to accommodate their growing populations, resulting in dramatically lowered residential population densities and fewer public spaces. There are two main reasons: an increase in land and housing speculation, and the difficulty faced by city governments to enforce urban legislation, plan and regulate urbanisation, protect public property, and ensure access to adequate and affordable housing. Cities often lack specialised knowledge and adequate data to respond effectively with evidence-based policies and programmes. Without data, capacity, and practical tools, some city governments may opt for “template” urban policies with stock solutions, which have limited benefits.

UN-Habitat collaborates closely with cities, mainly by supporting them with technical expertise to identify challenges and define the methodology, parameters and indicators to measure progress. In particular, UN-Habitat promotes an Integrated and Holistic Sustainable Urban Development Policy that brings together urban planning and design, legislation and municipal finance. Housing is also placed at the centre of urban policies and is supported by practical tools such as land readjustment and land-value sharing.



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Reforming Legislation to Unlock Land for Development in Banha

One example of how the UN-Habitat works with cities for concrete policy interventions is in Banha, north-eastern Egypt. Like many developing cities, Banha lacked effective urban laws and regulatory frameworks to deal with the challenges of urban development. Despite rapid urbanisation, the existing legal frameworks were outdated and irrelevant to the local context. This encouraged irregular land use and fragmentation. The affected the provision of infrastructure and basic services such as water, energy and sanitation, and led to sociopolitical and economic issues.

To promote capacity development in legislation, the UN-Habitat guided urban policy development in a participatory manner—not just by transferring international best practices, but supporting the local government to develop new urban laws that reflect local culture and practices. This involved several meetings, discussions and fieldwork sessions to understand the local situation. The UN-Habitat also conducted capacity building workshops to equip local officials with knowledge and skills to lead the legislation reform, which will help to unlock land for urban development, improve housing strategies and increase urban population density.

01 The UN-Habitat initiated the Bukoba Water Project in Tanzania, which improved residents’ access to regular and clean piped water through rehabilitation of pipelines and construction of water tanks.

“The project introduced an active consultation process...leading to an unprecedented 98% consensus among the landowners for the application of the new law.”

Specifically, the UN-Habitat supported a land readjustment programme that helped the local government enact a new law to tax property developers and improve the city's street network. In exchange for formalised building permits and higher density developments, landowners released 30% of their land to the municipality. This resulted in increased land and property values, while also providing opportunities to develop affordable housing for urban communities, achieving one of the targets of SDG 11, which aims to ensure adequate safe and affordable housing and basic services for all, as well as to upgrade slums.

The project introduced an active consultation process that established clear channels of communication between lawmakers and constituents, leading to an unprecedented 98% consensus among the landowners for the application of the new law. It also improved all stakeholders' understanding of the problems associated with the existing legal framework, leading to the formulation of consensual alternative policy options. The Banha example illustrates the importance of secure tenure rights with legally recognised documentation, and the progress towards SDG 1, which aims to eliminate poverty in all its forms. Beyond Banha, the UN-Habitat has helped over 40 countries to reform their legal frameworks for urban projects as well.

Mapping Public Spaces in Nairobi

Similarly, the UN-Habitat has supported 12 countries to improve the lives of over 500,000 people through the Global Public Space Programme. Well-managed public spaces, though essential to improve the quality of urban life, have been neglected in many cities due to development pressures. Such was the case in Nairobi,

Kenya, before the UN-Habitat initiated a project to develop a city-wide public space strategy in 2012. This strategy combined physical work, technical guidance, capacity building and close stakeholder engagement.

The UN-Habitat provided Nairobi with technical advice and tools to improve policies, plans and designs for safer, more inclusive and accessible public spaces. The UN-Habitat's City-wide Public Space Assessment Tool, which enables cities to digitally map the distribution, location, connectivity, availability, accessibility, quality, comfort and safety of public spaces, revealed significant disparities in the provision of and access to such spaces across Nairobi. The city had an average of 3.9 m² of open public space per capita (2.5% of land allocated to open public space). This figure is expected to drop to 2.4 m² per person by 2030 if the city does not create new open public spaces for its growing population. However, the average public space per capita dropped to only 1.13 m² in Mathare and 0.61 m² in Dandora, which form a stark contrast with over 8.6 m² in the high-end neighbourhood of Westlands, less than 20 minutes away by car.

The situation has prompted the UN-Habitat experts to work with local groups, especially youths, to improve public spaces in slums and low-income areas such as Mathare and Dandora. In Dandora, the Dandora Transformation League collaborated with the UN-Habitat, City County of Nairobi and other key partners to adopt an innovative community-driven approach in rehabilitation and management of public spaces. The residents pay an appointed youth monthly, who will then be responsible for the regeneration and maintenance of their courtyard—a small unit in the neighbourhood—and the

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01 Beyond Banha, participatory slum upgrading is also taking place in other areas such as Kilifi, Kenya, to improve the lives of the urban poor and make urbanisation more inclusive.



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adjacent public streets. Through this project, Dandora residents enjoy the creation of new public spaces, more vibrant street life, increased sense of personal safety and civic duty, economic opportunities for the youth and a general improvement of quality of life for residents. The project started with one courtyard in 2014 and has reached more than 120 courtyards in the neighbourhood today, engaging the youth in creating a better quality of life in their neighbourhood. It has also recently won the 2018 Dubai International Award for Best Practices for Improving the Living Environment.

The mapping of public spaces also revealed that dangerous and deserted areas inhibit people, particularly women and girls, from using and benefiting from them. The lack of pedestrian-friendly infrastructure also affected people's mobility and hence, their enjoyment of public spaces. Only 16% of the open public spaces in Nairobi are accessible by a 5-minute walk and 32% are reachable within a 10-minute walk. The unequal distribution of public space in the city compromises the quality of life, particularly for disadvantaged communities.

“The project improved walkways, created cycling paths, installed public lighting...Today, the place is safer and is thriving with 5,000 daily visitors including women and girls.”

To address this issue, the UN-Habitat initiated a pilot project to redesign and rehabilitate selected public spaces. The Jeevanjee Gardens project emphasised a participatory approach that involved some 50 local organisations. These stakeholders worked with the UN-Habitat to improve the security, accessibility and appeal of the public park that was considered one of the most insecure places in the city centre. The project improved walkways, created cycling paths, installed public lighting and provided benches, public toilets and trash bins. Today, the place is safer and is thriving with 5,000



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daily visitors including women and girls. By achieving one of the targets of SDG 11—the provision of universal access to safe, inclusive and accessible, green and public spaces, in particular, for women and children, older persons and persons with disabilities—the Nairobi example illustrates how working towards the SDGs can make a positive impact on individual lives.

As seen from these examples, cities that focus on sustainable development can avoid the pitfalls of inequality and exclusion of vulnerable groups as they urbanise. The SDGs are also interlinked for holistic, integrated and sustainable development. While technical knowledge and tools have a big impact on the progress, what is even more crucial is the collaboration between different parties, to ensure that global, national and local agendas remain linked in a common objective towards sustainable urban growth. Only then can cities provide opportunities for everyone to prosper, leaving no one and no place behind. ●

“What is even more crucial is the collaboration between different parties, to ensure that global, national and local agendas remain linked in a common objective towards sustainable urban growth.”

01 Jeevanjee Gardens in Nairobi is now a safe, accessible and comfortable public space for all.

02 Sunken Car Park in Nairobi is another vibrant and inclusive public space where people can enjoy skating on weekends.



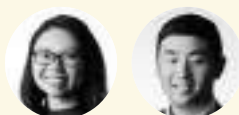
Internet+ Urban Services

When Urban Services Meet the Internet

Recognising that Internet technologies now dominate the lifestyles of mobile-dependent citizens, Chinese government agencies have enhanced service processes with closely integrated mobile applications that deliver greater ease and civic engagement. **Yuting Xu** and **Yimin Zhou** elaborate on the development, benefits and downsides of this digital revolution.

Evelyn, a typical office worker in Beijing, woke up to a WeChat push notification from the Beijing Traffic Police reminding her of the vehicle travel regulation during the upcoming public holiday. The sky was overcast, so she secured a car ride on Didi Chuxing, the Uber-equivalent ride-hailing app. On her way to the office, she purchased a train ticket to her hometown and paid her utility bill on Alipay. When her father sent her a voice message asking for dining recommendations, she found a highly rated restaurant on Meituan and shared the listing. She even made a booking on the restaurant's WeChat Public Account for her father and paid with WeChat Pay.

This is a snapshot of a typical day for mobile-dependent Chinese urban dwellers. Chinese cities are redefining modern urban living with more efficient and equitable urban services, delivered through the Internet and its associated technologies. Behind this unprecedented phenomenon is the gigantic and diverse “Internet+ Urban Services” ecosystem—comprising Internet technology firms and service providers—supported by the central government and well received by the people. This ecosystem built on integrated platforms continues to nurture innovation and deliver greater convenience to Chinese residents.



Yuting Xu and Yimin Zhou are researchers at the Centre for Liveable Cities.



In most Chinese cities, retail and F&B outlets have fully integrated Alipay and WeChat Pay solutions for more efficient ordering and checking out.



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The Mobile-Internet Boom

With a large domestic market and eager entrepreneurs, China is now the world leader in e-commerce and fintech. Total e-commerce transactions reached 22.97 trillion yuan (S\$4.8 trillion) in 2016. Mobile payments—dominated by Internet tech firms Alibaba and Tencent—amounted to 150 trillion yuan (S\$31 trillion) in 2017. In many cities, wallets have been replaced by mobile phones as a necessity.

Thanks to the population's enthusiasm for new technology, apps such as Meituan and WeChat have seen exponential growth.

The latter, boasting popular features such as e-Hong Bao (a digital monetary gift given to show well wishes), attracted almost five million users in the first three months of its release in 2011, and now has one billion Monthly Active Users (MAU).

By providing solutions ranging from e-commerce to artificial intelligence and cloud computing, Tencent and Alibaba have joined Facebook, Google and Amazon among the world's five largest Internet companies. Together, they shape user behaviour—people now eat, shop and connect to everything else on their smartphones.

“(Internet companies)... shape user behaviour—people now eat, shop and connect to everything else on their smartphones.”

The Onset of “Smart” Urban Services

In stark contrast to the proliferating Internet technology scene, urban services in Chinese cities have been known for poor accountability and transparency, inefficiency, red-tape and lacklustre customer service. To certify a document, citizens often had to visit multiple departments, sometimes even resorting to “guanxi” or personal connections to expedite the process. This was made worse by the lack of updated information across departments and limited service capacity.

Marrying urban services with mobile Internet became the way forward. In 2015, the central government started promoting “Internet+”, a concept that seeks to integrate innovative Internet applications with other economic sectors to enhance overall productivity and efficiency. A series of guidelines was released to city governments to optimise and simplify service processes. For example, city governments have been tasked to adopt Internet and digital technologies to improve service quality, while the central government conducts regular progress checks and ensures poor performance is rectified. To create a conducive environment for “Internet+ Urban Services”, the central government provides institutional support, including the upgrading of ICT infrastructure, and the setting of new laws and regulations to protect critical network infrastructure, safeguard government data in commercial collaborations and create a cybersecure environment.

The “Internet+” concept synergises with China's Smart City agenda, a national urban development plan introduced in 2012. Over

300 cities have been shortlisted as national pilot smart cities, which China defines as cities that harness the Internet of Things, Big Data, Cloud Computing, Geographic Information System and other advanced information technologies. “Internet+ Urban Services” thus presents itself as a viable smart city project for cities to fulfil their Key Performance Indicator (KPI).

Top-Down Meets Bottom-Up

The “Internet+” policy direction has given a strong push to existing bottom-up business initiatives with a smart city emphasis. Since the early 2010s, Tencent-owned WeChat and Alibaba-affiliated Alipay have been integrating fragmented services into their well-established platforms. Today, these platforms support urban services in over 300 Chinese cities, ranging from public safety and traffic management to healthcare, education, housing and public administration.

Wuhan Xiehe Hospital, for example, holds a public account on WeChat with functions that allow users to check doctors' schedules, make medical appointments and even receive remote diagnoses. This reduces the strain on hospital resources by digitising the time-consuming components of the service process.

Hangzhou, the capital city of Zhejiang Province, has made roughly 50 types of city services available on Alipay. By March 2017, 15 million city service payments were conducted on these integrated service platforms, of which 83% were made on Alipay. Users only need one app to complete virtually every service they require.

01 WeChat payment and other digital payment solutions have significantly enhanced business efficiencies and become widely accepted by businesses in Chinese cities.

“More than ever before, city governments now communicate and engage with residents for public matters through social media.”

With these platforms, service requests such as checking social insurance balance and paying taxes can mostly be performed on the go. Even more complicated processes involving two to three departments such as traffic accident claims—which typically took weeks to complete—can now be completed within 30 minutes of case submission on WeChat.

Service catchment of third-party service platform apps are not bound by city jurisdictions. Travellers and tourists now need not carry multiple public transport fare cards or worry about tedious service processes when they travel between cities: all they need is a mobile phone installed with WeChat or Alipay, which geolocates them and brings services from respective cities to them. Integrated service platforms supported by the large service ecosystem is transforming the traditional service model.

Mobile Social Media for Citizen Engagement

More than ever before, city governments now communicate and engage with residents for public matters through social media. Many agencies have jumped on the bandwagon and created Public Accounts on WeChat. These have become the key source of information for Chinese netizens, with 52% of users receiving regular push notifications of news and notices. By August 2015, over 83,000 WeChat Public Accounts relating to civic matters had been created by government agencies from 31 provinces.



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On Xi'an Traffic Police Department's Public Account, residents can lodge complaints about bad driving behaviour, report traffic incidents and receive updates on the status of their feedback.

“Xinji Publishes”—the official Public Account of Xinji Municipal in Hebei Province with 320,000 followers, around half its population—was used to solicit public feedback on matters such as erecting a sculpture in front of its High Speed Rail Station. Within 12 hours of the announcement, it had gathered over 60,000 views and 640 comments—many of which expressed opposition—from the public. The municipal government eventually cancelled the project and used the funds to improve city greenery and sanitation infrastructure instead.



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“Release the Power”: Let the Market Solve Problems

Many Chinese cities have seen deeper and more extensive involvement of Internet technology firms in daily operation. Among Alibaba Cloud's government clients, the Guizhou government cooperated with Alibaba to build the “Guizhou Cloud” platform to integrate and consolidate data across its seven agencies, reducing 51% of IT cost. Alibaba also helped Zhejiang Industry and Commerce Bureau identify businesses with dubious corporate information using data collected from Alibaba's own platforms.

In industries such as healthcare, power is also “released” from the city government to enthusiastic Internet tech firms, which have created innovative service models to address problems. Tencent-backed WeDoctor, a healthcare mobile app, brings over 240,000 doctors in 2,700 hospitals from 30 provinces online to serve its 160 million registered users. Besides facilitating the remote diagnosis of patients through the sharing of medical records, WeDoctor consolidates the fragmented and inefficient Chinese healthcare supply chain by integrating diagnosis, treatment and pharmacies in its operation. It bridges the gap in healthcare demand and supply by precisely matching the specialties of the doctors to the described symptoms of the patients.

01 In museums, the public can scan a WeChat QR code to loan and return audio guides from a vending machine.

02 Tourists scan a QR code to purchase tickets at the Forbidden City, reducing queuing time as an effective crowd control tool.

China demonstrates that building a large and diverse ecosystem with an open and cooperative mindset sustains the success and drastically increases the scale and resilience of innovations.

Digital Revolution Through Integrated Platforms

China demonstrates that building a large and diverse ecosystem with an open and cooperative mindset sustains the success and drastically increases the scale and resilience of innovations. In expanding their businesses, all-in-one platforms such as Alipay and WeChat adopt greater flexibility in their functionality, attracting service providers to build a large and diverse service agglomeration. This in turn attracts more cities and users to join, building the momentum for an inclusive digital revolution.

In a positive feedback loop, these integrated platforms continue to nurture innovation, as residents and service providers communicate and interact on the platforms. New service models that ride on these platforms emerge to address social issues.

Strong public-private collaboration is essential, as witnessed in the close cooperation between Internet firms, government and citizens. In China's case, such collaboration comes with a mandate from the central government, and thrives as the private sector actively develops solutions to create greater convenience and smoother service delivery for citizens.

China's success in e-payment and mobile platforms for urban services, however, is not without its shortcomings. For instance, while the creation of Public Accounts shows the willingness of city governments to work closely with citizens to improve service efficiency and accountability, many accounts were only created to meet performance targets and lack regular updates or follow-up processes for the feedback received.

For digitisation to be effective, existing bureaucratic structures and work



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processes also need to be restructured. Digitisation makes the alignment and integration of workstreams across departments imperative, while social media requires a different communication and public engagement strategy.

Concerns on data privacy and legal loopholes exploited by these innovative service models have also been growing. The 2018 Facebook privacy scandal in the US shed light on how legislative systems are inadequately equipped to regulate new modes of businesses that use online platforms as infrastructure and data as currency. While the Internet facilitates efficient service delivery, greater clarity on the roles and responsibilities and stronger enforcement are required to safeguard consumers' interests. How Chinese cities approach these issues remains to be seen, but one thing is clear: it takes more than technology to make the digital revolution work. ●

01 At a career fair in Shanxi, job seekers scan QR codes of companies and organisations to submit their resumes using WeChat.

02 Commuters pay for bus rides by scanning their personalised Alipay QR code at the payment device, which deducts the bus fare from their Alipay account.



ESSAY

Meeting the Evolving Needs of Cities

Shaping Future Downtowns: What Matters Next

More than just business districts, downtowns need to be more diverse, inclusive, innovative and vibrant to meet the changing demands of businesses and individuals. **Mina Zhan** and **Michael Koh** look at the factors fuelling this shift and how cities can create attractive work-live-play spaces.

Traditionally, the planning and design of business districts tend to cater to the needs of specific industry verticals. In the late 1990s and early 2000s, downtowns around the world were looking to anchor key financial institutions.

Today, the same sector is experiencing what Mr Antony Jenkins, former group CEO of Barclays Bank, described as “the Uber Moment in Financial Services”. If financial technology delivers what it promises to over the upcoming years—in terms of improved efficiency, streamlined jobs and reduced costs—a substantial reduction in office space demand by banks and financial services firms could be looming on the horizon.

The profile of downtown occupants has also evolved. Downtown San Francisco’s edgy South of Market (SOMA) district has seen over 60% of its office space taken up by tech firms. In New York’s Midtown Manhattan, the market share of the total office space occupied by the Technology, Advertising, Media and Information services sector nearly doubled from 2009 to 2015. According to real estate services firm JLL, tech firms in several cities around the Asia Pacific region, such as Tokyo, New Delhi, Manila and Sydney, already account for 20% or more Grade A office space.



Mina Zhan is a researcher at the Centre for Liveable Cities.

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Tech firms cluster in San Francisco’s SOMA district, which is adjacent to the CBD in North of Market (NOMA).



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“By 2030, 30% of corporate portfolios will comprise flexible space, including co-working, incubator or accelerator space.”

The seismic shift in demand for flexible space is also having a major impact on the future of workspace. In fact, it has become a key workspace option even among global brands and major corporates as they look to contain costs and better respond to the flexibility and agility demanded by the gig economy. In the longer term, JLL research estimates that by 2030, 30% of corporate portfolios will comprise flexible space, including co-working, incubator or accelerator space.

So how should cities go about creating next-generation urban spaces that respond to this new geography of demand by businesses and individuals?

“It is crucial that future downtowns project a strong sense of innovation, agility and connectedness that will draw talented workers.”

Diversity: Injecting Greater Mix

First, it would be critical for downtown space to bridge the sectorial silos, and be supported by a mix of big and small companies from MNCs to SMEs and start-ups, because a knowledge-based ecosystem demands more than what a few mono-disciplinary headline global firms or large research institutes alone can provide. The ability to harness the collective wisdom and strengths of a dense community of innovators and entrepreneurs will have a strong impact on the success of future business districts.

Instead of leaving it to designated innovation districts, it is crucial that future downtowns project a strong sense of innovation, agility and connectedness that will draw talented workers. Cities like Shanghai have already recognised this as a priority—it plans to develop a Central Innovation District as an integral part of its Central Business District (CBD) by introducing mixed-use innovation clusters within the downtown area.

To encourage greater diversity, downtown business districts need to go beyond the conventional “big block” developments to offer more differentiated parcel sizes and building typologies. In Singapore, places like Tanjong Pagar, a historic mixed-use neighbourhood located in the central area, have benefited from a series of planning strategies to enhance its mix of uses over the past decade. Measures include boosting the hotel industry and increasing the live-in population through the release of more government

land sale sites for hotel and residential uses, in addition to existing public housing options.

Today, the area attracts a variety of people and businesses, and is bustling with social life and commercial activities. The Tanjong Pagar Centre, a transit-oriented development that sits directly on top of the Tanjong Pagar Mass Rapid Transit Station, saw 37% of its Grade A office space snapped up by tech and media companies, as of October 2016.

Inclusiveness: Supporting Live-in Districts

Second, future CBDs need to be planned as central social districts too in order to respond to both the work and life aspirations of their occupants. Providing for a live-in population is going to be an increasingly important consideration for downtown planning as the younger workforce rediscovers the convenience of urban living. In London, the phase 1 development of the new CBD at Canary Wharf was predominantly for office use. The more recent phase 2 extension, known as Wood Wharf, has been weighted more towards housing and social amenities. Slated for the new development area are 3,500 homes, with over 600 earmarked for affordable housing. Two primary schools, a multi-purpose sports hall and a healthcare facility also form part of the development plan. Importantly, the first-storey use plan has been carefully curated to encourage community activities and social interaction.

01 Mixed-used Tanjong Pagar is popular with a variety of businesses and people.

Besides homes, social amenities also play a crucial part in supporting a more lived-in downtown. High-quality learning institutions and public libraries can serve as highly prized value differentiators for attractive urban precincts. Instead of letting high land value and limited land space preclude downtowns from having access to these amenities, there is much scope to turn these constraints into opportunities for creative planning models and design concepts, as demonstrated by Tokyo's Mode Gakuen Cocoon Tower, a high-rise vertical campus housed in the prime commercial centre of Nishi-Shinjuku.

Flexibility and Affordability: Attracting Young Minds

Third, in order to attract a greater functional mix, including start-ups, downtowns have to appeal to innovators who seek flexible leases, distinctive spaces and affordable costs. Besides conventional and fully fit-out workspaces with standard lease terms, other development typologies that offer flexible leases and customisable space could enhance the attractiveness of the overall ecosystem. Such space not only allows stakeholders from both public and private sectors to better respond to new trends and demands over time, but also increases the relative affordability of development projects, presenting opportunities for inclusive participation from a wider range of market players.

Ultimately, to meet the diverse needs of a dynamic workforce, a higher degree of innovation and flexibility in the conventional land development process will be necessary. This will allow greater room for test-bedding and piloting, and doing things differently.

“**High-quality learning institutions and public libraries can serve as highly prized value differentiators for attractive urban precincts.**”

The experience of Paris in remaking the city through its “Reinventer Paris” initiative provides useful lessons for others—since 2014, the city has facilitated numerous sales or leases of city-owned sites not to the highest bidder but to the most innovative proposal, incorporating social and community inputs.

In terms of living space, as millennials become the lifeblood of today's workforce, having flexible and affordable housing options incorporated into new downtown space could also go a long way in anchoring the brightest young minds. In the San Francisco Bay area, private sector companies are already providing shared housing to freshly graduated young entrepreneurs and bootstrapping start-ups, capitalising on their demand for affordable and flexible housing in city centre locations. By allowing like-minded people to live, network and collaborate together, these “housing++” models contribute to a more holistic ecosystem that goes beyond just living to also address occupants' needs and desires relating to working, playing and learning.





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“Since 2014, Paris has facilitated numerous sales or leases of city-owned sites not to the highest bidder but to the most innovative proposal.”

Vibrancy: Invigorating Streets and Places

Last but not least, future downtowns should put people first, by creating spaces that integrate work with other lifestyle activities so the time-pressed workforce can lead a rich and seamless lifestyle that connects them to amenities for culture, recreation and nature.

With two-thirds of knowledge work already happening outside the office, new workplaces will become less about individual properties and more about being part of an urban environment that is attractive to talented and skilled individuals. The blurring boundary between workspace and non-workspace means well-designed and curated public realms will play a more crucial role in fostering spontaneous interaction and collaboration. While permanent future developments may take a while to realise, short-term uses

such as interim public spaces, linear parks, performance spaces and food markets can enliven these districts and provide a sense of vibrancy at any stage of its development. In Singapore, planners actively put out vacant state land parcels for interim uses, such as the Artbox pop-up creative market that attracted huge crowds to downtown Marina Bay. In Paris, a temporary urbanism plan guides temporary developments.

To improve the safety and experience of pedestrians, a clearer distinction between key traffic corridors and local streets for pedestrians and alternative urban mobility modes such as bikes and personal mobility devices needs to be established. Innovative concepts such as Barcelona’s “superblocks”, which Melbourne has set out to try, can reinstate streets for people, as part of a network of inclusive and human-oriented public spaces.

- 01 Co-living apartments under the brand of lyf, launched by The Ascott Limited, are designed by millennials for millennials. lyf will provide community living and social spaces for technopreneurs, start-ups and individuals in key gateway cities.
- 02 Paris defined areas and processes where it wanted innovation to occur.

“The blurring boundary between workspace and non-workspace means well-designed and curated public realms will play a more crucial role in fostering spontaneous interaction and collaboration.”

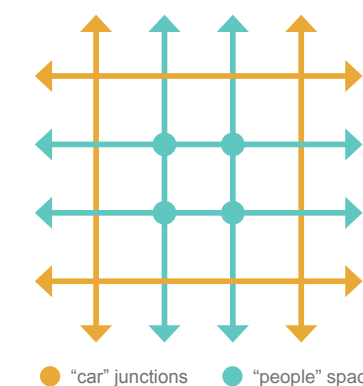
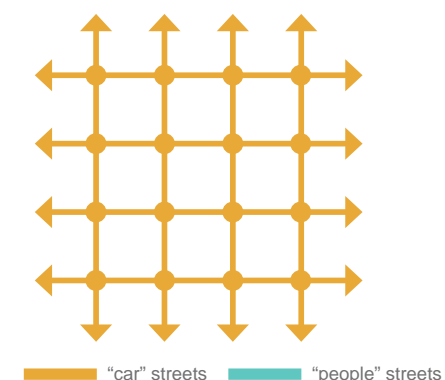
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Moving with the Times

Cities today are grappling with fresh challenges and opportunities. With the rise of millennials in the workforce, their preferences and needs for work-live-play spaces increasingly matter. Future downtowns are becoming less about businesses only in business districts—attractive employment hubs will need to be interesting social spaces where work, live, play and learn are creatively blended.

As major corporates like Google shift their epicentres out of the Silicon Valley to the “Silicon Alleys” of San Francisco’s SOMA and New York’s Chelsea, the message is loud and clear—where the next generation of workers want to be is essentially where businesses also want to be. And it is timely that city leaders review their criteria for successful business districts, and start considering diversity, inclusiveness, innovation and vibrancy as key factors that will shape the future of our downtowns. ●



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- 01 Visitors throng the Artbox Singapore pop-up market at Marina Bay for food, retail products and entertainment.
- 02 Barcelona’s Superblock concept provides good quality public spaces for the people, inspiring similar projects in Melbourne.



Seoul

Listen up! The People are Speaking

Mayor Park Won-soon at a public debate about air quality held at Gwanghwamun Plaza.

Over the last few decades, Seoul has shed its previously top-down approach to urban policies to focus more on its citizens. **Remy Guo** explores how the 2018 Lee Kuan Yew World City Prize Laureate gave its people more say in developing their city.

A giant red ear sits outside the Seoul City Hall. Coined *Yobosayo*—which plays on a Korean expression for initiating a phone conversation—the artwork invites Seoulites to air their views, ideas or complaints. Beyond listening, it projects the comments over speakers in the city hall, uses sensors to detect the size of the crowd that each message attracts and archives the popular ones.

Installed in 2013, *Yobosayo* mirrors Seoul's efforts to pay more attention to people's voices. Through innovative new ways of citizen engagement, Seoul has shifted away from South Korea's traditional top-down governance.

The capital was a very different place 20 years ago. It expanded rapidly in the post-war economic boom through urbanisation plans led by the government and *chaebols* [large Korean conglomerates]. However, public confidence in the government suffered following political corruption cases and a spate of urban disasters in the 1990s due to lax construction standards. At the same time, South Korea's political transition to modern democracy brought about rising citizen demand for public accountability and civic participation. In response, the government started to step up public engagement on policies and projects.

“Solutions are found at the site of the problem, not in boardrooms or behind desks.”

In 2011, Mayor Park Won-soon was elected with the campaign promise: “In Seoul, the Citizens are the Mayor”. Under his leadership, Seoul's policies focused on communication and collaboration with citizens. The government not only strengthened tried-and-tested engagement methods, but also stepped into uncharted waters to boost the breadth and depth of citizen involvement.

Strengthening Face-to-Face Communication

First, the government worked to bridge communication gaps with its 10 million citizens. Driven by Mayor Park's belief that “solutions are found at the site of the problem, not in boardrooms or behind desks”, the Seoul Metropolitan Government (SMG) worked to bring the city administration closer to the community. Resident dialogues are held in different districts through the On-Site Office of the Mayor initiative, while the Policy Listening Workshops gather citizens and policymakers to discuss pertinent topics.



Yobosayo records and broadcasts comments from citizens, archiving the ones that people pay more attention to, while recycling others as ambient music.



Mayor Park prioritises people by making time for community events such as the 2017 Seoul Kimchi Festival, where more than 5,000 people bonded over kimchi-making.



Remy Guo is Senior Assistant Director at the Centre for Liveable Cities, where he is involved in research related to planning and development. Prior to joining CLC in 2013, he was a practising urban designer and architect in the private sector.



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“To gain trust and improve transparency, the SMG...allowed public access to all administrative documents and data not classified as personal or confidential.”

Opening Data to Build Trust

To gain trust and improve transparency, the SMG took a bold step with the Open Government 2.0 policy in 2012. It became the first South Korean administrative unit to allow public access to all administrative documents and data not classified as personal or confidential. Municipal documents and quantitative datasets are available on the Open Information Communication Plaza and Seoul Open Data Plaza websites respectively. This information sharing creates opportunities for businesses and researchers to contribute solutions to urban issues.



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Connecting Online

With Seoul boasting among the world's highest levels of Internet and smartphone penetration, the SMG leveraged social media and online platforms to connect with citizens. The Seoul Social Media Center was set up to coordinate the SMG's 44 social media accounts and address citizens' queries and requests more efficiently. The SMG also launched *Eungdapsso*, an integrated online channel for citizens to submit feedback and complaints. This platform shortened the average feedback handling time from 3.8 days in 2013 to

2.7 days in 2015. Citizens could also vote for policies and proposals on their phones and computers through the mVoting app. This helped policymakers to get a sense of people's opinions on everyday matters.

The SMG even implemented some ideas submitted by citizens through online channels. For instance, the citizen-suggested Night Owl Bus service was introduced to offer affordable late-night transport, in lieu of expensive taxi rides. The service was voted the best public service initiative in 2013.

01 More than 5,000 people visit the Citizens' Hall daily for forums, workshops and other citizen-oriented activities within the Seoul City Hall building.

02 The Eunpyeong-gu Sharing Center came about from a citizen's idea for the Participatory Budgeting System. Residents share tools, services and knowledge with one another using an alternative currency system.

“The Participatory Budgeting System allows the public to decide the use of up to 5% of the city’s budget.”

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Planning with the People

Similarly, major policymaking processes in Seoul became more citizen-driven. Examples include the Seoul Plan 2030—the city’s spatial master plan—and the Participatory Budgeting System, which allows the public to decide the use of up to 5% of the city’s budget. For both projects, the SMG set up citizen committees with rigorous processes for participants to voice their opinions, deliberate on issues and build consensus for solutions. Ideas and opinions were solicited from the wider public through smart platforms such as the mVoting system.

These efforts helped the SMG to complete the Seoul Plan 2030 with fewer public objections than previous master plans. Several projects proposed by citizens to address their needs were also funded under the Participatory Budgeting System, including the Eunpyeong-gu Sharing Center, a non-profit organisation and community space for sharing anything from tools to knowledge.

Seoul’s newfound confidence in working with multiple stakeholders also redefined the city’s urban rejuvenation. Moving away from the demolish-and-rebuild process that prevailed until the 2000s, the city worked with stakeholders to retrofit and transform existing structures into people-friendly urban spaces. The SMG conducted more than 200 interviews and other engagements to establish the plans for Makercity Sewoon, a cluster of 1960s commercial superblocks rejuvenated into a creative district, while a Citizens’ Committee comprising residents, businesses and experts informed the proposals for urban park Seoulo 7017.

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While it has not been easy to reflect citizen opinions in policies and projects—with delays sometimes being inevitable—the people-centric approach has been key to Seoul’s recent success. As Mayor Park explained in the *Stanford Social Innovation Review*: “We cannot expect to solve all of the complex problems we face using the perspective of just one expert or the skills of just one sector.” With a listening ear close to the ground, an open attitude to new possibilities and an astute leadership that balances visionary governance with citizen empowerment, Seoul has transformed into a city that is simultaneously created for the people, by the people. 🌐

The author would like to thank the Seoul Institute for sharing knowledge on Seoul and its policies.

01 The government collaborated with residents, businesses and experts for Seoulo 7017, an elevated urban park transformed from an old expressway.

02 A Hanbok [traditional dress] fashion show in the plaza of Makercity Sewoon.



Lee Kuan Yew World City Prize Special Mentions

Innovation & Collaboration in Practice

Faced with the need to balance economic, cultural and environmental growth, while meeting the evolving needs of a diverse population, cities can no longer be solely managed by the state. **Yi Xuan Tan** explores how Hamburg, Kazan, Surabaya and Tokyo—awardees of the 2018 Lee Kuan Yew World City Prize Special Mentions—have adopted innovative and collaborative approaches in their city development strategies.



Hamburg, Germany Revitalising the Waterfront

With its inner city densification strategy, Hamburg has successfully regenerated its waterfront from former derelict docklands into a dynamic mixed-used district for residential, commercial and recreational uses. This new HafenCity was driven by collaborations among urban planners, investors, academic professionals and citizens. The focus on built heritage since its planning stages gives the lively area a blend of tradition and modernity.



Restoring Green Spaces

Hamburg complements its public-private partnerships with the people's voices when dealing with traffic noise pollution and disconnected neighbourhoods. Extensive public consultation sessions gave rise to the creative solution of covering parts of the Autobahndeckel with parks and community gardens.



Regaining Spaces for Pedestrians and Public Transport

Commendable efforts were made to create a sustainable transport system through car-lite strategies that have been well received by the public. Public transport now plays a major role, with the rapid transit lines and bus services forming a complex network that enhances connectivity. Hamburg also prioritised footpaths and cycling routes to encourage pedestrianisation.



Kazan, Russian Federation

A City of Green and Blue

Kazan strives to improve the urban landscape through the integration of greenery and water. Through the partnership between the Kazan municipal authority and several private agencies, numerous river embankments such as those along Kazanka River and Bulak River have been developed, and the Lebyazhye Lake has also been rehabilitated. Today, the areas near these rivers are teeming with life.



A Cultural Hub

The Kazan Kremlin, a UNESCO World Heritage site where Orthodox churches and Islamic mosques stand alongside one another, epitomises the peaceful co-existence of religious communities in Kazan. Its Historic and Architecture Complex offers an open space for collaboration between the municipal state, religious groups, the non-governmental organisations and public to curate exhibitions and educational activities that promote cultural and religious appreciation among locals and tourists alike.



A Sporting Capital

By strategically leveraging international sporting events such as the 2013 Summer Universiade, 2015 FINA World Championships and 2018 FIFA World Cup, Kazan has successfully branded itself as the sporting capital of Russia. The staging of these events gave the initial impetus for the construction of new sporting infrastructure, offering more sporting facilities for its people after the events.



Surabaya, Indonesia

Greening the Kampung

Trees, bushes and flowers now line the streets of kampungs and adorn the houses, thanks to the residents' greening efforts and partnerships with the private sector to develop and maintain green spaces. With more than 100 parks and 20% of its land covered by green spaces, Surabaya offers its residents a cooler and more serene living environment.



Cleaning the Kampung

Since the early stages of the Kampung Improvement Programme, the municipal authorities have organised discussions with kampung residents to understand their needs and problems. The people have also been invited to give feedback on programme proposals. The programme successfully gathered strong community support to clean up the kampungs. Residents initiated the idea of using yellow and blue bins to differentiate the disposal of non-recyclable and recyclable wastes, as part of community-based waste management programmes.



An Economically Productive Kampung

The Kampung Unggulan (Prominent Kampung) and Pahlawan Ekonomi (Economic Heroes) programmes aim to promote home-based entrepreneurship to alleviate poverty and support the subsistence economy. With government support, residents are encouraged to set up small businesses, and housewives are especially empowered to improve their family's economic conditions. The private sector is also involved, by providing residents with professional training to improve production and promotion of products. Today, nearly 70% of dwellings have their own businesses, ranging from food stalls to tailoring shops and beauty salons.



Tokyo, Japan

Enlivening Business Districts

Strong public-private partnership enables the city government to tap the private sector's expertise for urban improvement projects. The Otemachi-Marunouchi-Yurakucho District is emblematic of how the private sector strives to balance profits and citizens' social benefits by introducing retail and cultural spaces into the lower floors of office buildings, and creating more entertainment spaces along the streets. This has enlivened the business districts, transforming them into inclusive spaces for different users.

Ensuring Public Transport Efficiency

The Tokyo government and the private sector have continually invested in public transport infrastructure over six decades to ensure train efficiency and reliability. With limited subsidies from the government, the private train companies make innovative use of space within transit stations by diversifying into a range of retail and commercial businesses. This not only ensures sustainability of profits, but also generates social benefits for citizens.

Towards a Socially Inclusive City

Tokyo is working towards becoming a "Safe", "Diverse" and "Smart" city by 2020. In line with its hosting of the 2020 Paralympic Games, Tokyo is stepping up its barrier-free efforts to become a socially inclusive city for everyone, including the handicapped and the elderly.



CASE STUDY

Amaravati | Land Pooling Scheme

Pooling Land for Development in Andhra Pradesh

Securing land for development through land acquisition is often a protracted and expensive process in India and the world over. Andhra Pradesh's model of land pooling for its new capital Amaravati offers a compelling alternative.

The Challenge

In 2014, the Indian state of Andhra Pradesh was separated into two. One state continued to be called Andhra Pradesh, while the other was named Telangana. The existing state capital Hyderabad was to be shared for 10 years, before eventually coming under Telangana's jurisdiction after 2024. Under pressure to plan and build a capital city from scratch within this short timeframe, the new Andhra Pradesh looked to the world for inspiration and approached other countries for assistance. Singapore helped to initiate the development by producing masterplans

for the capital city Amaravati and its surrounding region in just six months.

Still, the Andhra Pradesh government had its work cut out, with much of the land required for development belonging to agrarian landowners. It was not viable for the government to buy over private land through land acquisition—a costly process that had a history of generating public discontent over compensation rates when previously implemented in India. Such contestations would not augur well for Amaravati's vision to become “The People's Capital”, where citizens reap the benefits of its progress.



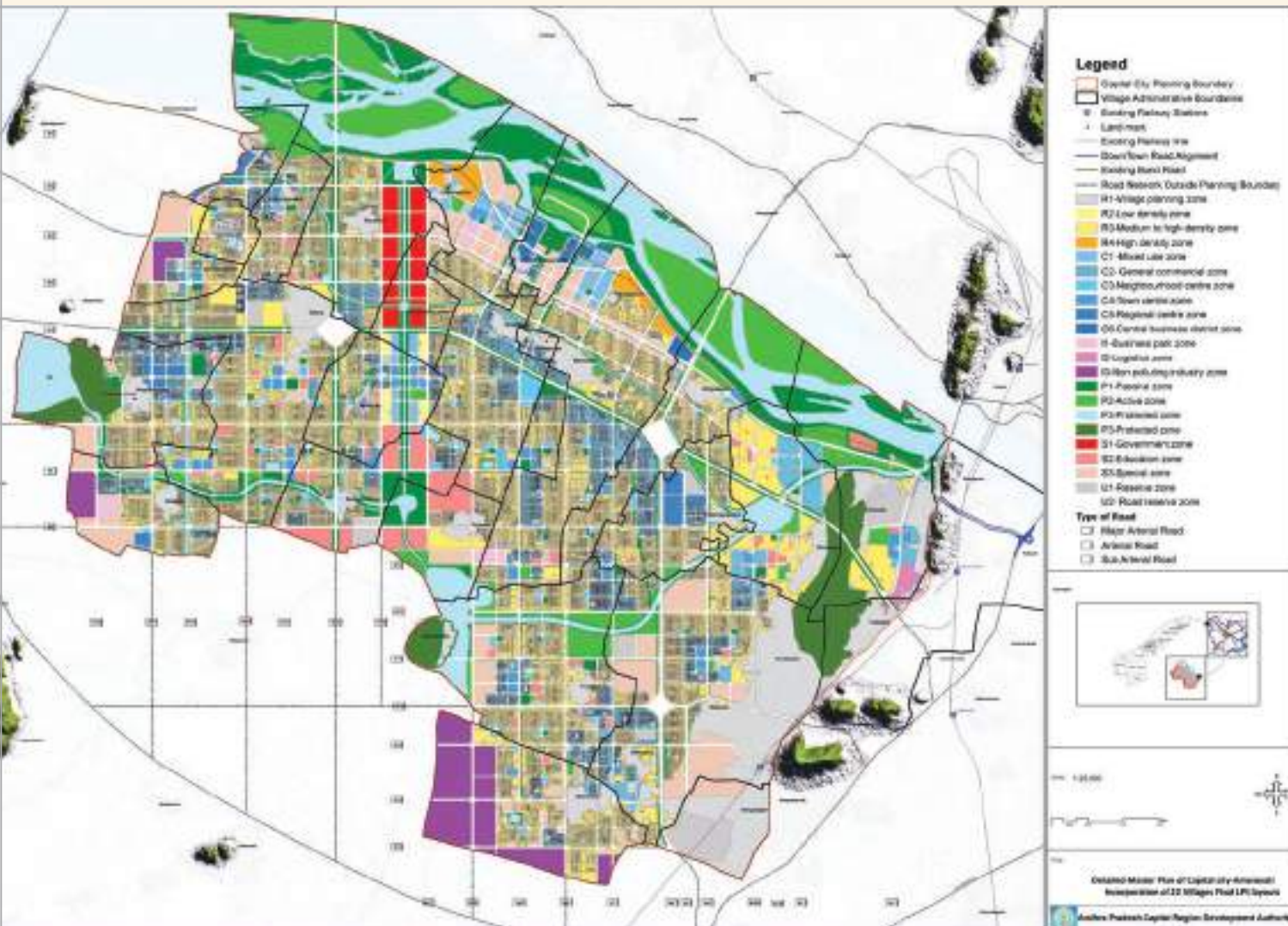
Ramakrishna Rao Ravi is the Director of Planning at the Andhra Pradesh Capital Region Development Authority, overseeing all planning-related matters for Amaravati. Prior to this, he was Chief Planner at the Hyderabad Metropolitan Development Authority for the Outer Ring Road Growth Corridor Project.

Subadevan Mahadevan is a Manager at the Centre for Liveable Cities, where he primarily works in the Advisory and Capability Development teams with a focus on India and South Asian partnerships.



The Andhra Pradesh state is under pressure to solicit land to plan and build its new capital city, Amaravati.





The Solution

In search of other ways to secure land for Amaravati's development, the Andhra Pradesh government found inspiration in the alternative method of land pooling, through which the state promises landowners a smaller but developed plot of land in the future in exchange for current landholdings. These reconstituted plots would come with smart utilities and infrastructure such as citywide WiFi access, paved roads, sewage pipes and electricity lines. The government realised this model could encourage landowners' buy-in by giving them a stake in the future capital. Making land the primary mode of exchange instead of money would also reduce the pressure on the state's finances.

A cabinet subcommittee was tasked to devise a land pooling system. They studied how other Indian states such as Chhattisgarh and Gujarat had previously executed land pooling, and discussed the idea with officials from across the country. They also visited the villages in the planned development area to seek the farmers' input. After these consultations, the committee created a policy detailing how landowners would be compensated under the land pooling scheme. The scheme started in January 2015, with the aim of obtaining 38,581 acres of land.

“Making land the primary mode of exchange instead of money would also reduce the pressure on the state's finances.”

The Andhra Pradesh Capital Region Development Authority (CRDA)—Amaravati's urban planning agency—recognised that the scheme's success would depend on whether it was inclusive and fair to those being asked to give up their land. A draft of the scheme was made widely available to the public, with 30 days given for public feedback and objections. Government officials visited various villages to consult residents on the design, size and location of their returnable plots. Landowners could see for themselves the plot subdivision plans for their villages and address their queries to the officials directly.

The CRDA took the landowners' feedback seriously, incorporating their suggestions into the revised scheme. For instance, farmers insisted that reconstituted land plots be located as close as possible to their existing villages, and should comply with the principles of *Vastu shastra* (a traditional Hindu architectural system), such as by aligning with true north to the greatest extent possible. They also asked for plots of various sizes so they could choose between a single large plot or multiple smaller plots, as well as the joint allocation of plots together with friends and family.

Out of the 24 villages approached to give up their land, 22 agreed within four months of the scheme's announcement. Following this, the returnable land plots were allocated through electronic lotteries for fairness. These lotteries were held at the villages, with landowners receiving confirmation of their plot allocation via mobile message. Their plot allotment letters were also printed and handed out to them immediately, with soft-copies made available online.



01 The masterplan of Amaravati Capital City illustrates how the city pools together land from individual farmers and the state to create a world class “People's Capital”.

02 CRDA officers explaining the masterplan and land pooling scheme to the villagers to solicit feedback.

“Within just 60 days of implementation, the government managed to persuade 25,000 farmers to give up 30,000 acres of land.”

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Meanwhile, despite the CRDA's efforts to convince them of the benefits of land pooling, landowners in two villages have refused to give up their land due to personal reasons such as fears over their livelihoods if they forgo agriculture. To secure land necessary for Amaravati's development, the state is moving to invoke the Land Acquisition Act, where the villagers will be required by law to give up their land in return for monetary compensation. These pockets of resistance, however, are small in comparison to the majority support, with nearly 90% of the required land already secured through land pooling.

The Outcome

As the largest exercise of its kind in India to date, land pooling for Amaravati has made milestones for its unprecedented scale and efficiency. Within just 60 days of implementation, the government managed to persuade 25,000 farmers to give up 30,000 acres of land. As of June 2018, over 33,700 acres have been consolidated through the scheme. The Indian central government has lauded Amaravati's land pooling scheme and other states such as Maharashtra have taken efforts to study the upcoming capital's model.

Beyond consulting the people to ensure proper compensation, the Andhra Pradesh government has looked into helping landowners transition to urban livelihoods in the long run. For example, 123 landowners were sent to Singapore in 2017 to learn about urban development, from integrated masterplanning to development forms

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such as integrated waterways, heartland malls and mixed-use developments that they might see in their future city.

Time will tell the success of Amaravati's development. However, the solid foundation enabled by land pooling and public consultations bodes well for the ambitious capital's future. ○

01 Andhra Pradesh's Chief Minister Nara Chandrababu Naidu handing out plot allotment letters under the land pooling scheme for Nallapadu village.

02 Landowners from Amaravati were sent on a study visit to Singapore in 2017 to learn about urban development.



CASE STUDY

Singapore | Intelligent Transport Systems

Tapping Tech for Smoother Traffic

As Singapore progresses towards its vision of a smart and car-lite nation, *Urban Solutions* looks at how it has capitalised on technology to ensure safe and smooth road traffic over the decades.

The Challenge

Land-scarce Singapore faces the perennial challenge of balancing density with liveability. For transport, the island state needs to constantly innovate for better urban mobility.

After Singapore gained independence in 1965, its fledgling transportation system struggled to keep up with a growing economy and population. Disorganised bus services and severely congested roads led to further traffic delays and air pollution.

From the 1970s to the early 1990s, the government tackled these issues by building more roads and expressways,

overhauling public transport to introduce a Mass Rapid Transit (MRT) train system, and reducing car ownership. To regulate road usage, the 1975 Area Licensing Scheme (ALS) required drivers to purchase passes for high-traffic areas.

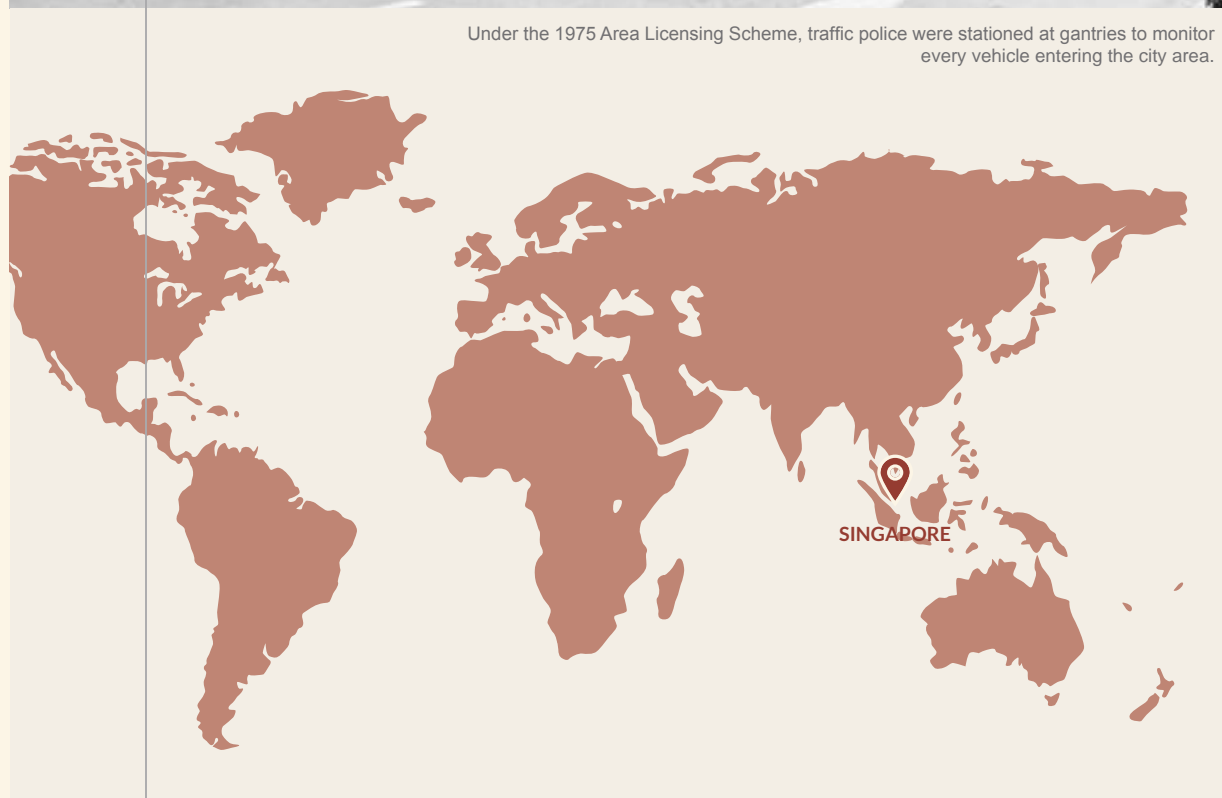
Despite improvements in the road situation, Singapore needed more sophisticated traffic management measures by the turn of the 21st century to deal with a rising vehicle population and a larger and more complex road system. Existing initiatives remained manpower-intensive and inefficient—the ALS needed constant monitoring and strict enforcement to prevent motorists from entering the city centre multiple times with one ALS pass.



Tay Qiao Wei is a writer and editor at Tuber Productions.



Under the 1975 Area Licensing Scheme, traffic police were stationed at gantries to monitor every vehicle entering the city area.





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The Solution

In line with the emergence of transportation technology from the 1980s to 1990s, Singapore's Land Transport Authority (LTA) started drawing on technology to improve traffic efficiency and safety. Collectively called Intelligent Transport Systems (ITS), the measures aimed to automate processes and collect data not just to improve traffic coordination and control, but also provide real-time traffic information to help users plan smoother journeys.

One major development was the Electronic Road Pricing (ERP) system, which replaced the ALS in 1998. Instead of requiring officers to check for passes on windscreens, the ERP deducts a charge from each vehicle's smart card device as it passes through a gantry. The fees are adjusted according to demand, with higher rates during peak hours. This system was expanded to high-traffic roads and expressways beyond the city centre.

The Green Link Determining (GLIDE) system also improves traffic flow by adjusting the green time at traffic signals

Wire sensors under the road surface detect vehicles, while push buttons on traffic signal poles inform the GLIDE system of pedestrians.

islandwide according to real-time vehicle and pedestrian volume. Wire sensors under the road surface detect vehicles, while push buttons on traffic signal poles inform the system of orphan.

Other ITS contribute to safety. Started in 1998, the Expressway Monitoring & Advisory System (EMAS) features cameras along expressways to detect obstructions and monitor speed. The footage is sent to a central command at the ITS Centre. When operators detect an accident or vehicle breakdown, they activate a recovery crew and alert motorists of the situation via electronic signboards along expressways.

01 An electronic signboard displays estimated travel times to the key expressway exits based on real-time vehicle volume, to help drivers make informed route choices.

02 Electronic Road Pricing automates toll collection to reduce congestion on busy thoroughfares such as Orchard Road.

“While Intelligent Transport Systems often feature cutting-edge technology, they must be user-centric.”



The ITS Centre also consolidates real-time data from other systems such as Junction Electronic Eyes—400 surveillance cameras at major intersections—and TrafficScan—a network of Global Positioning System-enabled taxis that act as probes for road conditions across the island. The range of information, from incident locations and estimated travel times to webcam road footage, is then disseminated to the public through electronic road signboards, radio broadcasts and online, to help them make informed travel decisions.

While ITS often feature cutting-edge technology, they must also be user-centric, shared Dr Chin Kian Keong, LTA's Chief Engineer who has worked on ITS for over two decades.

"Often, the challenge for ITS lies in getting the end-users to accept the system and use it correctly," said Dr Chin in an interview with *Urban Solutions*.

He added that the LTA made sure to introduce the ERP in a user-friendly way. Smart card in-vehicle units (IU) were installed

for free for all 900,000 private vehicles, while drivers were educated on the new scheme through publicity campaigns. A test drive was conducted months before the launch to check if the IUs were working.

The LTA involves citizens and the private sector in improving transport. Many ITS were developed with technology firms such as NCS and ST Electronics, the electronics arm of ST Engineering. For LTA's Smart Mobility 2030 plan launched in 2014, extensive data sets such as real-time traffic conditions, bus arrival timings and taxi availability were published online for citizens to co-create solutions such as traffic information apps.

“Technology...is only one part of a holistic transport strategy grounded by ‘sound and practical policies and processes’.”

Although technology can improve Singapore's mobility services, Dr Chin emphasised that this is only one part of a holistic transport strategy grounded by “sound and practical policies and processes”. The ERP, for example, was effective because it was complemented by public transport improvements and a vehicle quota system to support a car-lite shift.

The Outcome

With ITS now spanning over 164 km of expressways and roads, Singapore has improved both traffic safety and efficiency.

Complementing road safety campaigns and enforcement efforts, ITS such as the EMAS have contributed to a reduction in annual road accident fatalities, from around 210 in 2000 to 122 in 2017. Recovery crews start clearing vehicle breakdowns within 15 minutes thanks to the EMAS. The average 24 minutes saved per incident and shorter delays translate to annual cost savings of S\$40 million.

“The average 24 minutes saved per incident and shorter delays translate to annual cost savings of S\$40 million.”

With the ERP, traffic volume on expressways dropped as much as 15% and average travel speed rose from 40 to 50 km/h. Smoother traffic reduces travel time for motorists as well as other road users on public buses. These commuters also benefit from traffic lights programmed to give priority to buses.

Singapore topped the 2017 Global Smart City Performance Index by Juniper Research, which praised its integration of mobility technology with strong policy curtailing car ownership. The country also shares its traffic management expertise with neighbours such as the Philippines, with which it signed a memorandum of understanding to ease Manila's gridlocked roads with ITS.

The city-state continues to upgrade its transport technology for greater equity and efficiency. Traffic lights were enhanced with a Green Man+ system from 2009 to offer the elderly and pedestrians with disabilities longer crossing times. An upcoming satellite ERP system will eliminate gantries and charge motorists based on distance travelled on congested roads, while trials on technology such as autonomous vehicles and shared on-demand transport services are underway.

This forward-looking approach, together with strong transport policies and a citizen focus, enables Singapore to continue pushing boundaries in improving urban mobility. **○**

01



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01 A display board shows the available lots in nearby car parks to assist drivers looking for a space to park.

02 By tapping their EZ-Link cards at Green Man+ traffic light posts, the elderly or pedestrians with disabilities get more time to cross roads.



CASE STUDY

London | Spacehive

Crowdfunding a Better London

How can cities give their people more say in improving neighbourhoods, beyond passive feedback and engagement efforts? London has leveraged crowdfunding for community projects to empower its citizens to decide, initiate and collaborate with institutions for local regeneration.

The Challenge

In many cities, residents usually do not play a direct role in improving public infrastructure and spaces, which governments are largely responsible for. Public participation is often limited to complaints to or consultations with authorities on existing plans. Even if residents have ideas to regenerate local parks, community centres or spaces, they face difficulties such as red tape in garnering funds and support.

This was the situation in London at the turn of 2010. Many Londoners were

discontented with the traditional top-down approach—over 75% thought developments did not meet local needs, while 80% believed their role in development should go beyond consultations, according to research by the Greater London Authority (GLA).

Simultaneously, in the aftermath of the 2008 financial crisis, city councils across the United Kingdom faced severe budget cuts, with an 80% plunge in funding for civic projects across the nation. Councils lacked the resources and tools to improve citizen participation in urban regeneration.



Tay Qiao Wei is a writer and editor at Tuber Productions.



City councils lacked the resources and tools to improve citizen participation in urban regeneration, especially after budget cuts following the 2008 financial crisis.



“The Spacehive model democratises both ideas and funding and encourages individuals, businesses and the authorities to work together to make things happen.”



02

The Solution

In 2012, a new platform that aims to address these issues emerged in the form of Spacehive, an online portal for Londoners to propose and crowdfund neighbourhood improvement projects. Inspired by crowdfunding portals such as Kickstarter, which aggregates funds from a large group of online supporters for creative projects, Spacehive founder Chris Gourlay saw the potential to apply this model to bottom-up urban improvement initiatives.

Anyone can post their ideas to rejuvenate their neighbourhoods on Spacehive's website. A range of stakeholders, from individual citizens to institutions such as city councils and businesses, can donate any amount they choose to projects they like. Unlike the traditional top-down approach where urban projects are largely determined by the authorities, the Spacehive model democratises both ideas and funding and encourages individuals, businesses and the authorities to work together to make things happen.

Before projects go live online, they are verified as feasible by experts from community development network Locality, which checks project details such as costings and proof of permissions.

Mr Gourlay told *Urban Solutions* that Spacehive allows society to make the best use of ideas by encouraging and supporting innovative ground-up proposals. Examples include a sculpture park that activates East London's waterways, a giant pop-up water slide through Bristol's main shopping street and the conversion of a Liverpool flyover slated for demolition into an elevated urban park.

As urban projects tend to require significant capital, Spacehive saw the need to involve large organisations, especially the government, to maximise funding. They approached the Mayor of London and his GLA team to fund Spacehive projects alongside individuals and businesses.

01 The Park and Slide project made sliding through Park Street in central Bristol a reality.

02 Sculptures and contemporary artworks at The Line, a community-proposed sculpture walk, lend an artistic vibe to East London's waterways.



01

While the administration was initially cautious about this unconventional approach to investment in local projects, they were drawn by the opportunity to discover and support Londoners' ideas and give them a greater sense of participation in their city.

To familiarise the GLA with crowdfunding, Spacehive worked with them on four pilots from 2015 to 2017. The GLA worked out a system to select civic projects based on potential benefits and levels of community support. The funds invested by the Mayor are drawn from existing GLA grants such as the London Regeneration Fund.

Today, the Mayor's Crowdfund London initiative hosted on Spacehive enables grassroots campaigns to pitch for up to £50,000 (\$\$89,500) from the Mayor's office.

"Crowdfund London...is inspiring a new generation of civic leaders and helping them unlock creative and innovative ideas for their communities," said Mayor of London Sadiq Khan in a press release. For example, Crowdfund London supported the revival of the Well Street Market as a creative and

commercial space for local makers and youths. This attracted crowds, created jobs and generated revenue for local traders.

While sceptics have questioned why citizens should fork out additional money on top of their taxes, Spacehive maintains a firm stand that crowdfunded projects should not replace existing efforts by the state to provide key infrastructure such as roads or hospitals.

"It's really important that the state continues to invest in the civic environment," explained Mr Gourlay. "But beyond its core responsibilities...we have the opportunity to collaborate on extras. This is complementary and entirely optional."

"Crowdfund London... is inspiring a new generation of civic leaders and helping them unlock creative and innovative ideas for their communities."



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The Outcome

By empowering citizens to contribute ideas and funds, Spacehive has delivered over 435 projects and raised £9.4 million (\$\$16.8 million) across the UK. These ground-up projects have improved neighbourhoods physically, socially and economically—reactivating dead spaces, uniting communities around a common goal and stimulating the local economy.

The portal has also won several awards, including the 2014 Prime Minister's Big Society Award for its pioneering work as the first civic crowdfunding platform that combines individual-led donations with institutional contributions.

Spacehive's collaboration with the Mayor was recognised as one of world's top innovations in government and collected as a case study in the Edge of Government Experience report 2016, prepared for the World Government Summit. It has also led to crowdfunding being adopted as the default way for the GLA to distribute grants for community projects.

"It is an opportunity to create a culture where people have a pathway to make things happen."

Thanks to the combined efforts of the government and individual and corporate donors, over £3 million (\$\$5.37 million) has been raised for 85 Crowdfund London projects. These generated over 300 jobs, as well as environmental benefits such as the protection of green spaces and wildlife.

Spacehive has also partnered 25 other city councils across the UK. Other cities, including Seoul, Singapore and Afghanistan, have expressed interest in the collaborative crowdfunding model, said Mr Gourlay. He believes it can be replicated in cities worldwide to improve financial efficiency of funding, spur innovation and build community. "It is an opportunity to create a culture where people have a pathway to make things happen." ○

01 Chalton Street Market aims to encourage economic growth and strengthen Somers Town's community by acting as a focal point for locals to shop, socialise or even set up their own stalls.

02 An integration of people, nature and heritage at Tottenham's Café, a disused bowling green area that was transformed into a multi-purpose community hub.

03 Local businesses, residents and community organisations are involved in co-curating LITERALLEY, a library that weaves through the previously under-utilised Angel Alley on Whitechapel High Street.



CASE STUDY

Singapore | OneService@SG

Joining Forces for Better Municipal Services

Every day, Singapore government agencies and Town Councils receive some 3,000 cases of public feedback on municipal issues. By leveraging technology to integrate feedback from various sources, the Municipal Services Office has transformed how agencies coordinate efforts to improve services for citizens.

The Challenge

The delivery of municipal services, which involves the upkeep and improvement of the living environment, has been undertaken by different authorities since the 1970s. Non-government Town Councils (TCs) manage public housing estates, while government agencies each handle specific areas ranging from cleanliness and greenery maintenance to road infrastructure maintenance.

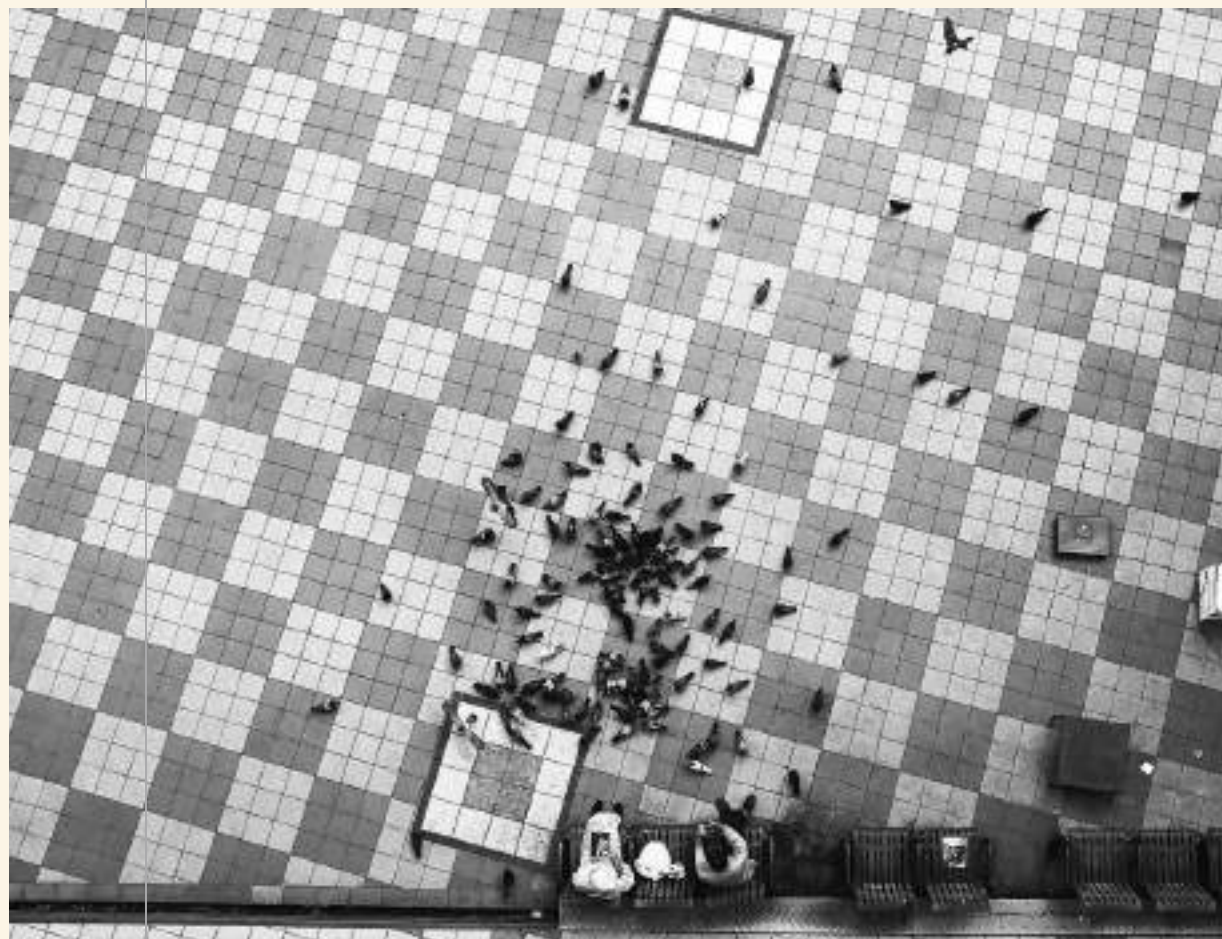
While the agencies have built up expertise for specific municipal issues over the years, such an arrangement divided responsibilities among the agencies based on land boundaries or statutory functions. As issues became more intertwined, it has become increasingly difficult for citizens to

pinpoint the relevant agency to seek assistance from—dealing with pigeon nuisance, for instance, involved two agencies and the TCs as it pertains to cleanliness, public health and management of birds.

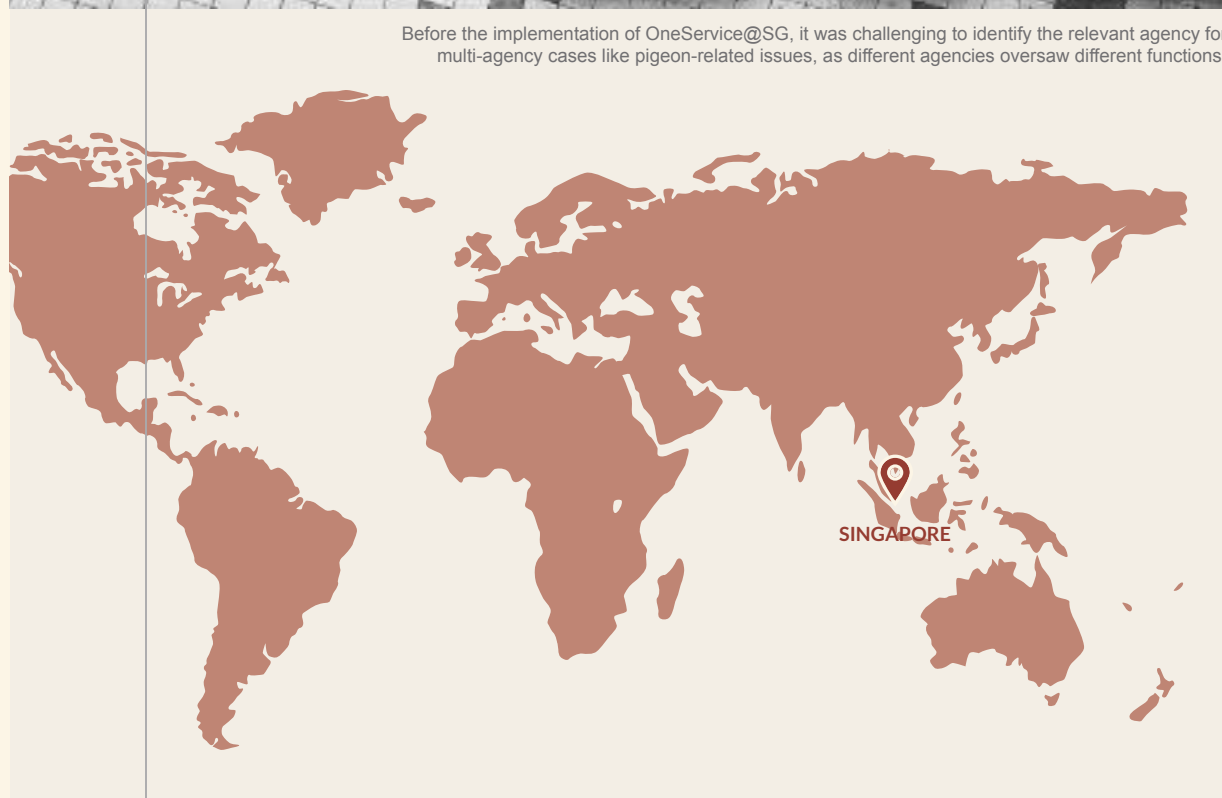
Measures were introduced to improve service delivery, such as the No Wrong Door policy that channels public feedback or requests to relevant agencies, as well as the First Responder Protocol, which requires a first responder agency to address multi-agency requests quickly first, even while ironing out the back-end kinks between agencies. However, some cases still took a long time to resolve, with those involving multiple agencies often being lost in transit due to human errors as there was no central tracking system for accountability.



Belinda Tan is a researcher at the Centre for Liveable Cities.



Before the implementation of OneService@SG, it was challenging to identify the relevant agency for multi-agency cases like pigeon-related issues, as different agencies oversaw different functions.



The Solution

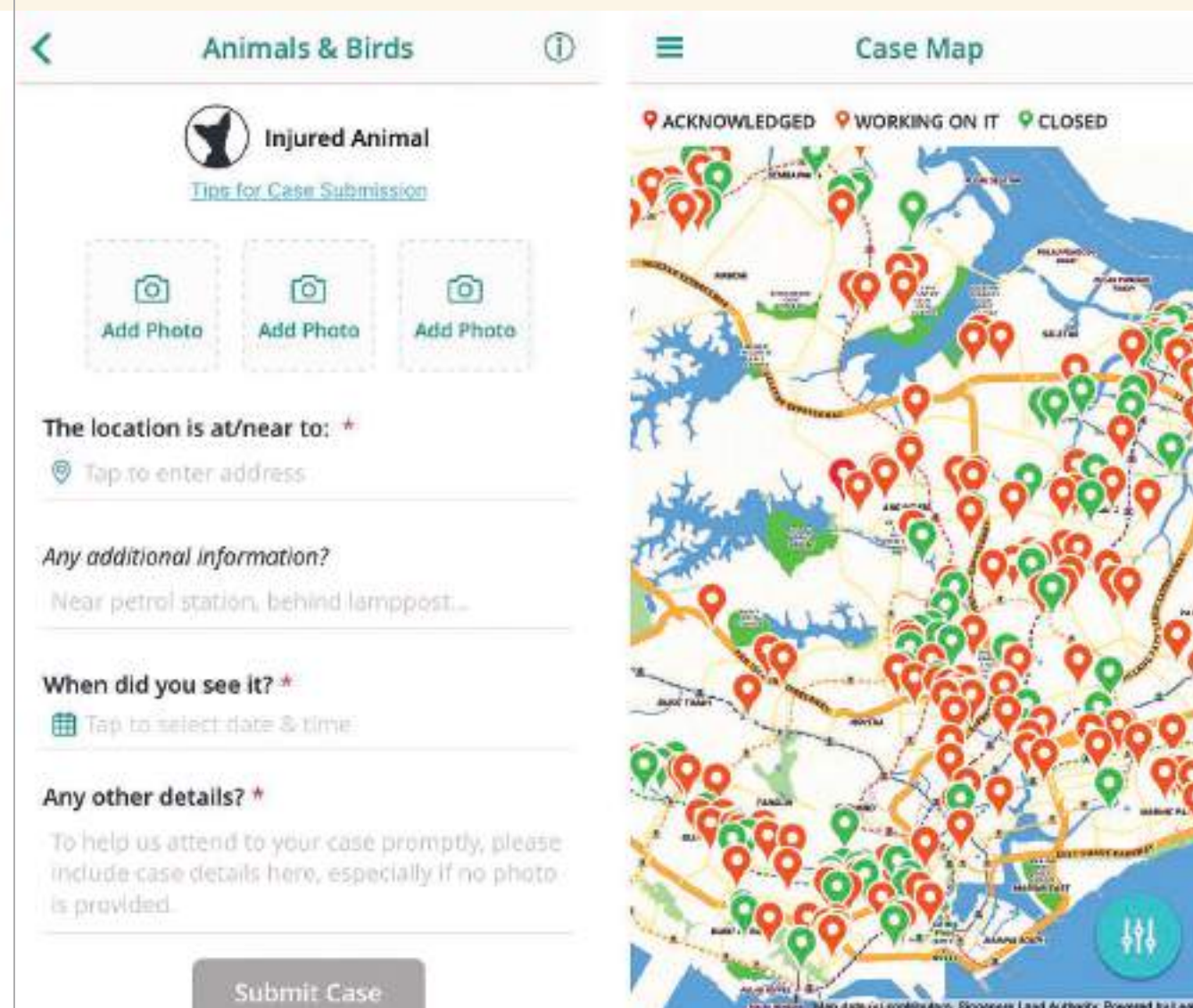
To improve how agencies coordinate and deliver municipal services, the government set up the Municipal Services Office (MSO) in 2014.

The MSO simplified the feedback reporting process for the public by developing a OneService mobile application. Launched in January 2015, the app allows users to report municipal issues without having to identify which agency to direct the feedback to. They can also tag the location of the feedback and receive case updates. An accompanying OneService web portal was pushed out in September 2016. Both the app and portal offer a map for users to track the location of feedback, amenities and infrastructure works.

On the back end, the MSO built an integrated case management system to link the feedback management systems of 11 agencies and 16 TCs. This OneService@SG system consolidates all feedback from letters and emails to transcriptions of hotline calls. It tracks cases closely to ensure that they are being looked into and resolved promptly—agencies will receive an alert if they have not accepted a case after five working days.

MSO Senior Director of Policy and Planning Yip Hon Weng told *Urban Solutions* that the TCs' involvement is fundamental as they handle a significant proportion of municipal feedback. Having access to their data gives the MSO better situational awareness of municipal issues across Singapore, beyond the government's purview.

The data gathered from the TCs and agencies for OneService@SG is visualised via the Municipal Services Dashboard, an internal planning tool that highlights and analyses key issues within each estate. The dashboard helps the MSO's partner agencies and TCs gain insights on potential partners to collaborate with for better service delivery in the long run.



The MSO built an integrated case management system to link the feedback management systems of 11 agencies and 16 TCs.

To identify patterns in the data that can help agencies tackle issues more systematically, the MSO undertook data analytics studies. For example, they identified a strong correlation between stray dog-related feedback and construction sites. The analysis suggested that the clearance of forested land before construction drove dogs out of their habitat, while food waste from construction sites might

be a source of food for the dogs. Based on these findings, the Agri-Food & Veterinary Authority (AVA) established an arrangement with the Housing & Development Board to trap stray dogs before and after infrastructure works, and ensure proper food waste disposal at the canteen areas in construction sites. The AVA also partnered with animal welfare groups to rehome these dogs.

“The average time to close 90% of complex multi-agency cases reduced from 16 working days at end 2015 to 11 by end 2017.”

01



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Beyond data and systems, the MSO recognises that the most important factor for service delivery is still how well the frontline officers work together. Thus, the MSO brought operations officers from various government agencies together to discuss multi-agency cases and understand other agencies' roles through the Regional Operations Network sessions. These ongoing sessions help officers develop closer partnerships to improve municipal services delivery.

The Outcome

Over the past four years, the MSO's efforts have helped agencies improve collaboration and feedback management, to provide more citizen-centric services. With an integrated feedback system and greater clarity of roles and responsibilities, more cases are now being referred to the correct agency at the first instance. The

average time to close 90% of complex cross-agency cases reduced from 16 working days in end 2015 to 11 by end 2017.

The OneService app and portal have also proven to be useful for citizens. In 2017, the number of registered users grew by 43% to 114,000, while the number of cases submitted doubled to 153,000.

But the MSO's work does not end here. It aims to improve upstream planning and operational processes in agencies through the formulation of Standard Operating Procedures and workflows, and will also work towards using more data insights for anticipatory service delivery. Recognising that residents also play a key role in municipal service delivery, the MSO will continue to work hand-in-hand with residents to build a better living environment for everyone. 

01 Officers from various agencies work together to deliver better municipal services for citizens.

02 OneService@SG provides unprecedented data access, enabling not just reactive but proactive management of municipal issues such as the management of stray dogs near construction sites.



Private Sector Enablers

The Business of Urban Solutions

New technological applications often stem from the commercial sector, but require collaboration with other players to make an impact. *Urban Solutions* looks at international examples of how cities adopt private sector innovations to improve transport infrastructure, boost environmental awareness, provide timely healthcare services, and support urban planning and policy formulation.



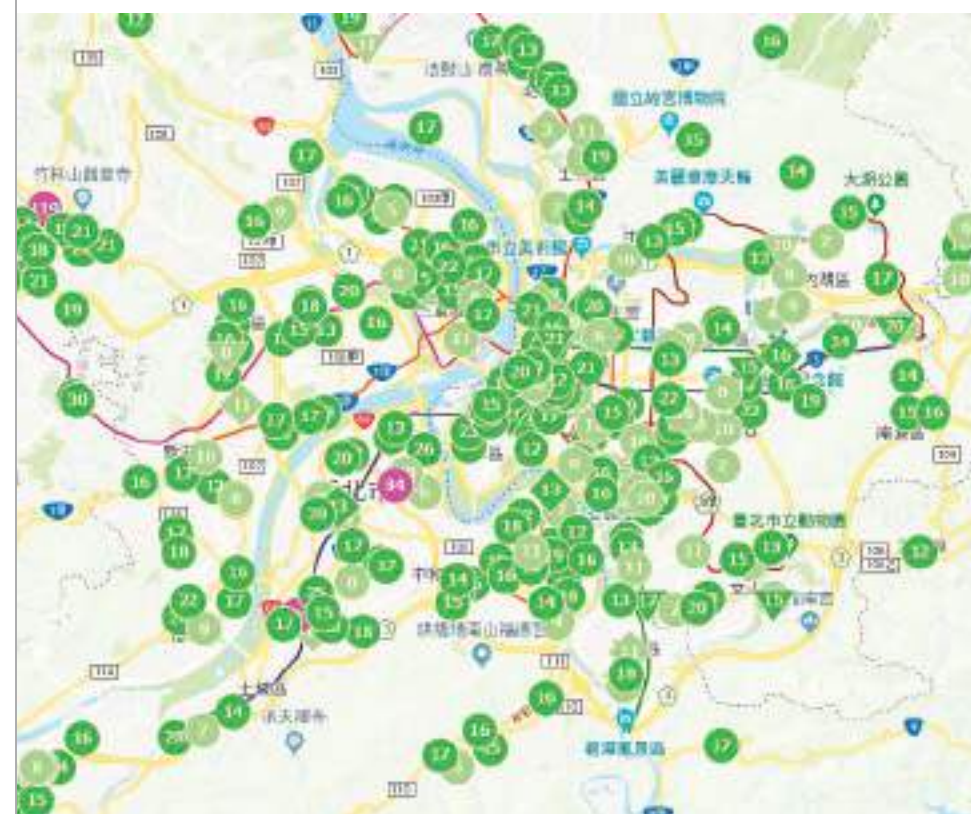
Reimagining Infrastructure for Commuter Comfort

Built by ST Engineering, the Airbitat Oasis Smart Bus Stop in front of Plaza Singapura mall in Singapore is the world's first next-generation smart bus stop. Overhead nozzles deliver cool and fresh air addressing urban heat and air pollution, with up to 70% energy savings compared to a conventional air conditioner with similar capacity. Computer vision and smart sensors analyse commuter traffic and waiting time, while digital panels display live updates of temperature and PM2.5 concentration levels.



Cloud Computing for Accessible Healthcare Services

Hewlett Packard Enterprise partners with state healthcare departments and local healthcare providers to implement cloud-enabled eHealth Centres in India. Located in remote areas, these centres are connected to the nearest hospitals through cloud computing, for patients to receive diagnostic tests and remote consultations free of charge. Since 2012, 94 centres have treated 525,000 patients in 18 Indian states, complementing the existing healthcare system with accessible primary healthcare services in resource-poor locations.



Monitoring Air Quality with AirBox

AirBox is an Internet of Things (IoT) air quality monitoring device that publishes real-time data on its cloud platform for public access through mobile or web. With sponsorship from the city government and Edimax, hundreds of AirBoxes were installed in public spaces and schools in Taipei to complement existing air quality monitoring stations.

The availability and transparency of air quality data has raised environmental awareness significantly and stimulated scientific discussion on air quality among the public. In schools, students have been taught to read air quality indices and even develop their own air quality sensors.

Optimising Sydney with Big Data

The Committee for Sydney used Mastercard’s anonymised and aggregated payment transaction data to understand the city’s night-time economy and how it compared with other global cities. The analysis helped the Committee to generate 22 recommendations to maximise the social, cultural and economic potential of the city at night, captured in a “Sydney as a 24-Hour City report”.



	Sydney	London	Hong Kong	Berlin	San Francisco	Tel Aviv	Montreal	Melbourne
	77%	66%	67%	64%	67%	72%	79%	82%
	23%	34%	33%	36%	33%	28%	31%	18%

How does Sydney Compare to Global Cities?

	12%	—	37%	—	—	—	—	—
	2%	12%	—	—	—	—	—	—
	6%	14%	—	—	—	—	—	—
	27%	14%	—	—	—	—	—	—
	0.1%	3.8%*	—	—	—	—	—	—
	1.1%	—	—	2.5%**	—	—	—	—

- Day & Night % of Spend
- Restaurant & Bar
- Apparel
- General Merchandise
- Grocery & Food Stores
- Live Performance & Entertainment
- Misc Entertainment & Recreation

* London’s spending has grown 12 times in the past three years.

** Berlin’s spending growth is twice of Sydney’s in the past three years.

Virtual Singapore Model as a Digital Test Bed

Designed as Singapore’s authoritative platform for simulations and virtual testing of urban planning solutions, Virtual Singapore is a 3D digital rendering of Singapore that is built on topographical and dynamic real-time data. It will be launched for use by government agencies and rolled out progressively for businesses and the public. Virtual Singapore is a collaboration between the National Research Foundation Singapore, the Singapore Land Authority and the Government Technology Agency of Singapore, supported by Dassault Systèmes’ 3DEXPERIENCE technology.



Cooling Islet for Climate Comfort

Paris is preparing for more frequent and severe heat waves, and one of the measures being piloted is the Cooling Islet developed by Climespace and ENGIE. Shaped like an urban tree with a crown as shelter and roots as benches, the biomorphically designed street furniture by architectural firm SETEC features a patented plug-and-play connection to the Parisian district cooling network that cools the seats, offering pedestrians a welcome respite in summer.

CENTRE for LiveableCities SINGAPORE

The **SINGAPORE URBAN SYSTEMS STUDIES SERIES** draws on original research to document Singapore's transformation into a liveable and sustainable city.

Taking reference from the Singapore Liveability Framework, the Urban Systems Studies series aims to answer two key questions: how Singapore has transformed itself into a highly liveable city within the last five decades, and how Singapore can build on its urban development experience to create knowledge and urban solutions for current and future challenges relevant to Singapore and other cities, through applied research.

The Urban Systems Studies series is available for free download from the CLC website.

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