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Developing a Liveable & Sustainable Singapore

Toh Boon Kwan

**PUBLIC TRANSPORT PLANNING AND
THE TECHNOLOGICAL REVOLUTION**

Lee Chuan Teck

**GROWING A BIOPHILIC CITY
IN A GARDEN**

Kenneth Er

THE FUTURE OF HEARTLAND LIVING

Cheong Koon Hean



ETHOS

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Editorial

by **Alvin Pang**
Editor-in-Chief, ETHOS

For the island city-state of Singapore, city-making has been synonymous with nation-building. Since gaining independence in 1965, we have had to take a whole-systems approach to developing our urban environment. This means being keenly aware of the intricate interdependence and interplay between the various elements that make up society—not just infrastructural and economic demands but also social, political and environmental factors. As a

small, vulnerable young nation with no natural resources other than a favourable geographical location, the stakes of our bid at urban reinvention have been nothing less than existential.

Singapore's developmental achievements have since come to attract global attention. But this is our underlying context. Our urban solutions are the outcome of efforts to address and overcome prevailing,

Singapore's urban solutions are the outcome of efforts to address and overcome prevailing, complex constraints through unique approaches.

Raising a city and building a nation are about heartware as much as hardware.

complex constraints through unique approaches that, taken together, work for the benefit of our people and the long term sustainability of our economy, national sovereignty and way of life.

This is why urban developments in Singapore should be understood in light of a comprehensive, national system of planning and governance, in which mindsets, principles and values bear as much weight as technical considerations (*p. 4*). For the same reason, integrity—in terms of clean, reliable government as well as congruent effort—is regarded as the basis for effective public policy and action, upon which so much of a city's functions depend (*p. 16*). Characteristically, Singapore's

significant urban projects exhibit a high degree of forward thinking and forward planning—with ambitions to address multiple objectives at once. Business requirements go hand-in-hand with living and leisure needs. Longer term goals are balanced with market dynamism and the flexibility to shift plans as circumstances require.

On a strategic level, our urban plans sustain and advance Singapore's competitiveness on a global scale in key sectors (*p. 26*). At the same time, they also bring in the best the world has to offer, in terms of technology and innovation. These are put in service of a savvy, compact population who have come to expect advanced conveniences and a high

quality of life, and who look to the promises of the digital revolution with fluent optimism (p. 38).

Of course, raising a city and building a nation are about heartware as much as hardware. A new generation of public housing, in which over 80% of Singaporeans live, feature not only hi-tech residential facilities but also attractive amenities meant to encourage active, healthy lifestyles and to bring communities closer together, engendering a sense of neighbourhood pride (p. 46). Other planning initiatives combine thoughtful town planning, healthcare providers and community networks to ensure that Singapore's seniors remain vital and socially connected in their later years (p. 58). In a city that has sometimes been regarded as clinically efficient but sterile, Singapore's burgeoning arts and heritage scene is being brought to

the fore as a way to create distinctive places and foster memories and bonds (p. 70). As the city and its people mature, so too do the rich possibilities for urban evolution: as people, private and public sectors pool their expertise, aspirations and resources to reimagine and transform the cityscape (p. 82, p. 98).

The world's cities face a gamut of unique challenges, and Singapore's distinctive conditions are perhaps unlike any other. But certain premises are ubiquitous: resources are finite; human needs and aspirations unceasing; change and complexity are constants. In engaging with these universals within Singapore's unique circumstances, we have found, and continue to find, new ways to tell our own urban story.

I wish you an inspirational read. ■

Developing a **Liveable** and **Sustainable** Singapore

by **Toh Boon Kwan**

Singapore's developmental success is underpinned by principled approaches to the ubiquitous challenges of urban governance.



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The author wishes to thank Mark Chen, Vernie Oliveiro, James Low and Song Hsi Ching for their help in the drafting of this article.

THINKING PAST LIMITS

When Singapore gained independence in 1965, national survival was at stake. With a small land area of 581 km² then and no natural resources, it was burdened with high unemployment and squalid urban conditions.¹ Today, Singapore ranks among the world's most competitive economies.² The city-state's streets are safe. Singapore's urban landscape is clean, lined with trees and flowering shrubs, and dotted by green spaces and well-manicured gardens. Over 90% of Singaporeans own their homes, with about 80% living in multi-ethnic public housing estates.³ These estates are served by transport links and amenities ranging from neighbourhood shopping malls to community centres, schools, sports complexes and hawker centres that provide cheap and good food in a sanitary environment. Unemployment rates are low at 2.2% in 2017.⁴



LIVEABLE AND SUSTAINABLE SINGAPORE - BY THE NUMBERS

Transparency International ranks Singapore **6th** out of 180 least corrupt countries and territories

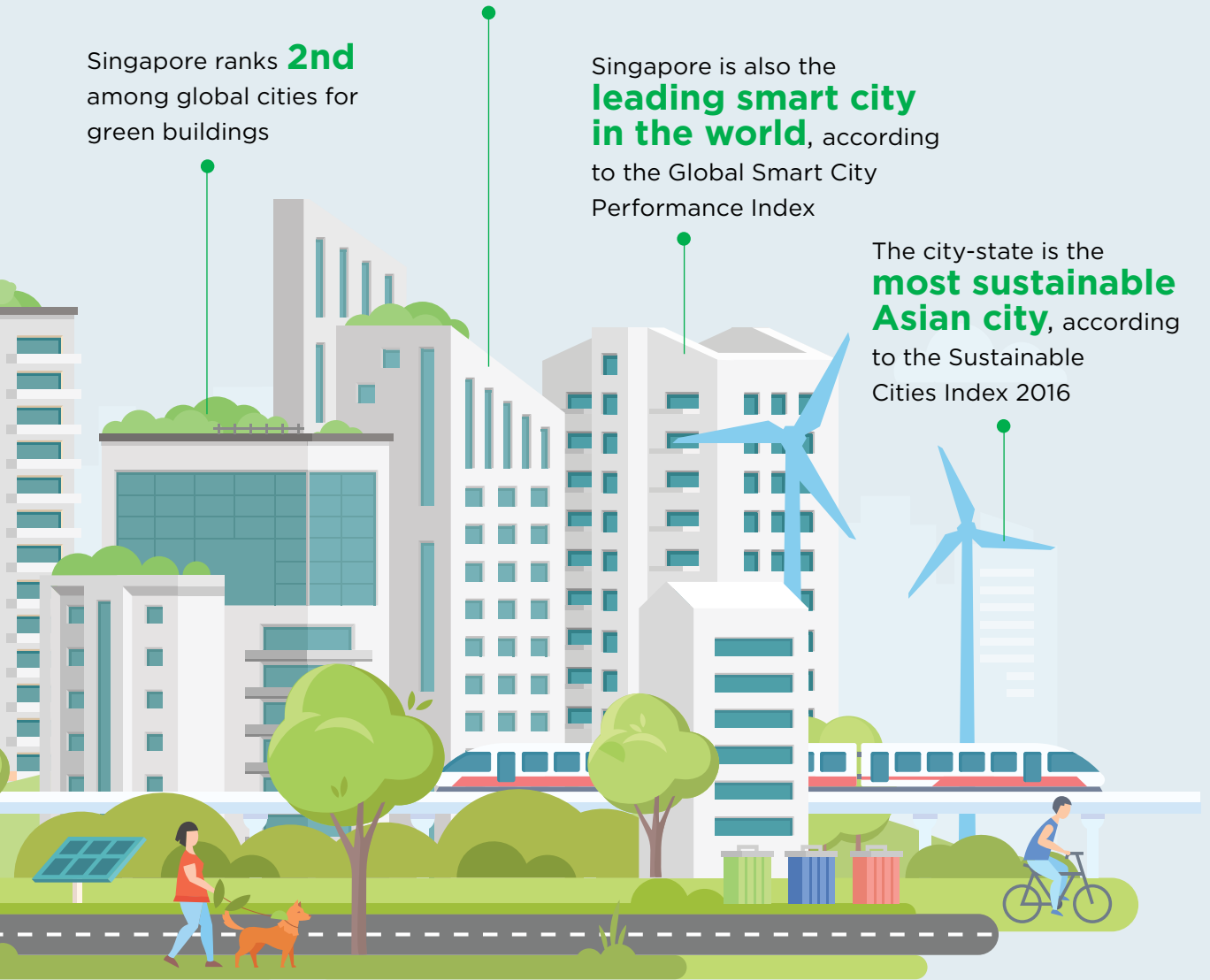


Mercer's 20th annual Quality of Living Rankings ranked Singapore **the most liveable city in Asia**

Singapore ranks **2nd** among global cities for green buildings

Singapore is also the **leading smart city in the world**, according to the Global Smart City Performance Index

The city-state is the **most sustainable Asian city**, according to the Sustainable Cities Index 2016



Sources:

Lynette Khoo, "Singapore Ranks Top in Sustainability among Asian Cities, Second Globally", *The Business Times*, 14 September 2016.

Navin Sregantan, "Singapore Tops Global Smart City Performance Ranking in 2017: Study", *The Business Times*, 14 March 2018.

Navin Sregantan, "Singapore Still the Most Liveable City in Asia: Mercer", *The Business Times*, 21 March 2018.

Ng Huiwen, "Singapore Ranked 6th among 180 Countries in 2017 Corruption Perceptions Index", *The Straits Times*, 22 February 2018.

Nur Sabrina Azmi, "Singapore Ranks 2nd among Global Cities for Green Buildings", *The Business Times*, 15 June 2016.

The disadvantages that Singapore faced as a city-state in its early days meant that its approach to planning and urban governance has had to be long-term, integrated, balanced and dynamic. For instance, while the immediate task upon independence was to create jobs and house the people, the need to curb pollution and diseases also meant that a “develop first, clean up later” model was not viable, given its small land area and lack of hinterland. Growth could not occur at the expense of the environment or citizens’ quality of life. Environmental protection therefore went hand in hand with the economic imperative—a good, clean and green environment made a positive impression on visitors and potential foreign investors. It differentiated Singapore from the other cities in the region, and demonstrated exceptional, effective and efficient governance.

Dynamic Urban Governance

Under the CLC Liveability Framework, five guiding principles stand out as key to Singapore’s dynamic urban governance approach:

Lead with Vision and Pragmatism

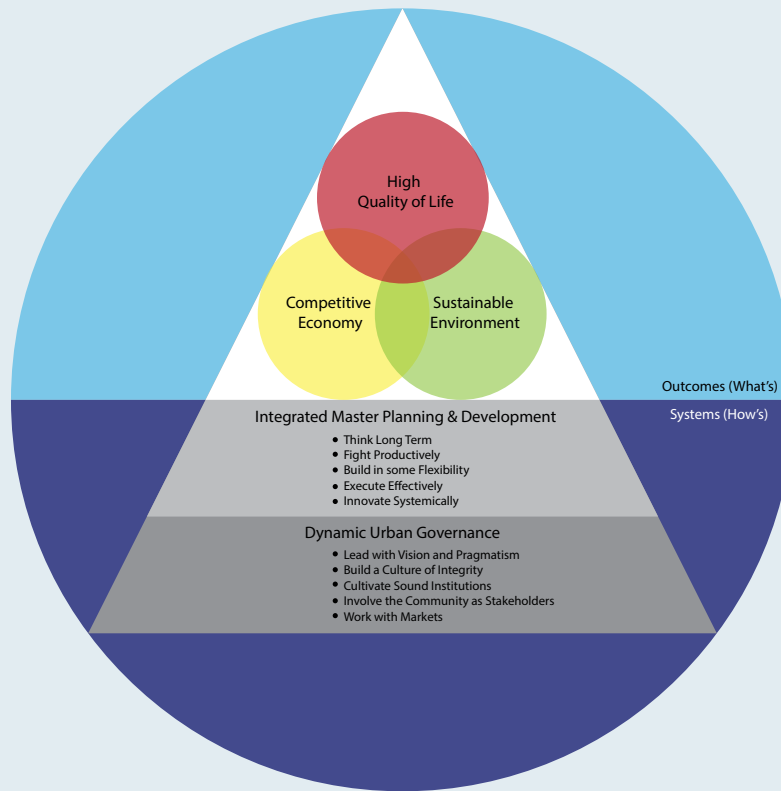
Singapore’s model of urban governance derives in part from the exigencies of a severely resource-challenged and economically vulnerable polity. As founding Prime Minister Lee Kuan Yew’s candid assessment of Singapore’s

The CLC Liveability Framework

Good urban governance requires technocratic and professional expertise: it requires a capable public service, even as the political leadership sets the overall direction, based on the electorate’s aspirations and interests.¹ The Centre for Liveable Cities (CLC), in researching Singapore’s urban planning and development achievements, has distilled a large body of codified and tacit knowledge and developed the CLC Liveability Framework. Ten implicit principles were identified and they form the two key pillars of the Framework—the **Integrated Master Planning and Development system**, and the **Dynamic Urban Governance approach**.² These ten principles, taken together, account for three outcomes, namely: a competitive economy, a sustainable environment and a high quality of life.

Integrated Master Planning and Development

Peter Ho, Chairman of the Urban Redevelopment Authority (URA), has observed that **thinking long term** made Singapore’s urban planners “adopt a future-oriented and long-term perspective in policy formulation. This avoids the pitfall of making decisions that might be expedient in the short term but prove costly later on.” To “**fight productively**” means making decisions that are derived from robust debates among all stakeholders, in



Source: Centre for Liveable Cities

order to find the strongest ideas for Singapore. Consensus is reached “not from fulfilling *all* the desires of *all* the stakeholders, but from finding compromises among all stakeholders”. The need to “**build in some flexibility**” has characterised Singapore’s urban planning regime, which has had to question assumptions and even reverse decisions if circumstances change in a

volatile environment. “**Execute effectively**” and “**innovate systematically**” reflect the Singapore government’s proclivity towards action rather than “maintaining the status quo”: holding to the dictum that “policy is implementation, and implementation is policy”. Policy entrepreneurship, encouraged by the government, becomes a way to find new urban solutions that maximise the effectiveness of scarce national resources.³

Notes

1. S. Dhanabalan, Interview by the Centre for Liveable Cities (unpublished transcript), 20 December 2011.
2. Khoo Teng Chye, “The CLC Liveability Framework”, *Liveable & Sustainable Cities: A Framework* (Singapore: Centre for Liveable Cities and Civil Service College, 2014), 2–42.

3. Peter Ho, “Epilogue”, *Liveable & Sustainable Cities*, 251–253.

prospects in 1965 suggests:

*"[...] an island city-state in Southeast Asia could not be ordinary if it was to survive. We had to make extraordinary efforts to become a tightly knit, rugged and adaptable people who could do things better and cheaper than our neighbours, because they wanted to bypass us and render obsolete our role as the entrepôt and middleman for the trade of the region. We had to be different."*⁵

This ethic has strongly informed the mindset of the core leadership in Singapore since. As a result, governance in the city-state has been characterised by the prioritisation of economic progress and socio-political harmony, regarded as a critical component of overall development.

Since it gained power in 1959, the ruling People's Action Party (PAP) has governed continuously for nearly six decades. Political longevity has allowed the government to adopt a long-term, future-oriented perspective to policymaking and urban planning, while responding to the needs of Singaporeans. As one former senior civil servant put it, "it is the practice of good politics that drives urban governance"⁶ in a virtuous cycle.

At the same time, Singapore could not afford the luxury of ideological approaches to governance: its policies had to work in practice, not just in theory, with the vulnerable young city-state's survival at stake. An ethos of pursuing ideas that work on the ground, and of learning by doing while keeping broader visionary objectives in sight, have been a hallmark of public administration during Singapore's early days.



We are pragmatists. We do not stick to any ideology. Does a policy work? Let us try it, and, if it does work, fine, let us continue with it. If it does not work, toss it out, try another one that may work.

—Lee Kuan Yew,
founding Prime Minister⁷

Build a Culture of Integrity⁸

Those responsible for city planning propose and develop many large infrastructure projects that shape the city, involving significant national resources. How well

these officials do their work affects the day-to-day living of many citizens: from the roads used, to the roofs over their heads.

Public sector culture affects how civil servants and public officers, as well as politicians, carry out their responsibilities.



Was it planned from the beginning? No! It was a process of learning, adjusting, refining and passing it on to the next generation so that they don't have to relearn the process.

—Lee Kuan Yew⁹

What has stood out in Singapore's development experience is the emphasis on establishing a culture of integrity. In this respect, the Singapore Public Service has long been concerned with keeping itself honest. It maintains its reputation for incorruptibility with an extreme intolerance of corruption.

While holding public officers to a high standard of probity, the government also remunerates them with market-competitive salaries to reduce the temptation for graft. They must also avoid conflicts of interests between their official positions and private interests; refuse, surrender or declare and pay for gifts given in connection with their work; sign an annual declaration of non-indebtedness in order to avoid acquiring compromising obligations; and declare their personal and familial assets to make transparent any properties or investments acquired beyond their means.

Cultivate Sound Institutions

Honest, competent and motivated people

Although good leadership is key to a country's or organisation's success, decisions cannot be made on judgement and inevitable biases. Robust institutions and processes are important to ensure

that all available resources and expertise within a country or organisation can be fully utilised.¹⁰

Since independence, the Singapore Government has regarded the public service as crucial to the achievement of its objectives. Transforming the colonial-era bureaucracy to a Singapore Public Service geared for nation-building involved the fostering of both human capital and institutions. Efficient and resilient institutions resulting in a capable technocracy has been central to the city-state's rapid development.¹¹

The close working relationship between the Singapore Public Service and the political leadership is seen as a means of encouraging effective and efficient implementation of policies and programmes.¹² The centrality of the public service to the government's development objectives for the country, and the need for talented officers to carry out those objectives, have led the government to pursue aggressive talent recruitment, development, and retention policies for the public service. Meritocracy informs the recruitment and promotion of public servants at all levels. The Public Service Commission and other public agencies in Singapore award scholarships for tertiary education to academically able students who are then bonded to

serve their sponsoring agencies for a period of time. Emphasis is also placed on fostering morale, promoting staff well-being, and encouraging consistent training and continuous learning.¹³

Agile, innovative agencies

While the limits of resources, whether natural, physical or financial, place bounds on urban development, innovation can mitigate these limits or remove them in the long term. Innovative thinking, coupled with engineering expertise, have been vital in ensuring that urban policies and programmes make Singapore's 721.5 km² of land area liveable.¹⁴ Solving Singapore's urban problems required officials to see different possibilities beyond conventional wisdom. It was this audacity that led Singapore to court investment from multinational corporations to generate export-led economic growth when it was unfashionable thinking to do so in the 1960s. It also introduced the world's first road usage pricing system in 1975 to ease traffic congestion, which was ahead of its time, though common place now.¹⁵

The priority given to housing and economic development was clear from the fact that the first statutory boards created under self-government were the Housing and Development Board (HDB) in 1960, to construct public housing for Singaporeans, and the Economic Development Board (EDB) in 1961, to attract job-creating direct investments to Singapore. With more autonomy than ministries in implementing public policy and pursuing innovations in their specific areas of focus, these statutory boards have outperformed their predecessor organisations (such as the Singapore Improvement Trust and the Singapore Industrial Promotion Board respectively).

Other specialised public agencies include the Jurong Town Corporation (JTC) to develop and manage industrial estates, and the Development Bank of Singapore (DBS) to provide industrial capital.

Involve the Community as Stakeholders

Since the 1960s, a number of campaigns have been launched to inculcate a sense of civic ownership. These include the 1967 "Garden City" campaign, the 1968 "Keep Singapore Clean" campaign, the 1971 tree planting campaign and Annual Save Water Campaigns, and so on. More recent programmes, such as the Community Gardening initiative, the 1997 "Adopt a Park" and the 2006 "Friends of Water", encourage the community to get involved in taking care of the environment and natural resources.

On the planning front, the Concept Plans and Master Plans of the Ministry of National Development (MND) have been open to public consultation since the 1980s. Development plans and guidelines are published and widely disseminated to developers, professionals and the public through the media, government gazette, dialogue sessions and public exhibitions, and feedback is solicited. In recent times, beyond a more straightforward public consultation, officials have taken steps to more actively canvass for ideas from the public. Recognising that an empowered citizenry participating in the policymaking process—and taking shared ownership over public outcomes—is essential for public policy success, public engagement has become an integral part of urban governance processes. In recent years, these efforts

have also involved the judicious use of digital platforms to actively encourage citizen participation and engagement.¹⁶

Public engagement efforts have also been accompanied by a Public Service Transformation (PST) push in August 2012. This marked “a shift from a transactional mode of governance to a more relational one”. With the aim of building “One Trusted Public Service with Citizens at the Centre”, PST sought to create a more empathetic and citizen-centric Public Service. The then Head of Civil Service, Peter Ong, laid out the tasks ahead for the Public Service: “to partner Singaporeans and harness their energies and ideas for the good of Singapore. No one has the monopoly on ideas and the public service may not always have the answer, or be the answer. We are constantly on the lookout for opportunities to crowdsource, consult and co-create—both within the service and with Singaporeans—as we shape our future together”.¹⁷

Work with Markets

A driving force behind Singapore’s urban governance approach has been the consistent emphasis on improving the efficiency of public service delivery by leveraging market forces as much as possible while avoiding the pitfalls of market failure.

This requires careful balancing between the competing demands of a diverse stakeholder community. While the government can level the playing field and provide an environment for entrepreneurs to earn decent profits, it also has to enforce regulations on businesses to ensure that the costs of externalities are not unfairly borne by society, that there is

sufficient competition in the marketplace to protect the interests of consumers, and that appropriate interventions are made where the market has failed—to ensure that public interest is upheld.

Public housing is one example where the government has applied market principles to ensure effective public service delivery. Public housing is subsidised through the mechanism of pricing flats below market value to promote the social goal of home ownership, thereby increasing the sense of belonging to Singapore; and ensuring the affordability of public housing. New flat buyers pay different market prices which are determined by the location, floor level, orientation, design and size of their properties. This market subsidy approach is more equitable for flat buyers as it recognises the variable market values of individual properties.¹⁸



Singapore's water policies also benefit from the application of market principles, namely: not subsidising water consumption, pricing water to reflect its true value and working with the private sector to exploit technology to produce alternative sources of potable water in a cost-effective manner. Thus, even though Singapore is one of the most

water-stressed places in the world, it continues to maintain access to adequate supplies of potable water. This is the result of consistent investments in water treatment and reclamation technologies and infrastructure, appropriately scaled to make water affordable but without subsidising consumption and encouraging a culture of prudent water use.¹⁹



On its own, the free market will worsen inequalities. [W]e believe in free markets but active government intervention where markets fail, together with personal responsibility and a supportive community.

—Desmond Lee,
Second Minister for National Development²⁰

Governing for the Future

When Singapore was thrust into independence, there was little inkling of what the future might hold. The foremost need was to make this small new island nation work and thrive. It was a time for action rather than reflection. There was no room to systematically formulate and codify principles of governance. It is only later, with a proven track record of success, that Singapore's public sector sought to document our experiences and hard-won lessons, and to codify the principles that have guided Singapore's integrated planning and development and approach to dynamic urban governance. Our current landscape is one of a more

diverse population, in which the interests of a complex network of stakeholders intersect, cross-cut or even compete. At the same time, we need to engage with a rapidly changing world where international rules that have provided stability since World War Two are being stress-tested or disrupted. In this context, a framework of principles for governance offers an anchor for us to frame, understand and approach change. But circumstances evolve, and new developments, including the technological and social, are overturning existing models of doing things. Our approaches to nation-building must continue to evolve with the shifting political and economic landscape, even as we adhere to the core values of integrity, service and excellence that ground and guide us in a volatile world. ■

Notes

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9. Sunanda K. Datta-Ray, *Looking East to Look West: Lee Kuan Yew's Mission India* (Singapore: Institute of Southeast Asian Studies, 2009), 134.
10. Lim Hng Kiang, Interview by the Centre for Liveable Cities (unpublished transcript), 13 April 2012.
11. See Michael Barr, "Beyond Technocracy: The Culture of Elite Governance in Lee Hsien Loong's Singapore", *Asian Studies Review*, 30, 1, March 2006, 1-17; and Gary Rodan and Kanishka Jayasuriya, "The Technocratic Politics of Administrative Participation: Case Studies of Singapore and Vietnam", *Democratization*, 14, 5, December 2007, 795-815. *The Economist* referred to Singapore as "the best advertisement for technocracy". See "Minds Like Machines", *The Economist*, 19 November 2011.
12. See Han Fook Kwang, Warren Fernandez and Sumiko Tan, eds., *Lee Kuan Yew: The Man and His Ideas* (Singapore: Straits Times Press, 1998), 92; Neo Boon Siong and Geraldine Chen, *Dynamic Governance: Embedding Culture, Capabilities and Change in Singapore* (Singapore: World Scientific, 2007), 323.
13. For more information on the Singapore Public Service's talent recruitment, development and retention efforts, see Neo and Chen, *Dynamic Governance*, chapter 7.
14. Singapore's land area has increased since independence through land reclamation from the sea.
15. See Singapore Infopedia, "Area Licensing Scheme", accessed 13 June 2018, http://eresources.nlb.gov.sg/infopedia/articles/SIP_777_2004-12-13.html.
16. For example, the Municipal Services Office's OneService mobile application allows citizens to provide prompt feedback on municipal issues and makes it more convenient for them to access municipal services. The Land Transport Authority's Beeline public transport application aggregates data on commuters' transport needs and feed these to transport operators to consider providing a new service to plug the gap. The code for Beeline has been made open source since October 1, 2017 to further encourage community innovation.
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INTEGRITY:

FUNDAMENTALS FOR SINGAPORE'S GOVERNANCE SUCCESS

by Ng Li Sa, Ong Toon Hui and
James Wong

More than just creating honest, clean government, integrity as wholeness and working together as one united Service will ready Singapore for the future.



Ng Li Sa is Director of the Public Service Commission Secretariat.

Ong Toon Hui is Secretary of the Public Service Commission. She is concurrently Deputy Secretary (Leadership), Public Service Division and Dean & CEO, Civil Service College.

James Wong is immediate past Secretary of the Public Service Commission. He is currently Deputy Secretary (Land & Corporate), Ministry of Transport.



ver the past five decades, Singapore has made good use of its physical and environmental resources to achieve its national outcomes of having a competitive economy, sustainable environment and high quality of life.¹ However, the best of plans can only be realised if certain conditions in the national environment are met. Without these, good plans may never see the light of day; projects may get derailed or mismanaged; a city might grow, but in a haphazard manner, hostage to the vagaries of human greed and ambition.²

Integrity as Honesty: Establishing the rule of law and a corruption-free government

The foundational condition which allowed independent Singapore's urban development plans to bear fruit was the establishment of the rule of law. Singapore in the 1950s and 60s was rife with crime, disorder, and corruption. Moving from that to a society where people submit to the authority of the law, rather than having arbitrary decisions of individuals hold sway, was not, by far, the natural inclination of the system: it took a costly and intentional shift.

Since the very beginning of Singapore's independence, the ruling People's Action Party (PAP) has staked its reputation on running a clean and honest government, free of corruption. Rooting out corruption was crucial in establishing the rule of law; for this, political will at the highest levels was vital. Through the decades, the PAP government has been consistent in its absolute intolerance for corruption. Early on in Singapore's independence, the Corrupt Practices Investigation Bureau (CPIB) was strengthened with new legislation, giving CPIB officers additional powers to investigate and arrest. Penalties for corruption were also increased, such as mandating the repayment of bribes as fines. To signal the importance placed by the political leadership on anti-corruption efforts, the CPIB reports directly to the Prime Minister as a matter of practice. No one is above the law, no matter their status. Cabinet ministers have been successfully tried for corruption, alongside rank-and-file public officers. Punishment has been and remains swift, serious and public.

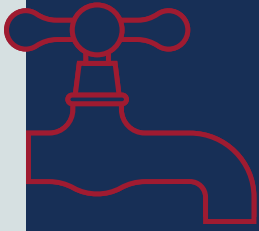
Not Swayed by Status



In 1970s, Wee Toon Boon, then Minister of State for Environment, was found to have used his ministerial status to favour a property developer. In return, he had received property, a free trip and funds amounting to over S\$800,000. Wee was charged in 1975 and later convicted for corruption.

In late 1986, then Minister for National Development Teh Cheang Wan was investigated for accepting bribes amounting to S\$1 million, in return for helping property developers to retain or acquire state land. Teh initially denied wrongdoing, but later tried to strike a bargain with the CPIB and even sought to meet then Prime Minister Lee Kuan Yew—who rejected his request. Days before he could be formally charged in court, Teh took his own life, and left behind a letter expressing his remorse. A Committee of Inquiry later concluded that the CPIB had uncovered misdeeds which would have remained unknown if not for the thoroughness and diligence of their investigations.

On the conviction of high-profile political leaders, the late Mr Lee Kuan Yew commented, “It is easy to start off with high moral standards, strong convictions and determination to beat down corruption. But it is difficult to live up to these good intentions unless the leaders are strong and determined enough to deal with all transgressors without exceptions. CPIB officers must be supported without fear or favour to enforce the rules.”³



The Largest Graft Amount in Singapore History



In 1994, the CPIB started investigating the case of Choy Hon Tim, a former Deputy Chief Executive (Operations)

of the Public Utilities Board (PUB) who was found to have accepted bribes to assist a sub-contractor doing work for PUB, on several occasions. Choy Hon Tim fled the country, but was eventually brought back to Singapore and charged on 27 October 1995 for criminal conspiracy and accepting bribes totalling around S\$13.85 million. He was sentenced to prison for 14 years.

To date, the total sum Choy received remains the largest total amount of bribe monies received by a public official in Singapore's history.

Maintaining integrity in Singapore in general, and in the civil service in particular, was never just a matter of going on the offensive against corruption, but also about looking to the constructive task of institution-building. Since its formation in 1951, the Public Service Commission (PSC) has been the custodian of the values of integrity, impartiality and meritocracy for the Public Service. As an independent and neutral body, overseeing appointments promotions and discipline within the service, the PSC plays a key role in ensuring that the civil service remains both clean and effective. Then Deputy Prime Minister and Finance Minister Lee Hsien Long summed it up thus:

"The PSC is a critical component of the civil service system. It is basically there to guarantee the integrity of the civil service. It is there to give the reassurance to the public that the civil service is being properly managed. That there is no nepotism, no monkey business going on. And it gives the reassurance to the civil servants that their position is secured and they won't be subject to political interference."⁴

Maintaining integrity is also about looking to the constructive task of **institution-building.**

Another aspect of integrity is **intellectual honesty**. This means looking problems in the face and solving them, not based on ideology, but on a hard-nosed assessment of the likely results.

Integrity as Intellectual Honesty: Nurturing good habits in policymaking

The founding generation of political leaders left a deep impression on the culture of the public service. In the first instance, integrity was understood as honesty and incorruptibility. But when speaking of a culture of integrity which enables good governance, we must not forget that habits of mind are also a manifestation of that culture. Another aspect of integrity, when applied to policymaking, is intellectual honesty. This means looking problems in the face and solving them using policies chosen not based on ideology, but on a hard-nosed assessment of the likely results. When pursued as a consistent practice, this manifests as an unsentimental pragmatism.

In Singapore's history and in the minds of our founding generation of leaders, this results-oriented approach to policymaking was linked to the drive for clean and honest government and

against corruption: a pragmatic focus on results would lead to the efficient provision of services to the public. This in turn would remove the incentive for corruption—if citizens could consistently enjoy efficient and effective services, then there would be no need to resort to bribery to get things done. This approach to policymaking, variously described as rational, pragmatic, unsentimental, and results-oriented,⁵ has become a hallmark of the Singapore Public Service's approach to governance.

An extension of this results-oriented approach to policymaking is the habit of “thinking again” both successes and failures in public policy, and being willing to confront the performance, either good or bad, of existing policies—so as

Intellectual honesty can only bear fruit where there is **courage to speak.**

to rework them to obtain better results.⁶ Intellectual honesty can only bear fruit where there is courage to speak. Thus willingness to speak truth to power is also part of the public service's culture of integrity, carefully nurtured over the years. Once a policy is decided, working with the elected government to serve the people of Singapore and shape Singapore's future means that civil servants will put their full efforts behind implementing the policy well. But in the preceding process of formulating policy, civil servants are encouraged to speak their minds as they develop options, robustly defend their divergent views, and push options which their supervisors may well disagree with. We believe that the best ideas surface when our diverse, 145,000-strong Public Service are empowered to speak and make a difference to policy directions.

Integrity as Wholeness: Moving into the future as One Public Service

Singapore has earned its international reputation for clean government. Based on available anti-corruption metrics, Singapore is doing well.

At the same time, there is a global trend of declining public trust in governments, with growing distrust of elites. In the 2018 Edelman Trust Barometer, the global level of public trust in governments was only 43%; Singapore was one of only a handful of countries classified by Edelman as enjoying high trust.

To maintain public trust in a shifting and increasingly complex environment, the Public Service cannot simply continue to do only the same things it has always done, in the same way it has always done them. Peter Ho, former Head of Civil Service and current senior advisor to the Prime Minister's Office, recently observed that the balance of public trust has shifted away from institutions and towards individuals, as people choose to believe peers in their social circles rather than experts or the authorities.⁸

In such an environment, ensuring that the government has the institutional and legal safeguards in place robustly to refute falsehoods is only one part of the answer.⁹ A second, equally important part has to do with the *how*

Singapore ranked:

- **6th among 180 countries** in Transparency International's 2017 Corruption Perceptions Index;
- The **least corrupt country in Asia**, in the Political and Economic Risk Consultancy's 2017 Report on Corruption in Asia;
- **4th for Absence of Corruption**, and top Asian country, out of 113 nations in the World Justice Project's 2017-2018 Rule of Law index.⁷

of delivering public services. We must ensure that the Public Service is prepared to function less hierarchically and more transparently in an environment of greater contestation and scrutiny. It must learn to gain trust by sharing information and sometimes admitting to not knowing, even as it continues to serve citizens with heart—with passion, empathy and care. To engage in transformational change while maintaining our bearings, remaining connected to our values is key. To this end, the Singapore Public Service's core values of integrity, service and excellence must continue to guide all aspects of our work even as we transform *how* we do that work.

As technology accentuates the complexity of cities as systems, every government must confront complexity well in order for their country to flourish. Governments that make the effort to understand and manage complexity will gain a competitive advantage.¹⁰ But how is a government to do this?

We have looked at integrity as honesty—in the form of clean government, and in terms of intellectual honesty when faced with policy problems. Another aspect of integrity is wholeness, undividedness. This is particularly key in a constantly changing and complex operating environment where the Public Service needs to organise itself to respond nimbly to changing circumstances. One of the mantras of Singapore's Public Sector Transformation¹¹ effort is accomplishing the Singapore agenda as One Public Service. The idea is that, in every aspect of building Singapore, the Public Service will emphasise alignment across all public agencies as

One Public Service, so that our efforts are coordinated and not fragmented. In a complex world where everything is interconnected, and interdisciplinary collaboration is essential for solving the big urban challenges of the day, whole-of-government, integrated policymaking and implementation has become an imperative and an essential antidote to the dangers of reductionism.

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This is not just relevant to urban governance, but also has broader application to all sorts of modern problems. Whether it is confronting terrorism, or regulating airborne personal vehicles or thinking about the ethics of regulating autonomous vehicles, many modern challenges fall outside existing organisational boundaries; they tend to involve multiple dimensions—security, social, economic. Seamless whole-of-government coordination gives us our best chance of addressing these challenges well. The One Public Service, whole-of-government philosophy of the Singapore Public Service is an important competitive advantage for getting Singapore ready for the future.

A vivid picture of this can be seen in the nationwide 3D mapping initiative, led by the Singapore Land Authority but involving multiple agencies—PUB, CAAS, GovTech, NParks, and URA. This project put together the most comprehensive geospatial dataset ever collected in Singapore, including buildings, roads, terrain, water bodies, vegetation, tunnels and bridges. The comprehensive 3D map data has provided a rigorous geospatial foundation for policymakers to develop solutions for complex urban challenges more effectively, and has applications in flood management, flight planning and airspace safety assessment, tree management as well as applications in studying potential solar energy harnessing, among others.

Going digital to the core is a key part of the Singapore Public Service's transformation plan. Our goal of making Singapore a **Smart Nation** has widespread implications for the practice of governance.

Ongoing Transformation: Going Digital

The rapid advance of technology has fundamentally changed the nature of service delivery. Every public agency is having to think again about what it means to serve citizens. Going digital to the core is a key part of the Singapore Public Service's transformation plan. Our goal of making Singapore a Smart Nation has widespread implications for the practice of governance. With sharing data across the Public Service as the default practice, and by fully exploiting available data for the good of the citizen, initiatives like Moments of Life—a digital platform that anticipates when citizens require government services based on significant events at different life stages—become possible.¹² Services that used to be bricks-and-mortar infrastructure affairs, such as housing the population, will need to be part of an integrated suite of anticipatory services offered to citizens at appropriate junctures.

This is a departure from traditional approaches, where agencies dealing with urban development have tended to be single-issue focused. The Housing and Development Board, for instance, was set up to tackle the issue of housing Singapore's growing population, in the early days of independence. Re-conceiving of its mission as just one piece of the wider goal of serving every citizen through his/her different stages of life is a transformation, a re-imagining of how we should serve citizens—when we put them at the centre.

With the conviction that rigid and siloed thinking is fatal in a complex and changing world, the Singapore Public Service will need to continually demonstrate our willingness to review rules and processes to facilitate progress, even as we preserve our commitment to clean government.

Both aspects of integrity—integrity as honest, clean government, and integrity as wholeness and making progress as one unified Service—must be upheld, in order for our Public Service to succeed in its mission of serving Singapore with excellence into the future. ■

Notes

1. *Liveable & Sustainable Cities: A Framework* (Singapore: Centre for Liveable Cities and Civil Service College, 2014): 8–11.
2. Points made in the discussion of the five implicit principles of dynamic urban governance, in Chapter 3, “Urban Governance: Foresight and Pragmatism”, *Liveable & Sustainable Cities*, 101–74.
3. Lee Kuan Yew, *From Third World to First—The Singapore Story (1965–2000): Memoirs of Lee Kuan Yew* (Singapore: Singapore Press Holdings and Times Edition, 2000).
4. Warren Fernandez, *Without Fear or Favour: 50 Years of Singapore’s Public Service Commission* (Singapore: Times Media Private Limited for the Public Service Commission, 2001): 14.
5. Neo Boon Siong and Geraldine Chen, *Dynamic Governance: Embedding Culture, Capabilities and Change in Singapore* (Singapore: World Scientific Publishing Co. Pte. Ltd., 2007): 166.
6. The terminology of “Thinking Again” is Neo Boon Siong’s and Geraldine Chen’s, in their study of the Singapore model of governance. They define this as “the capability to confront the current realities regarding the performance of existing strategies, policies and programmes, and then to redesign them to achieve better quality and results.” See Neo and Chen, *Dynamic Governance*, p. 35.
7. Ng Huiwen, “Singapore ranked 6th among 180 countries in 2017 corruption perceptions index,” *The Straits Times*, 22 February 2018, accessed 23 Mar 2018, www.straitstimes.com.
8. Yuen Sin, “Balance of trust tilts more towards individuals today, says former civil service head Peter Ho,” *The Straits Times*, 6 February 2018, accessed 23 March 2018, www.straitstimes.com; Peter Ho, “When public trust is no longer centred on the government”, *Today Online*, 8 February 2018, accessed 23 March 2018, www.todayonline.com.
9. The Singapore Parliament resolved to set up a Select Committee on Deliberate Online Falsehoods to study the phenomenon of using digital technology to deliberately spread falsehoods online, and also to report on how Singapore can prevent and combat these, including specific measures such as legislation. For more information, see www.parliament.gov.sg/sconlinefalsehoods. Accessed 23 March 18.
10. A point made by Peter Ho, in the first of four IPS-Nathan Lectures, 5 April 2017, “Lecture 1—Hunting Black Swans & Taming Black Elephants: Governance in a Complex World”.
11. Public Sector Transformation refers to a movement within the Singapore Public Service, led by its collective leadership, to transform the Public Service to enable the Singapore agenda, by making the Service lean, agile and digital to the core, with skilled and adaptable leaders and officers, leading globally in service delivery and innovation.
12. GovTech Singapore, accessed 26 March 2018, www.tech.gov.sg.





Connecting to the World: SINGAPORE AS A HUB PORT

by Christl Li

Singapore's success as a major global maritime hub is the result of bold vision, national determination, and assiduous planning.



Christl Li is Senior Manager at the Port Policy Division of the Maritime and Port Authority of Singapore. She was formerly with the Sea Transport Division at the Ministry of Transport.

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rom its establishment as a British trading post in the early 19th century to its growth into a global transshipment hub, the development of Singapore's port has been synonymous with the modern history of the island city-state, and the foresight exemplified by its leaders.

The decision taken in 1969 to build Singapore's first container terminal in Tanjong Pagar propelled Singapore from a small port into the global league. Singapore was the first country in Southeast Asia with a container port, which has since grown to become one of the busiest and most connected in the world, with links to more than 600 ports across 120 countries worldwide. Annually, more than 130,000 ships call at Singapore.

While Singapore's geographical location at the crossroads of important trade lines has been favourable, its pre-eminence as a global hub port has not been by chance. Strategic vision and leadership, with the courage to make bold decisions, have been vital in enabling Singapore to stay ready for the future, be a pace-setter, reap first-mover advantages, and thrive in a dynamic global industry.

ABOUT MARITIME SINGAPORE



WORLD'S BUSIEST
CONTAINER
TRANSHIPMENT HUB



IN 2017, VESSEL ARRIVAL
TONNAGE REACHED
2.8 BILLION GT



SUPPLIED
50.6 MILLION
TONNES OF
BUNKER IN 2017



MORE THAN
5,000 MARITIME
ESTABLISHMENTS



APPROXIMATELY **1,000 SHIPS**
IN THE PORT OF SINGAPORE
AT ANY ONE TIME



THE SINGAPORE REGISTRY
OF SHIPS (SRS) IS AMONGST
THE WORLD'S **TOP 5 LARGEST**
SHIP REGISTRIES

Vision and Decisiveness: Staying ahead of the curve

In the 1960s, containerisation disrupted the shipping industry—much like how online shopping and third-party hailing apps disrupt the retail and taxi industries today. But the 1969 decision to build a container terminal in Singapore was a huge risk.

At that time, it was unclear whether there would be demand for container shipping along the Europe and Far East route that Singapore served. However, the alternative was an even bigger risk: becoming obsolete and irrelevant if container shipping were to become the prevailing mode of transporting cargo by sea.

Singapore's first container terminal at Tanjong Pagar, which opened in 1972, allowed us to catch the wave of containerisation before the rest of the region. Had we waited for containerisation to take off before making the infrastructural investment, we would have lost this first-mover advantage.

Key Elements of a Successful Port

Singapore's strategic vision for its port has been about ensuring the 3 Cs of Connectivity, Capacity, and Competitiveness.

Connectivity is a measure of the frequency and range of feeder and deep-sea connections. Connectivity is key for shippers, and Singapore

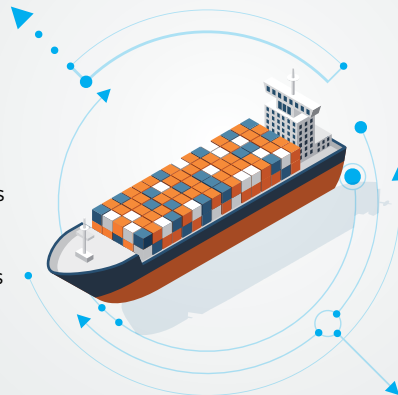
offers a high level of connectivity as the primary transshipment hub in the region. By anchoring key shipping lines and alliances that ply the main shipping route from Asia to Europe, and establishing a strong complementary feeder network to smaller ports in the region, Singapore has built up a reliable and densely connected network. We are able to handle increasingly fragmented and dispersed connections across shipping lines and feeders.

TRANSHIPMENT OPERATIONS: Complexity, Scale and Connectivity

A vessel calling at Singapore can receive connections from up to 200 different vessels, with less than five boxes per connection. This high degree of network connectivity can only be achieved with scale (i.e., capacity).

LOAD 1600 BOXES FROM 200 VESSELS

- >100 boxes from 0 carriers
- 51-100 boxes from 7 carriers
- 31-50 boxes from 4 carriers
- 11-30 boxes from 24 carriers
- 6-10 boxes from 27 carriers
- <5 boxes from 144 carriers



DISCHARGE 1900 BOXES TO 100 VESSELS

- >100 boxes to 2 carriers
- 51-100 boxes to 6 carriers
- 31-50 boxes to 7 carriers
- 11-30 boxes to 25 carriers
- 6-10 boxes to 14 carriers
- <5 boxes to 46 carriers

Long-term, strategic port planning must ensure that the port can provide adequate **capacity** to meet the demands of key shipping lines and their alliance partners in sizeable blocks of volume. This means being able to berth their vessels and conduct cargo operations efficiently. Scale, and the availability of space to grow the port, are essential for retaining Singapore's edge in connectivity

and network strength. Shipping lines prefer partnering with ports that can accommodate their long-term growth plans. Adequate port capacity and operational capability to keep pace with shipping lines' demands provide certainty and distinguish Singapore's port. Together with Singapore's competitive advantage in connectivity, assurance of capacity goes a long way in helping PSA

to ink new joint ventures¹ with leading shipping lines and secure long-term commitments in Singapore.

Creating value for key stakeholders² or bettering our business proposition (e.g. by leveraging technology to deliver more efficient service) is vital to sharpening **competitiveness**. Singapore's value proposition is that of a "catch-up port" that offers shorter transit times and enables vessels to make up for delays upstream. Delivering efficient service in an optimum manner helps shipping lines reduce costs. To this end, Singapore has continually invested in technology and innovation to extract productivity gains and enhance our competitiveness.

Catering to Growth

The decision to expand Pasir Panjang Terminal in 2004 provided the necessary capacity to cater to growth in container throughput.

With this, Singapore has been able to maintain its position as the world's leading transshipment port. In addition, it has enabled Singapore to anchor global shipping lines such as China's Cosco and France's CMA CGM, both of which have joint-venture agreements with PSA to operate berths at Pasir Panjang Terminal.

Building Capacity in Tandem with Demand

Pasir Panjang Terminal (34 Million TEUs Capacity)



Source: Photo courtesy of PSA Corporation Ltd

City Terminals (16 Million TEUs Capacity)



Source: Photo courtesy of PSA Corporation Ltd

Tuas Terminal (Up to 65 Million TEUs Capacity)



First berths operational in 2021

Source: MPA

Benefits of Port Consolidation and Expansion

- Provides assurance to shipping lines that their growth can be accommodated
- Eliminates inter-terminal haulage
- Clean slate to introduce new technology to improve productivity
- Frees up existing port land at prime location for re-development



New port cranes will allow for remote monitoring, supervision and control of up to 5 cranes.

Source: Photo courtesy of PSA Corporation Ltd

In addition, greater connectivity (i.e., more deep-sea and feeder connections from the port) enhances the product diversity that the port supports, adding value and improving competitiveness.

By offering top-notch productivity and unrivalled connectivity on an

By offering top-notch productivity and unrivalled connectivity on an unmatched scale, Singapore's port has become a critical nexus in the global sea-trade system.

New Systems

In place of conventional rail-mounted gantry cranes that are individually manned, PSA has introduced new systems at Pasir Panjang Terminal that enable a single crane operator to remotely monitor and control the operations of up to five cranes.

unmatched scale, Singapore's port has become a critical nexus in the global sea-trade system.³

Shipping Landscape Today

An increase in scale

Shipping alliances today have become larger as shipping lines consolidate. Shipping lines are deploying mega vessels⁴ (i.e., a vessel with a capacity in excess of 10,000 twenty-foot equivalent units, or TEUs) on

major trade routes. Underpinning these trends is the industry's belief that size and scale are prerequisites for survival, and that smaller players will be hard-pressed to out-price larger alliances. The increasing use of mega vessels and consolidation of shipping lines into ever larger alliances will accentuate peak volumes and increase the complexity of transshipment operations. An analogy would be a big group of diners showing up at a restaurant at the same time and demanding to be seated together. Consequently, a transshipment hub's ability to accommodate larger alliances and their more complex transshipment connections will be critical to its success or survival. Ports that fail to invest in capacity in anticipation of demand will find it challenging to deliver the high service levels that have come to be expected.

Digital revolution

Digital developments are poised to transform the entire global maritime industry, including the port. PSA invests in technology as a multiplier of capacity, to boost productivity and improve port operations. Aided by technology, advanced planning and optimisation of equipment deployment will facilitate the seamless transfer of containers from vessel to wharf, and then to truck and yard, and vice versa. Harnessing automation will also increase PSA's competitiveness. For instance, instead of prime mover drivers, automated guided vehicles (AGVs) will ferry container boxes around our port at the new Tuas Terminal.

For Singapore to stay ahead of the curve, flexibility and open-mindedness in enacting business-friendly regulations and experimenting with new ideas and

technologies are essential. For instance, the Maritime and Port Authority of Singapore (MPA) proactively experiments with digitalisation initiatives, adopting a "regulatory sandbox" approach in which trials with new technologies may be observed in controlled environments. This enables regulators to be up-to-speed when introducing new regulations and capturing first mover advantages. PSA and MPA have also established living labs to facilitate the test-bedding of new technologies, with a view to future large scale deployment at Tuas. These initiatives will help promote cutting-edge innovation and build up competencies in port development.

The Broader Economic Importance of Singapore's Port

Singapore is committed to sustaining the growth of our port because this is an industry critical to our economy.

Our leading position as an International Maritime Centre (IMC) is built upon our status as a top transshipment hub. Strong linkages and a high degree of complementarity between the port and the IMC mean that the port is the driving force behind Singapore's vibrant maritime sector and economy at large—it anchors shipping lines in Singapore. Once shipping groups establish operations in Singapore, there is a stronger impetus to shift their other functions and activities to Singapore too. By encouraging greater "stickiness" of shipping groups, the port has helped draw in other international maritime companies providing essential services to support the shipping lines. In turn, this has helped spawn a wider ecosystem of maritime service providers

including bunkering, shipbroking, ship finance, maritime insurance, as well as maritime law and arbitration, amongst others.

Beyond the maritime sector, the port also supports other industries. Our position as a leading transshipment hub and well-connected port anchors the growth of Singapore's logistics, manufacturing and wholesale trade sectors. As a hub port, Singapore is able to offer a high degree of connectivity and competitive shipping rates to an extensive range

Project SAFER

Given the need to ensure navigational safety as Singapore's vessel traffic grows, Project SAFER is a collaboration between MPA and IBM Research to develop and test-bed new analytics-based technologies to improve maritime and port operations.

The SAFER system can automate and increase the accuracy of critical tasks that formerly relied on human observation, reporting, Very High Frequency (VHF) reporting and data entry.

Examples include Automated Movement Detection and Utilisation Prediction.

For more information on Project SAFER, go to ETHOS online at www.csc.gov.sg/ethos.

Increasing Efficiency & Productivity

Better Use of Data Analytics



Predictive Maintenance

Higher Degree of Automation



Automated & Remote Yard Cranes

Source: Photo courtesy of PSA Corporation Ltd



Unmanned Automated Guided Vehicles

Source: Photo courtesy of PSA Corporation Ltd

of players across the logistics supply chain. Superior maritime connectivity supports the manufacturing sector by contributing to the ease and affordability of importing raw goods and exporting manufactured products. Access to the connectivity afforded by our port is a critical consideration in wholesale trade and logistics companies' decisions to be located in Singapore. Today, we see global shipping and logistics players tapping on Singapore as a base for regional operations.

The twin pillars of Maritime Singapore—our hub port and IMC—account for the lion's share of Maritime Singapore's 7% contribution to GDP and employ more than 170,000 people in Singapore. The port, in particular, is a source of good jobs for locals—the percentage of locals employed by the port sector is consistently higher than the national average. The percentage of locals in the port sector holding PMET (Professionals, Managers, Executives and Technicians) positions also far outstrips the national average.

Looking Ahead to Tuas

By the early 1980s, it was apparent that Singapore's first container terminal, Tanjong Pagar Terminal, would be operating at maximum capacity by the 1990s and would not be able to handle the envisaged growth in trade volumes. Beyond the City Terminals (Tanjong Pagar, Brani, and Keppel Terminals), plans were made for port expansion at Pasir Panjang. By 2000, Singapore's container throughput had reached 17.1 million TEUs. City planners were already looking ahead to the relocation of the container port as the next chapter in Singapore's maritime story. The decision to consolidate the

port at Tuas with a planned capacity of up to 65 million TEUs was made with an eye on the future. Having sufficient capacity in a single, contiguous location affords Singapore a critical competitive advantage—it provides greater economies of scale and also eliminates the need for inter-terminal haulage. In addition, the certainty of increased capacity at Tuas provides assurance to shipping lines and alliances that Singapore can accommodate their growth over the long term. This helps position Singapore's port more competitively amidst increased competition.

Anchoring Maersk to Singapore

The port played a significant role in anchoring the Maersk Group's shipping and related services in Singapore. Maersk started out using Singapore as its transshipment hub, subsequently expanded the breadth of its operations in Singapore, and eventually established its regional headquarters here. Today, Singapore is the Maersk Group's largest business operations centre outside Denmark, with about 650 employees. It performs global and regional functions for 13 business units that span the container, drilling, tanker, towage and salvage, and terminals business segments. Besides the port, the conducive business framework environment in Singapore is a key factor which contributes to its growth.



GOSHO—world's largest grab dredger currently deployed at Tuas for reclamation works

Source: MPA

Tuas Terminal is expected to be the largest container terminal in the world in a single location. It is designed with finger-shaped piers to yield higher capacity berths by maximising usable berth length and enhancing utilisation intensity. Beyond berth design, the construction of Tuas Terminal is also record-breaking in several aspects. For example, each of the caissons that form the permanent wharf structure is 28 metres tall (about 10 storeys high) and weighs the

equivalent of around 8,000 cars—these caissons designed for the first phase of

Unlike other ports that are completely out of bounds to the public, Tuas will incorporate elements of community integration.

Tuas Terminal are amongst the largest ever used in the world. In addition, the world's largest grab dredger, the GOSHO, has also been mobilised for reclamation works—it can fill an Olympic-sized swimming pool with just 15 grabs!

Productivity improvements in port operations are also critical to meet demand-side requirements (e.g., catering to mega vessels)

and address Singapore's perennial supply-side constraints (i.e., land and labour scarcity). Notably, large-scale deployment of AGVs as well as automated yard and quay cranes at Tuas Terminal, all of which would be remotely operated from a control centre, will improve port productivity.

PSA continues to harness data and technology to optimise turnaround times and facilitate just-in-time port calls, with a view to sustaining high berth and yard productivity. Today, PSA is already achieving higher and consistent berth productivity through intelligent planning and automation. PSA works with key customers to develop protocols for vessel stowage (placement of containers on vessels) to facilitate optimal container loading and discharging rates. Last but not least, PSA has also been actively working with planners of shipping lines to spread out cargo volumes such that more cranes can be deployed to minimise each vessels' turnaround time.

Given the scale and complexity of Tuas Terminal, the Next Generation Port 2030 (NGP 2030) Initiative is a multi-agency effort led by MPA to create an intelligent and sustainable port at Tuas

through improving space utilisation, land-use, productivity and efficiency.⁵ Unlike other ports that are completely out of bounds to the public, Tuas will incorporate elements of community integration. The Tuas Terminal gateway, which will be the interface between areas inside and outside the port, will be a multi-purpose complex with offices and even a maritime-themed visitors' gallery. Agencies are also working together to ensure accessibility for port workers to and from home to work.

Conclusion

Beyond our natural attributes, Singapore's development into a global hub port within our first 50 years of nationhood is no accident. The unparalleled scale and connectivity that we have assiduously cultivated, underpinned by solid operational capabilities, have enabled us to deliver compelling value to shipping lines. Forward-looking leadership, coupled with the courage to take bold decisions, will enable Singapore to continue capitalising on its hard-won advantages in this era of globalised competition between major hub ports to attract transshipment business. ■

Notes

1. For instance, PSA signed a joint venture agreement with CMA-CGM in 2016, while Cosco expanded its Singapore joint venture with PSA in 2017.
2. Key stakeholders include shipping lines, cargo owners, and freight forwarders.
3. The 2014 OECD report "The Competitiveness of Global Port-Cities" cited Singapore as the number one port in the world according to its three measures of "centrality" within the global sea-trade network.
4. The largest mega vessel today is the OOCL Hong Kong with a capacity of over 21,000 TEUs. Shipping lines have placed orders for 22,000 TEU containerships.
5. For the detailed infographic on the capabilities of Tuas Terminal, go to ETHOS online at www.csc.gov.sg/ethos.

Public Transport Planning

AND THE TECHNOLOGICAL REVOLUTION

by Lee Chuan Teck





A paradigm shift in public transport is on the horizon, but the right ecosystem of policies, regulations, infrastructure, and skills must first be in place.



As Deputy Secretary of Land and Corporate at the Ministry of Transport, **Lee Chuan Teck** oversaw the development of land transport strategies and policies, corporate communication and organisational matters, as well as the Futures Division which is spearheading the deployment of self-driving vehicles and drones in Singapore.

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ublic transportation has not undergone a technological revolution for more than a hundred years. The main modes by which we move within cities today have been around since the end of the

19th century. The first electric subway system started in London in 1890. The first motorised public bus service, with a capacity for six passengers, was launched in Siegerland, Germany in 1895. Taxis with distance meters were introduced in Germany in 1897. Over the years, these modes have proliferated and improved substantially—becoming more fuel efficient, more comfortable and less pollutive. However, the underlying technology—and importantly, the ways each of these modes are provided to and used by commuters—has remained largely unchanged. Consequently, the fundamental paradigms in transport planning have also remained largely intact.

The public transportation system is on the cusp of another technological revolution, enabled by the confluence of various digital technologies. Mobile connectivity now allows real-time information flow between commuters and transport providers in both directions. Smart algorithms can process this information

rapidly and generate schedules and routes of bus and train services dynamically to provide better and more targeted services, at less cost. Artificial intelligence reduces the need for human intervention, allowing public transport services to be provided more flexibly and efficiently. This article discusses some of the ways by which these technologies can free up traditional constraints and open up new possibilities in transport planning, along with some of the potential challenges that may arise.

Freeing the Routes and Schedule

Today, most public trains and buses run on fixed routes, schedules and capacities. Transport planners, typically through surveys, try to determine where and when commuters generally travel to or from. They then design routes and schedules so their limited transport resources can meet most of these needs. Once implemented, these routes and schedules are relatively rigid. Commuters will need to plan their day and

journeys around them. However, in so doing, the rigidity of a public transport system permeates through to the lives of commuters. The city marches to the beat of its bus and train schedules. Wealthier cities overcome this inflexibility by providing numerous routes that operate at very high frequency throughout the

The rigidity of a public transport system permeates through to the lives of commuters; the city marches to the beat of its bus and train schedules.





day. However, this is also not ideal as it can result in significant wastage of public transport resources.

With mobile technology and smart algorithms, on-demand public transportation is fast becoming a reality.

This year, we will be launching three on-demand bus services in Singapore. Through a smart phone, a commuter will indicate where he wants to be picked up and dropped off within a town area. The bus operator will use an algorithm to aggregate these demands and determine the number of buses to deploy and the routes they will take. The bus operator can thus avoid plying routes without commuters. Commuters will benefit from shorter waiting times and usually a more direct path to their destination. That said, some adjustment in behaviour is needed and we may need to ease commuters into this. Thus, we will be starting the trial during off-peak periods and will run some regular bus services along with the on-demand services.

With dynamic routes and schedules, we will also need to shift our mindset in transport planning. Instead of thinking about specific points of origin and destination, we will need to optimally determine geo-fenced areas, within which commuters usually travel. If the area is sized too small, there may not be enough commuters, especially during off-peak periods, to garner much efficiency. If

Fare structures may need to be more dynamic: less a fixed function of the distance travelled and more reflective of demand and supply conditions.

the area is too large, commuters may have to endure long waiting times and circuitous routes. Transport planners may also need to rethink how they size their bus and train fleets. Rather than buy trains and buses that give them

maximum carrying capacity, they may want a mix that gives them maximum flexibility. Fare structures may also need to be more dynamic: less a fixed function of the distance travelled and more reflective of demand and supply conditions.

Autonomous Vehicles: Overcoming Manpower and Land Constraints

The race to develop a “Level 5” fully autonomous vehicle (AV) is gathering pace. In November 2017, Waymo, a subsidiary of Alphabet, announced that it had begun testing vehicles without a safety driver (a “Level 4” AV). Car and component manufacturers like General Motors, Delphi, Nissan and Daimler are following close behind. Industry experts project that a fully autonomous vehicle will be ready within the next 10 years. AVs will transform how we move people and freight. Their impact on the car industry and on public transportation will be profound.

AVs are particularly appealing to



Singapore because of our severe land and manpower constraints. The size of our bus and taxi fleet is limited by the number of drivers we can employ and the land take for roads, depots and car parks. AV technology removes the need for drivers. It can also increase the efficiency of road and parking spaces. Freight traffic can be shifted to night hours, thereby freeing up roads for human traffic in the day.

As AV technology advances, there should be a parallel effort to develop an effective ecosystem within which it can be deployed.

However, to maximise the benefits of AVs, we cannot simply drop them into existing regulations, operating models and infrastructure. As AV technology advances, there should be a parallel effort to develop an effective ecosystem within which it can be deployed. Recognising this, we started the Committee of Autonomous Vehicles (CARTS) in 2014 to bring together transport planners, city planners, traffic regulators and private companies to oversee and organise these efforts. We are developing a set of standards by which all new AV models must abide before they can be deployed on public roads. These standards will be scaled to cater to vehicles with different levels of sophistication—those which can meet the higher standards will be allowed to be used in more complex and crowded environments. We have also installed cameras and other sensors along the roads where AVs will be trialling. These, together with a mandatory “black box” in each

vehicle, will be useful for attributing faults in the event of accidents.

By the start of 2019, we will also be piloting a limited autonomous bus service on the island of Sentosa. This pilot will help us gain insights into how commuters, pedestrians and other road users respond to AVs. It will also help us develop an operating model for an AV fleet. One important area we will be studying closely is

how to incorporate a “man in the loop” to handle disruptions. From 2022, we will run a more extensive pilot in three new towns: Punggol, Tengah and the Jurong Innovation District. We envisaged two types of services: autonomous buses that run on scheduled routes and smaller on-demand shuttles. With feedback from AV developers, the town planners have incorporated some basic features, like AV charging spots and pick-up zones within the towns. This pilot will also try out new fare charging systems.

Narrowing the Gap between Private and Public Transportation

A key challenge of transport planning in large, metropolitan cities lies in managing the tradeoffs between private and public transportation. Private vehicles offer the most comfort and flexibility to commuters. Yet they result in huge



negative externalities for everyone else: congestion, noise, pollution and heavy usage of land for roads and parking. Many cities attempt to capture these externalities through vehicular taxes and charges. Some cities (e.g., London, Singapore) have used road-usage pricing; others (e.g., Beijing, Shanghai, Singapore) have rationed vehicle ownership. While these measures make the price of vehicle ownership more reflective of their true costs, the net effect is that commuters who cannot or would not pay these prices have to settle for less desirable public transport modes.

A common bug-bear of public transport is its inconvenience. A public transport journey usually comprises more than one segment: for example, a walk to a bus stop, then a bus trip to the train station, then the train journey, and finally a walk to the destination. Transport planners have sought to reduce this inconvenience by placing bus stops and train stations nearer to homes and linking walkways to them. In Singapore, we plan to have 8 in 10 households to be within a 10-minute walk to a subway station by 2030. Bringing transport infrastructure nearer to homes is an expensive endeavour. Technology now enables us to close the first-last mile gap and reduce the tedium of public transport in a more cost-effective manner.

Technology now enables us to close the last-mile gap and reduce the tedium of public transport in a more cost-effective manner.

Firstly, there has been a surge in the number of privately provided public transport modes. Bicycle-sharing operations are a good example of this. As recently as three years ago, bicycle sharing required expensive docks. These docks severely limit the scale of bicycle-sharing services and make them commercially unviable in less densely populated areas, where such services are most needed. The emergence of dockless shared bicycles, which are tracked via GPS technology, changed this entirely. In Singapore, the number of dockless shared bicycles rose from just 10,000 to more than

100,000 within a year. Some companies are thinking about extending these to shared e-scooters.

Even as new public transport services emerge, there is a parallel effort to "stitch" these services together. Mobility-as-a-Service (MaaS)

was first popularised in Finland. The idea was to allow a commuter to plan, execute and pay for different legs of a public transport journey with a single mobile app. This minimises hassle and waiting time, making a public transport experience very close to a private transport one.

From a transport planner's perspective, the growth of privately provided public transport modes not only enhances the commuting experience, but also expands the choices of public transport



commuters. This is a boon. However, it makes transport planning more complex. Travelling patterns are now less predictable. Commuter choices may change from day to day depending on,

say, the weather. There is thus a need to build a degree of flexibility in bus and rail capacity to cater to this. To understand commuter behaviour, we will also need a wider data pool: not only data from public train and buses, but also data in the private providers' realm. To facilitate MaaS, there may be a need to create an open fare-charging platform. The fare structure may also need to more dynamically manage changing demand and supply from day to day.

New Technologies, New Challenges

While the benefits from these new technologies are manifold, there are two key challenges that transport policymakers need to address. The first is the extent and nature of government involvement in these new technologies. Calibrating this incorrectly may inadvertently stifle innovation or lead to perverse outcomes. Our experience with dockless bicycle sharing is a case in point. When the bicycle sharing operations first emerged, they provided a good means to plug the first-last mile gap without the need for public funding or infrastructure. There was no need to regulate them. However, as the operations grew in size,

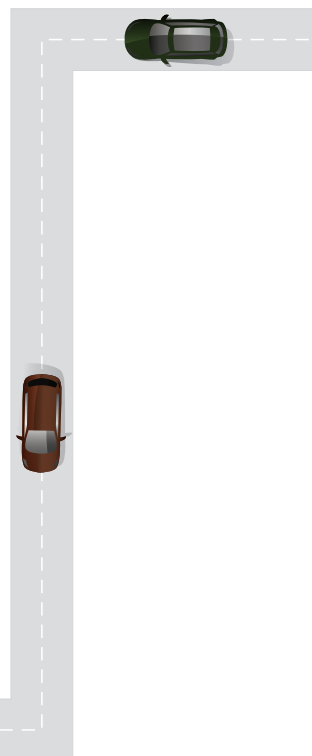
Calibrating government involvement incorrectly may inadvertently stifle innovation or lead to perverse outcomes.

as each bicycle sharing operator sought to gain market share by growing its fleet aggressively. As a result, we will be licensing bicycle sharing operators. A key principle in this licensing regime is that an operator will only be allowed to grow its fleet size if it can control the indiscriminate parking problem from its fleet. In response, the operators are now competing to develop new technologies to address this parking problem. We have thus better aligned the interest of the operators with public interest.

Other technologies require different types of government intervention. AVs, for example, require financial support and regulatory sandboxes to facilitate experimentation. MaaS relies on the provision of real-time transport data. To be sure, government involvement will evolve along with the advancement and application of the technology. To ensure that this involvement is appropriate, regular consultation with the industry and with fellow regulators abroad is critical.

The second challenge is ensuring that the labour force is adequately equipped to apply these technologies. In most cities, public transport typically employs a large number of people—from drivers

indiscriminate parking became pervasive. Bikes were strewn over parks and paths and public bicycle parking lots were overwhelmed by shared bikes. Left on its own, the situation was likely to worsen



In most cities, public transport typically employs a large number of people; retraining the workers will be an enormous undertaking.

to technicians and service staff. The technological revolution will redefine many jobs, in some cases drastically. For example, when autonomous buses are ready, bus drivers will no longer be driving buses. They may instead be trained to handle exceptions, such as when the autonomous buses break down, or commuter incidents. Retraining the workers will be an enormous undertaking. In Singapore, we have instituted a tripartite framework, involving employees, employers and the government to ensure that the public transport workforce is adequately trained to handle current and future technologies.

Conclusion

We are at an intriguing juncture in the public transport landscape. While emerging technologies offer unprecedented opportunities, we will also need to evolve our policies, planning and regulatory frameworks to harness the most benefits for commuters. This



Autonomous Vehicle (AV) test at Sentosa
Source: Ministry of Transport

process will necessarily involve some degree of trial and error. But without an appropriate ecosystem, such technologies will remain no more than an interesting curiosity. ■



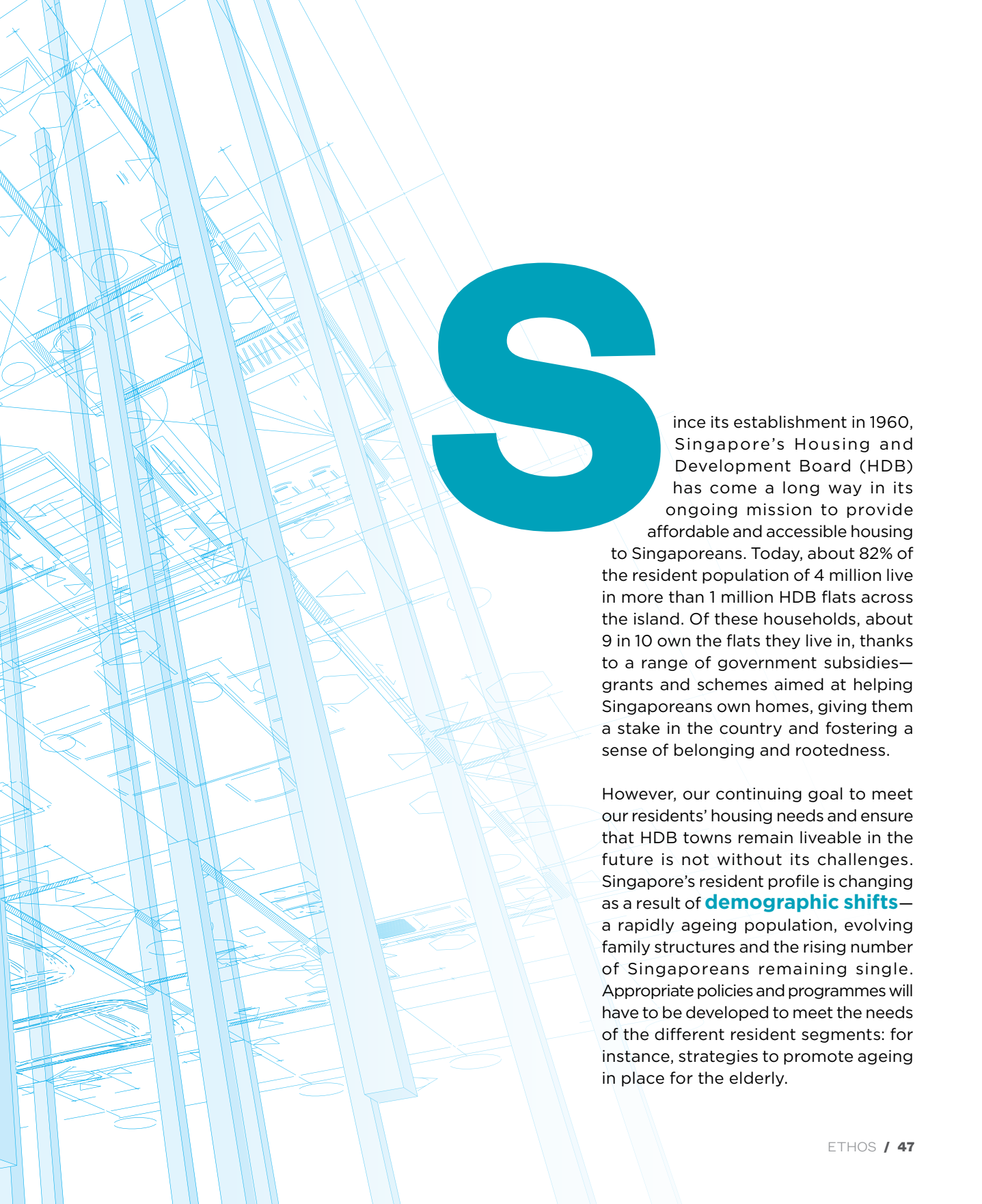
THE FUTURE OF HEARTLAND LIVING

by **Cheong Koon Hean**

Innovations in hardware and heartware shape the design of Singapore's next-generation residential towns.



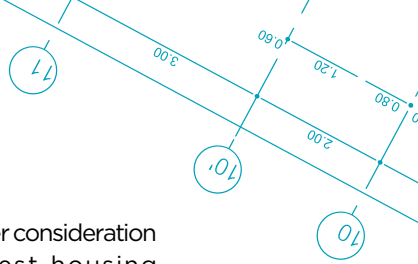
Cheong Koon Hean is currently CEO of the Housing and Development Board and previously CEO of the Urban Redevelopment Authority. Dr Cheong is on the National University of Singapore Board of Trustees, and is the Deputy President of the International Federation for Housing and Planning. In 2016, she became the first Asian to be conferred both the JC Nichols Prize for Urban Visionaries by the Urban Land Institute and the Lynn S Beedle Lifetime Achievement Award by the Council of Tall Buildings and Urban Habitat.



S

ince its establishment in 1960, Singapore's Housing and Development Board (HDB) has come a long way in its ongoing mission to provide affordable and accessible housing to Singaporeans. Today, about 82% of the resident population of 4 million live in more than 1 million HDB flats across the island. Of these households, about 9 in 10 own the flats they live in, thanks to a range of government subsidies—grants and schemes aimed at helping Singaporeans own homes, giving them a stake in the country and fostering a sense of belonging and rootedness.

However, our continuing goal to meet our residents' housing needs and ensure that HDB towns remain liveable in the future is not without its challenges. Singapore's resident profile is changing as a result of **demographic shifts**—a rapidly ageing population, evolving family structures and the rising number of Singaporeans remaining single. Appropriate policies and programmes will have to be developed to meet the needs of the different resident segments: for instance, strategies to promote ageing in place for the elderly.



There is now also a much more **diverse population** in HDB towns as we begin to see more inter-ethnic and transnational marriages as well as more new citizens. The complexion of our estates will evolve organically with these changes in social composition. The definition of “neighbours” must also include people connected through social media and not only by proximity. HDB plays a critical role in fostering social cohesion. We need to find ways to increase community connections and build a stronger community spirit so as to strengthen the sense of belonging and ownership of the living environment amongst our residents.

As a small city-state, Singapore is inevitably a **high density** environment. More than ever, planners and architects must find innovative planning and design solutions to ensure a pleasant living environment. Aspirations are rising and lifestyles changing. Many of our towns will mature and age over time. The cycle of improvements and rejuvenation that we have carried out since the 1990s will need to continue, subject to evolving needs and available resources.

Climate change is another consideration that HDB, as the largest housing developer in Singapore, will need to take into account—we must build in an environmentally responsible manner, ensuring that our towns are sustainable in an uncertain future.

Technology is set to disrupt the way in which we live, work and play: it should also prompt HDB to rethink the way we plan our housing estates and design for urban mobility. As the future of work and retail changes, we will need creative ideas to support residents and sustain the vibrancy of businesses and other activities in the town and neighbourhood centres. We can also harness technology to help us plan and maintain our estates better, achieve a car-lite environment, or introduce smart applications that can benefit our residents.

To address these emerging challenges, HDB has honed our housing policies and programmes to ensure that they remain relevant for future needs. We have also developed a roadmap for delivering a better living environment for our residents.

• We must build in an
• **environmentally responsible manner,** ensuring that our towns are sustainable in an uncertain future.

Proximity Housing Grant

In 2015, the Proximity Housing Grant was introduced to help extended families live closer together for mutual care and support. This was enhanced in 2018 giving a higher-tier grant to those who buy a resale flat to live with their parents or children.

Singles

In July 2013, the Single Singapore Citizen scheme was enhanced to allow singles to purchase a subsidised two-room flat in a non-mature estate directly from HDB. Previously, they could only buy flats from the resale market.

Two-room Flexi Scheme

The two-room Flexi scheme was introduced in 2015 as a new housing option to better cater to the diverse housing needs of families, singles and the elderly. It offers flexibility to home buyers through different lease tenures and a choice of fittings and finishes.

Evolving Housing Policies and Programmes

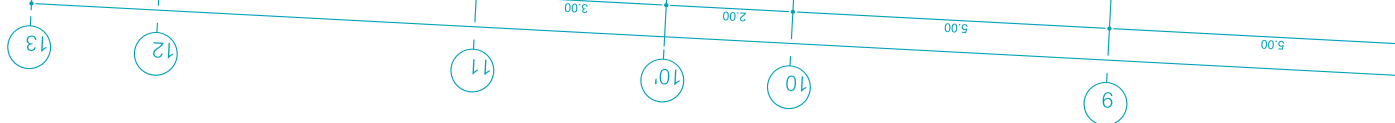
In recent years, HDB has enhanced or introduced new housing policies and programmes to cater to the diverse needs of different households, as demographics and lifestyles change.

Enhancement for Active Seniors (EASE)

The EASE Programme was launched in July 2012 to improve the safety and comfort of seniors living in HDB flats. Flat owners can choose from a range of government-subsidised elderly-friendly fittings to help the elderly move around the flat, such as grab bars, slip-resistant treatment to bathroom tiles and ramps. Flat owners pay only a small portion of the cost of these fittings.

Fresh Start Housing Scheme

The Fresh Start Housing Scheme was launched in 2016. It takes a targeted approach, helping second-timer public rental families with young children own a two-room Flexi flat so that they can start afresh in a new home. The scheme combines financial assistance with personal responsibility and social support.



A ROADMAP TO BETTER LIVING

In 2011, HDB announced its “Roadmap to Better Living in HDB Towns”, which would guide its development programmes over the next few decades. The roadmap aims to create:

- Well-designed Towns
- Sustainable and Smart Towns
- Community-centric Towns

Well-Designed Towns

As a master planner and developer, HDB takes a comprehensive approach in developing entire towns, not just housing alone. Over the years, town planning has evolved in tandem with changing socio-economic and demographic conditions, guided by a few principles:

a) Planning for Self-Sufficiency

HDB towns are developed as total living environments to meet people’s daily needs. Each town is reasonably self-sufficient. In addition to housing, residents are well served by shops, schools and social and recreational facilities.

b) The Neighbourhood Concept

At the heart of each town is the town centre: the key commercial and activity hub. Around it are smaller neighbourhoods of 4,000 to 6,000 units, each with its own shops, schools and parks. Each neighbourhood

further comprises precincts of about 400 to 800 units, served by a local shop cluster, precinct facilities (such as a playground) and a precinct green. Smaller and more intimate, walkable residential clusters of 1,200 to 2,800 dwelling units can be found in the newer towns, such as Punggol.

c) The Checkerboard Concept

Low-rise, low-intensity land uses such as parks and schools are juxtaposed with high-rise, high-density residential developments to achieve visual and spatial relief in our high-rise, high-density public housing environment.

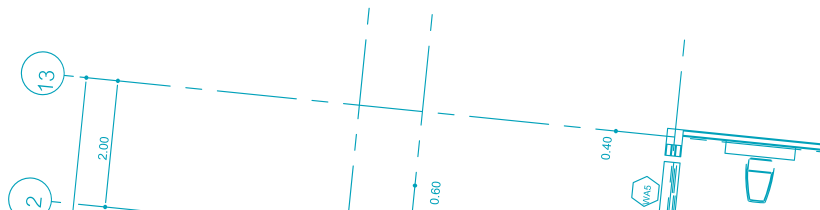
d) Hierarchy of Facilities

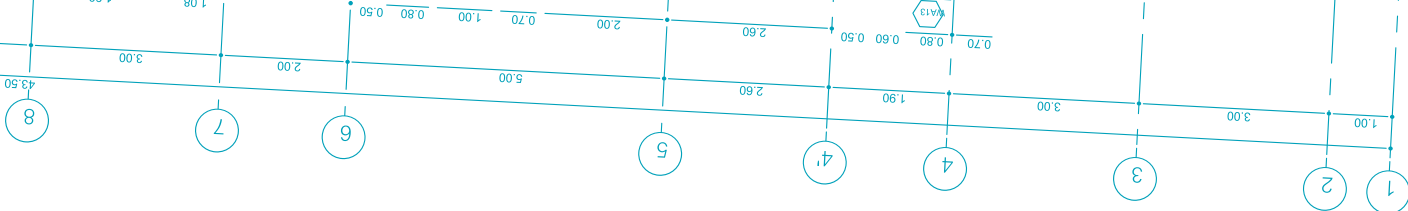
Larger facilities and amenities serve a wider catchment of residents, while smaller-scale amenities cater to localised day-to-day needs. The facilities at different levels include:

- At Town level—a town plaza, town park, sports complex, integrated transport hub and shopping centres.
- At Neighbourhood level—neighbourhood centres, schools and parks.
- At Precinct level—a precinct pavilion, 3-generational play and fitness facilities and community gardens.

e) Planning for Connectivity

HDB towns are well served by a mass transit network, highways and roads. This is now supplemented by more comprehensive cycling and pedestrian networks.





With the ramping up of the building programme in the early 2010s, HDB has taken the opportunity to plan and develop a new generation of public housing. Building on the principles above, we have formulated master plans for new areas of development like Bidadari, Tampines North and Punggol North, incorporating a number of fresh ideas:

a) **Focus on Quality Urban Design to Sculpt Distinctive Towns**

A key tool to shaping HDB towns is the use of urban design. In contrast to architecture, which focuses on the design of individual buildings, urban design deals with shaping a larger group of buildings, streets and public spaces at neighbourhood and district scale, with the goal of making better places for people.

● **HDB takes a comprehensive approach in developing entire towns, not just housing alone.**

b) **Develop Distinctive Districts and Neighbourhoods**

Heritage and place character will be capitalised on to create more distinctive identities and inform urban design for a new generation of towns, and in older estates being rejuvenated. The new building typologies provide a greater variety of designs to add more interest to the townscape, including courtyard and terrace designs, more intimate and lower slab blocks, juxtaposed with high-rises featuring sky gardens.

c) **Seamless Connectivity**

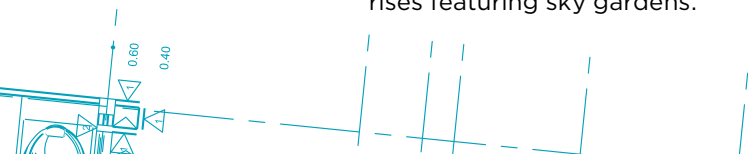
A car-lite environment will be encouraged through the use of public transport and pedestrian-friendly features such as connected paths and covered linkways. Where possible, new areas will be served by a good rail and bus network. Car-sharing schemes and the use of electric vehicles will be introduced where feasible. A comprehensive cycling network will be integrated with the towns.

d) **Living in Green to Mitigate High Densities**

Homes will be nestled within a garden as more tropical green and blue water elements are introduced in planning and design, relieving urban density. Blue elements, such as ponds and streams, are integrated with the landscaping. These elements will be multi-functional, collecting storm water while serving as aesthetic and recreational features.

e) **New Layouts for New Lifestyles**

Design details that can improve both functionality and aesthetics will continue to be incorporated in our flats. These include Universal Design features such as wider internal corridors and level floors which provide more convenience for the elderly and the disabled, and families with young children. Columns are positioned at the sides wherever possible, allowing residents more flexibility in reconfiguring the flat layout.



Sustainable and Smart Towns

In line with Singapore's commitment to reduce its carbon footprint, HDB carries out active research in a range of related domain areas, including social, economic and environmental sustainability. In 2011, we developed a comprehensive Sustainability Framework for Punggol Eco-Town. It features a variety of strategies from reducing carbon emissions to optimising the use of resources and achieving effective energy, water and waste management.

This is to provide a clean, safe, healthy and comfortable living environment for our residents.

HDB is also adopting innovations in information technology, the "Internet of Things" and big data to develop smarter HDB towns that are more sustainable, efficient, safe and liveable.

Since the 1990s, HDB has implemented various initiatives to upgrade housing precincts in the older towns and estates,

Smart HDB Towns

Working with industry partners and other government agencies, HDB is exploring technologies and urban solutions that could make HDB towns even more liveable, efficient, sustainable and safe.

Smart HDB Town Framework

Guided by the mantra "Smarter Towns, Better Living", the Smart HDB Town Framework comprises two key layers.

(1) Enabling Infrastructure that allows data connectivity and transmission. It includes a "sensing" layer (cameras, sensors, Internet of Things devices, etc.) which collects data to support analytics.

(2) Application and Services that help HDB serve residents better. These are grouped under five key dimensions:

- *Smart Planning*
Computer simulations and data analytics are used to improve the way HDB towns, precincts and buildings are planned and designed, and also to find optimal and cost-effective solutions.
- *Smart Environment*
This involves real-time sensing of the environment by linking HDB estates to a network of sensors that capture real-time information (e.g., temperature and humidity) within the town environment.
- *Smart Estate*
HDB leverages smart technologies to collect and analyse data so as to improve estate services, optimise maintenance cycles and pre-empt problems.

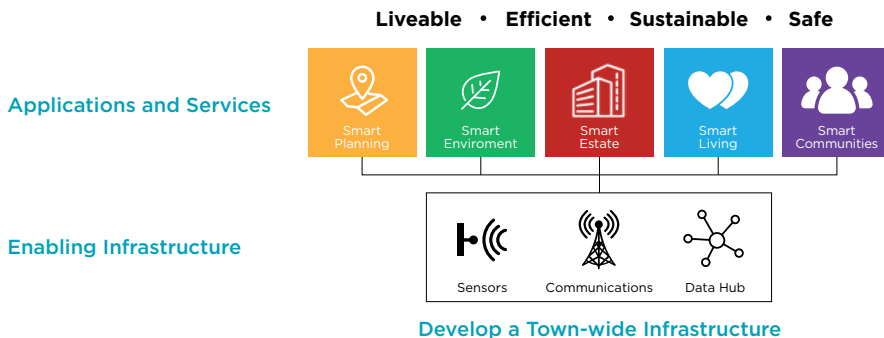
- *Smart Living*

HDB will build “smart enabled” homes by putting in place relevant infrastructure and standards. Residents can then tap on commercially-developed applications, such as smart elderly monitoring and utilities management systems.

- *Smart Communities*

Using information, communications and data technologies, HDB is able to better understand and engage residents, and empower communities to take more ownership in co-creating their living environments.

HDB's Approach Towards Smarter Towns



Source: HDB

Living Labs

New ideas and innovations are tested out in actual town settings. These living labs include Yuhua, where live-in residents provide feedback, response and usage data that help us calibrate solutions that meet their needs. Smart technologies, such as the smart car park management and smart irrigation, also enhance the urban planning and design for Punggol Northshore, one of seven waterfront housing districts planned in Punggol Eco-Town.

Smart solutions, like smart-enabled flats and smart lighting, are slated for wider-scale implementation in other Punggol developments.



The Neighbourhood Centre in Northshore, a smart and sustainable district in Punggol, will feature smart technologies.

Source: HDB



Environmental modelling is part of the Smart Planning process for Punggol, allowing HDB planners and architects to see the effect of urban design on environmental conditions.

Source: HDB

Bidadari

Bidadari Estate, in the central region of Singapore, features a unique site topography, history and identity. The estate is being developed into four distinctive districts complemented by a market square, with a range of facilities to serve residents' needs. Each district will incorporate new housing forms that respond to Bidadari's unique terrain and site characteristics:



Four distinctive districts in Bidadari
Source: HDB

For example, the Woodleigh district features a community of urban villages among lush rolling hills. In the Woodleigh Glen precinct, a Village Street located along an existing valley serves as a conduit connecting residents and linking to community spaces that flank the valley. Sky terraces open up views to the Bidadari Hill Park. To improve the design of the development, environmental modelling tools are used to simulate microclimatic

conditions such as wind flow, temperature fluctuations, and solar irradiance.

To recreate a sense of tranquility and recall memories of the former Alkaff Lake Garden in the area, a new Alkaff Lake will be created within the new Bidadari Park. The lake will also serve as a water retention pond.



Artist's impression of Woodleigh Glen
Source: HDB



Artist's impression of Heritage Walk
Source: HDB

A unique new feature of the estate is the Heritage Walk: the Old Upper Aljunied Road will be pedestrianised to preserve the canopy of mature trees. An existing Memorial Garden, which commemorates the heritage of the former Bidadari Cemetery and Singapore's prominent pioneers, will be integrated into Bidadari Park to bring the district's heritage closer to residents and visitors.



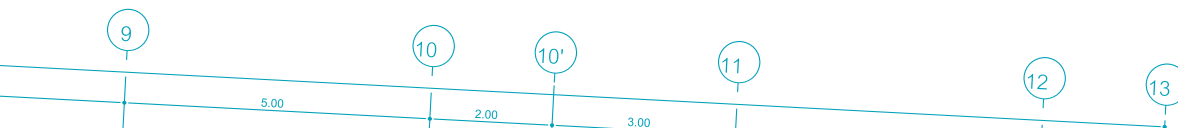
Perspectives of Remaking of Heartland 3
Source: HDB

bringing them to a standard closer to the newer ones. Such initiatives include the Main Upgrading Programme, Lift Upgrading Programme, Home Improvement Programme, Neighbourhood Renewal Programme and Selective En bloc Redevelopment Scheme. Beyond the upgrading and redevelopment of individual housing precincts, the Remaking Our Heartland (ROH) programme was launched in 2007 as a comprehensive blueprint to renew and further develop HDB towns and estates. For Woodlands, Pasir Ris and Toa Payoh—

the three towns announced in 2015 for ROH 3—a customised set of strategies was developed, taking into consideration factors such as local demographics, history, and the needs and challenges of each town. Residents and community stakeholders are actively engaged to seek their views and suggestions in drawing up these rejuvenation plans and proposals.

HDB also works with shop owners/tenants on the rejuvenation of retail shops through the Revitalisation of

• Such initiatives help to ensure the
• **social and economic sustainability** of our HDB towns.



HDB provides a living environment where Singaporeans of different races and socio-economic groups have opportunities to come together, mingle and bond as a community.

Kampung Admiralty



Kampung Admiralty

Source: HDB

Kampung Admiralty, an integrated development that caters to a range of diverse needs, is designed with seamless access to elderly housing and a wide range of facilities like childcare centres, a medical centre, active ageing hub, hawker centre and shops. There are also community spaces like the community plaza and community garden where residents of all ages can pursue their interests or participate in communal activities.

Shops Scheme. Under the scheme, co-funding and incentives are provided and promotional activities organised. In addition, with the increasing prevalence of online shopping, HDB has to consider ways to enhance the design of neighbourhoods to make them more delivery-friendly, like providing drop-off and parcel collection points at blocks and precincts.

Community-Centric Towns

With over 80% of Singapore's resident population living in HDB flats, public housing plays a crucial role in promoting social harmony in multi-racial, multi-cultural and multi-religious Singapore. To this end, we provide a living environment where Singaporeans of different races and socio-economic groups have opportunities to come together, mingle and bond as a community.

Community building is achieved through the provision of areas for the community to meet and mingle, like common greens, playgrounds and precinct pavilions. Residents can live, work and play while building ties. More community spaces to facilitate interaction and activities will be included in the planning of towns to support the flourishing of communities. "Community living rooms" located at void decks or landscape decks provide opportunities for residents to interact with each other. On a larger scale, partially covered plazas are provided at the town centre for group gatherings. HDB works with grassroots organisations to activate and improve the vibrancy of such spaces through systematic "place-making" programmes.

Beyond physical provisions, it is essential to nurture community spirit and foster social cohesion. Housing policies such as the Ethnic Integration Policy and Singapore Permanent Resident quotas help promote racial integration and a balanced mix among the various communities living in HDB towns. HDB also helps build "heartware" by organising community building programmes that would promote neighbourliness, expand residents' social network and provide opportunities for community participation. These programmes are guided by four goals: *Vibrant Neighbourhoods*; *Responsible Communities*; *Understanding, Trusting and Caring Neighbours*; and *Inclusive Communities*. Some of these programmes include: the annual HDB Community Week, Good Neighbour Award, MyNiceHome roadshows and Welcome Parties for residents who have moved into new housing developments.

CONCLUSION: NOT JUST HOUSING BUT HOMES & COMMUNITIES

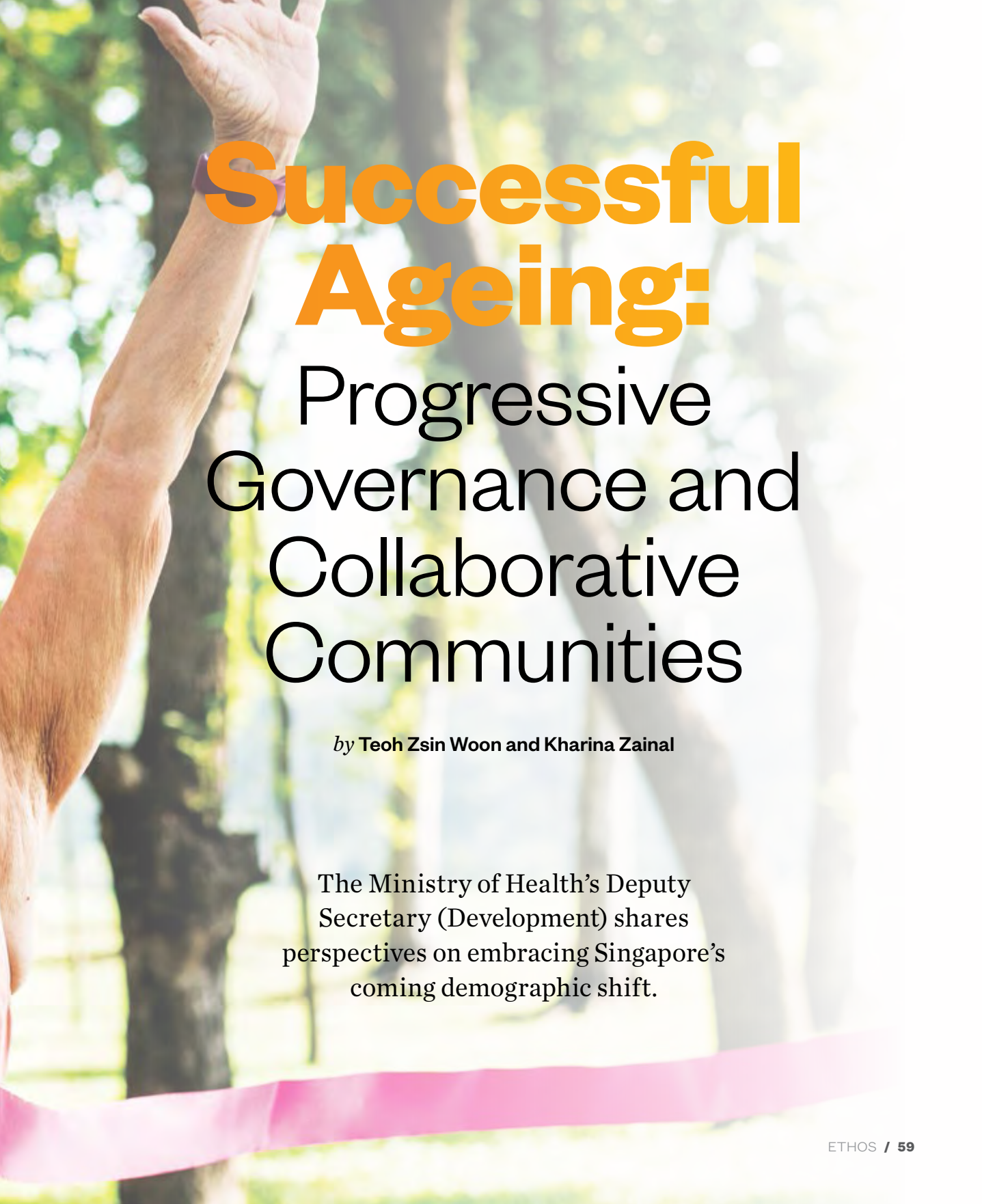
Since 1960, the public housing programme has not only provided homes for the people of Singapore but has also shaped the urban landscape. It has also served as a vehicle through which the fruits of Singapore's economic growth can be shared. Through the creation of a shared living experience, HDB has helped to build cohesive communities and fostered a sense of belonging and rootedness to Singapore. With greater innovation and more extensive stakeholder engagement, HDB looks to explore new frontiers in public housing, and co-create even better homes for generations to come. ■



Teoh Zsin Woon is currently Deputy Secretary (Development) in the Ministry of Health, overseeing the Ageing Planning Office, the Manpower Planning & Strategy Division, and the Infrastructure Planning & Policy Division. The Ageing Planning Office is secretariat to the Ministerial Committee on Ageing which maintains policy oversight over the Action Plan for Successful Ageing, a \$3-billion national blueprint to help Singaporeans age confidently and lead active lives, with strong bonds with family and community. It includes more than 70 initiatives covering 12 areas, namely, health and wellness, learning, volunteerism, employment, housing, transport, public spaces, respect and social inclusion, retirement adequacy, healthcare and aged care, protection for vulnerable seniors, and research.

Kharina Zainal is Principal Researcher at the Institute of Governance and Policy, Civil Service College. Her team studies issues of social policy development in Singapore. She is also involved in developing and facilitating programmes at the College. She adapted this article from an interview she conducted with Ms Teoh in April 2018.





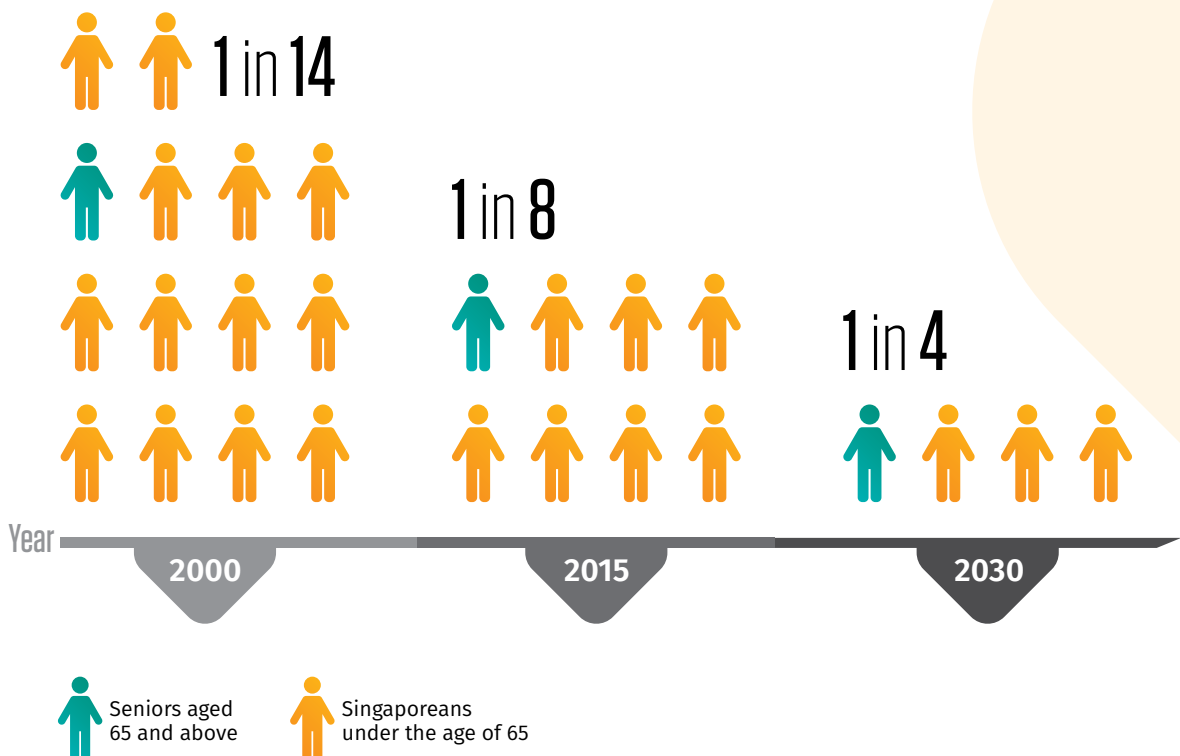
Successful Ageing: Progressive Governance and Collaborative Communities

by Teoh Zsin Woon and Kharina Zainal

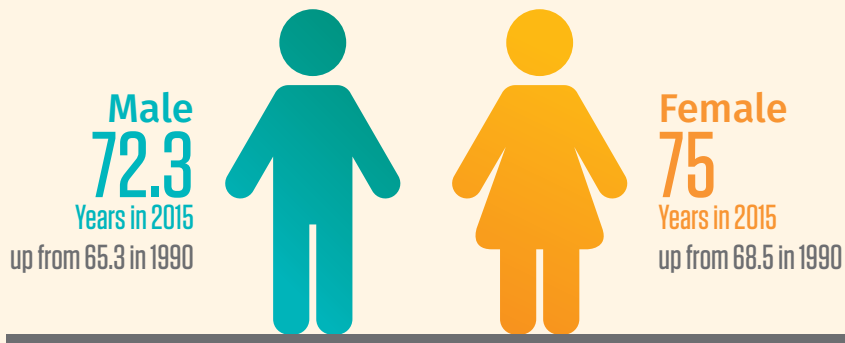
The Ministry of Health's Deputy Secretary (Development) shares perspectives on embracing Singapore's coming demographic shift.

Ageing is a key demographic challenge facing many Asian countries. Lower fertility rates and increased longevity mean that the number of seniors is expected to double to over 900,000—or 1 in 4 Singaporeans—by the year 2030.

OUR POPULATION IS AGEING RAPIDLY



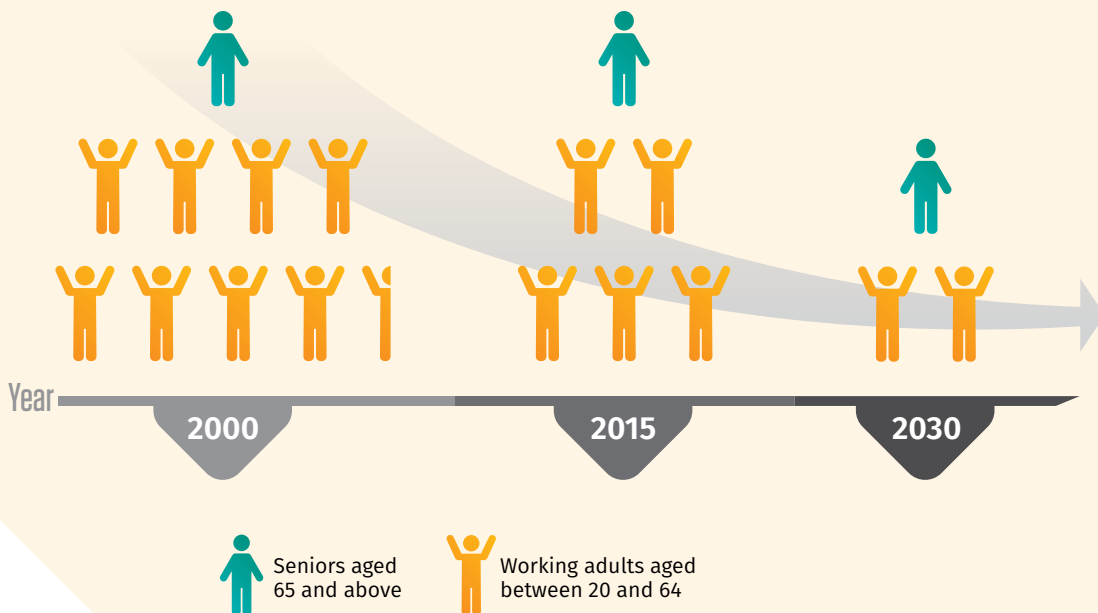
HEALTHY LIFE EXPECTANCY



Healthy life expectancy refers to the average number of additional years that a person at a given age can expect to live in good health, taking into account mortality and years lived in less than full health due to disease or injury.

Sources: Ministry of Health, "Life Expectancy in Singapore Information Note, 13 April 2016"; Ministry of Health, Population and Vital Statistics, <https://www.moh.gov.sg>.

OLD-AGE SUPPORT RATIO



Singapore has taken a whole-of-nation approach to preparing for population ageing. A Ministerial Committee on Ageing was established to coordinate government policies and programmes relating to population ageing. In 2015, the Committee launched an Action Plan for Successful Ageing which forms the nation's blueprint for preparing Singaporeans to age well.

Looking and Planning Ahead, Whole-of-Nation

Singapore's vision of a Senior Friendly City works at three levels: national, community and individual. At the national level, Singapore aims to be a **City for All Ages**. At the community level, Singapore wants to be a **Kampong for All Ages**. At the individual level, Singapore promises **Opportunities for All Ages** (see the Ministry of Health's "Factsheet on Action Plan for Successful Ageing").

Singapore aspires to be a home which enables its seniors to continue to grow and develop as individuals, even in their later years.

With advancements in human development and technology—from good public health to modern modes of transport and better digital services—our later years need not be a steep decline after an arbitrary age threshold. Teoh Zsin Woon, Deputy Secretary (Development) at the Ministry of Health, believes that the new narrative for ageing in Singapore is

one of “productive longevity”. Instead of a “hump”, Teoh suggests that we can have different experiences and continue to learn, grow, develop and flourish throughout our lives.

However, to be able to achieve productive longevity may require us to organise our workplaces, social systems and even urban environments, differently.

Seniors as Individuals

At the individual level, Teoh believes that it is important to create more opportunities for seniors to stay active and engaged.

Hence, under the Action Plan for Successful Ageing, the National Silver Academy was established to enable seniors to learn, for learning's sake. It offers a range of courses by post-secondary education institutions to seniors who feel that they would still like to learn to keep their minds active and to keep in touch with family, families and world affairs.

“Many of us may have been socialised into thinking that life is a ‘hump’: you begin life as infant, growing into your teens and early adulthood before maturing at your peak. Thereafter, it is downhill all the way ...”

— Teoh Zsin Woon

WHAT WE HAVE ACHIEVED SO FAR

As of December 2017 unless otherwise specified

In 2015, the Ministerial Committee on Ageing announced a \$3-Billion Action Plan for Successful Ageing covering over 70 initiatives in 12 areas to help Singaporeans age confidently and lead active lives, with strong bonds with family and community.

INDIVIDUAL LEVEL OPPORTUNITIES FOR ALL AGES

Longevity is opportunity. Seniors can continue working, learning and growing as they enjoy many more years of healthy life.

Seniors' Health Programme

Over 400,000 seniors reached through health talks and exercise programmes.

Workplace Health

44,000 mature workers reached in 7 sectors.

Learning

Over 21,000 places across 900 courses provided under National Silver Academy, benefitting close to 13,000 participants.

Volunteerism

Over 2,200 new senior volunteers as of Dec 2017.

Employment

From July 2016 to November 2017, 600 companies applied for the job redesign grant under enhanced WorkPro, benefitting more than 9,500 older workers aged 50 and above

COMMUNITY LEVEL KAMPONG FOR ALL AGES

Cohesive home with inter-generational harmony. We will involve the public, people and private sectors to strengthen community support and care for our seniors.

Dementia Friendly Communities

6 Dementia Friendly Communities in Yishun, MacPherson, Hong Kah North, Bedok, Queenstown and Fengshan. Reached out to over 23,000 individuals to support persons with dementia and their caregivers.

Inter-generational Harmony

Over 15,000 students

participated in inter-generational learning programmes.

NATIONAL LEVEL CITY FOR ALL AGES

Live well and age confidently in place. Transforming Singapore into a city where Singaporeans can age gracefully and confidently.

Research on Ageing

6 grant calls launched in home care, cognition, ageless workplaces, assistive devices, frailty prevention and falls prevention.

Housing

- 1st Active Ageing Hub at Kallang/Whampoa started in July 2017.
- 2nd Active Ageing Hub at Kampung Admiralty started in February 2018

Aged Care Facilities (Increase from end-2015 to end-2017)

- +23% nursing home beds
- +16% home care places
- +43% centre-based care places

Parks

- Parks incorporating more senior-friendly amenities (e.g. senior-friendly fitness corners)
- 3 therapeutic gardens opened at HortPark, Bishan-Ang Mo Kio Park and Tiong Bahru Park.
- NParks' "Design Guidelines for Therapeutic Gardens in Singapore" launched in September 2017.

Transport

14 Silver Zones completed, 804 Green Man Plus crossings, >96% bus services made wheel-chair accessible.

These are all supported by both communities and the government, and aimed at fueling a new narrative about ageing. Instead of associating seniors with recipients of help, the Silver Volunteer Fund empowers seniors to contribute to society as volunteers.

“We want to create a society where our seniors are visible. No matter your age, everyone is a valued member of our community.”

— Teoh Zsin Woon

Seniors as Members of Society

Teoh believes that people's responses to ageing will change over time. The goal is a society in which seniors are visible, and where everyone is a valued member of the community regardless of age.

An example of this principle in action is Kampong Admiralty, a new public housing initiative designed and built for residents of all ages. Here, facilities for seniors are integrated within the community and co-located with facilities for children.

Another initiative is the revamp of St Joseph's Home which used to only offer nursing and hospice services to seniors. Since August 2017, however, an infant and childcare centre has begun to operate out of the same location. The childcare centre's curriculum includes interaction with seniors so that the children get accustomed to issues of ageing and are at ease in the company of seniors. Seniors and children share an inter-generational playground that allows even those with disabilities to play with the children. Such interactions are

important to nurture, because as family sizes become smaller, there are fewer opportunities for children to be in touch with their grandparents.

Teoh is also a firm advocate for ageing in place. She strongly believes that it is important to preserve a person's sense of autonomy and independence, even as he or she gets older, so that he or she can age with dignity.

Therefore, close collaboration among different infrastructure agencies is needed to make our city an enabling one—one which allows the seniors, even those with physical or cognitive frailty, to age in place, and which gives them a sense of security and the confidence to continue to go out and lead active lives. Under the Action Plan for Successful Ageing, government agencies—from the Housing Development Board (HDB) to the Land Transport Authority, National Parks Board to the Urban Redevelopment Authority (URA)—work in concert to implement a comprehensive suite of plans to make

Singapore a City for All Ages. These plans include new housing options for seniors, senior friendly transportation as well as therapeutic parks for seniors.

Involve Community as Stakeholders

The Action Plan for Successful Ageing was put together after extensive consultation with seniors and stakeholders from diverse backgrounds. For example, together with HDB and URA, the Ministry of Health (MOH) conducted focus groups on housing options, urban design and barrier free access. These inputs from the seniors and other members of the community enrich the agencies' understanding of what really matters to seniors in terms of their living environment.

Our high density living environment can also be an advantage in forming strong communities of care—if we engage residents and link up community assets to form “vertical kampongs”. The Residents' Committees Centres within public housing estates make for convenient “active aging hubs” for seniors to participate in community health programmes, such as the Health Promotion Board's well-attended weekly exercise sessions. In several residential precincts, seniors in their 60s and 70s are volunteering to befriend and care for other older seniors living within the same neighbourhood. As we build up these “communities of care”, we also enhance the social capital within communities.

Silver Generation Ambassadors

The Silver Generation Ambassadors (SGAs)¹ conduct door to door outreach to all Singaporeans aged 65 years and above. These SGAs explain to seniors the government schemes that can help them, and serve to link seniors' needs with available government help schemes. Beyond this, SGAs are also trained as the frontline of our community care system—to pick up emerging health or social issues faced by seniors and get them help early, as well as to persuade seniors to participate in exercises and preventive health checks in their immediate neighbourhood. They form the bedrock of a uniquely Singapore response to population ageing.

Note

1. There are about 3,000 SGA volunteers who have undergone training on government programmes for seniors, with some basic knowledge on how to recommend and encourage seniors to stay active.

Community Partnerships

Teoh, who leads the MOH's Ageing Planning Office (APO), envisions a “school health service” equivalent for our seniors in the community. Just like school children who get their regular health checks, PE lessons, vaccinations

A SCHOOL OF DISTINCTION.
A COMMUNITY OF LEADERS.



Functional screening at Yishun Town Secondary School where students volunteer to conduct basic eye checks for seniors

Source: Agency for Integrated Care

and dental checks systematically in schools, the same must happen in the community for seniors, now that our age curve has shifted decisively.

To achieve this vision, MOH works with grassroots organisations, senior activity centres and even schools, leveraging existing spaces to bring health checks to seniors. On weekends, school children volunteer to help conduct eye checks for seniors as their school premises

turn into health centres for seniors to undergo functional screening, and their school dental buses double up to provide follow-up dental treatment for seniors with oral health issues.

Ultimately, because of the magnitude of population ageing, everyone has to play a part to achieve successful ageing for our population. Close collaboration between sectoral partners is a must, even though trying to bring together different systems and processes, and capability levels, can be challenging. For Teoh, it is about focusing on a shared purpose and common desired outcomes.

Joint planning and programming between communities and government, using data and leveraging existing infrastructure, gives new life and new social purpose to some of these spaces. This mode of programme delivery allows for much faster implementation across the island than just depending on building new infrastructure or retirement villages.

Tapping on Technology

Reaching out to seniors, meeting their needs and coordinating programmes and service offerings from providers across all sectors is a massive undertaking. However, the use of appropriate technology can greatly increase the reach and maximise the impact of this effort. MOH makes use of the URA's ePlanner, a



The team from the National Dental Centre Singapore providing dental follow-up treatment for seniors at Dunman Secondary School

Source: Agency for Integrated Care

“Population ageing is huge. I need all the productive energies in each community. I need the community to embrace and to care for the seniors. We really need to combine our resources and everybody needs to chip in to take care of our seniors in each community.”

— Teoh Zsin Woon

one-stop, multi-platform geospatial urban planning analytics tool. The ePlanner lets MOH visualise local data on the senior population, so as to better plan and stage new programmes and site new facilities and services for seniors. By better identifying “hotspots” of needs, MOH can be targeted in working with both the healthcare providers as well as local community-based organisations to plan new health and social programmes to meet local needs.

The Power of Data Analytics: ePlanner & GEMMA

Developed in-house, URA's ePlanner and GEMMA (GIS enabled mapping, modelling and analytics) are digital geospatial urban planning tools.

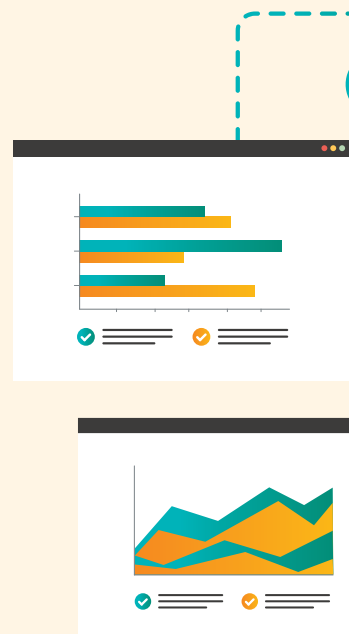
ePlanner allows city planners to easily visualise, analyse, overlay and interpret data from multiple sources to understand the housing and demography profiles and location of facilities in each area. This provides a more data-informed way for planners to assess residents' needs and to plan for amenities to be sufficient and also more accessible.

For example, by incorporating social data into the ePlanner, MOH is able to identify areas with a higher concentration of seniors living alone, and prioritise the development of befriender programmes to start in these areas.

GEMMA will take infrastructure planning for seniors to the next level. Planners across agencies use advance spatial analytics within to jointly analyse and map medium-to-long term planning scenarios, and to support planning and decision making. For example, they can identify and propose possible sites for a future aged care facility, as well as work with social agencies to identify opportunities to co-locate with complementary services to create synergies.

“Through conscious urban design and facility placement, we want to rekindle that magical bond between the young and old. We want our younger people to feel the love from the older people; and for the older people to fill their days with the laughter from the young.”

— Teoh Zsin Woon



Looking into the Future

Singapore has not seen the peak of its ageing phenomenon yet: a new wave of seniors who will soon reach the age of 65 is on the horizon. The measures being put in place today are not early but they are necessary and urgent. And there is more work to be done. As the population ages further, needs will also evolve. This is why Teoh thinks it is vital to build up the social infrastructure in tandem with the physical infrastructure.

At the same time, Teoh believes there is no one best path in achieving this, and that many options will open up as society matures and fresh ideas emerge. But the APO team is seeking the most optimistic path in bringing the promise of successful ageing to Singapore's seniors. In the longer term, this may have benefits and implications not just for Singapore but also the rest of Asia whose populations are also ageing rapidly. ■





REIMAGINING SINGAPORE: **PLACEMAKING THROUGH ARTS AND CULTURE**

by Rosa Daniel



Upgraded infrastructure and creative programming enliven the city's vibrant neighbourhoods, as it aspires to become a global cultural hub.



Rosa Daniel, in her capacity as Deputy Secretary (Culture) of the Ministry of Culture, Community and Youth, and Chief Executive Officer of the National Arts Council, oversees the policies and implementation work of the Ministry and its statutory boards, on issues related to the arts and heritage.

The author wishes to thank Clarissa Tan, Jen Ying-Zhen Ang, Wong Hsien Hui, Agnes Lim and Huang Lijie for their contributions to the drafting of this article.

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rban governance is a key facet of Singapore's success as a city-state. Our policies have sought to balance the functional needs of society, as a place to live, work and play.

With greater cultural diversity and the growing complexities of globalisation, there is a greater need than ever before to create physical spaces which can provide contexts for positive interactions, and serve as anchors of identity and community bonds.

Beyond good physical design, spaces connect with individuals and communities emotionally when they facilitate shared experiences and evoke memories of a common heritage. Good placemaking encompasses three key components: **places, programming and partnership**. Places and spaces help to enshrine the physicality of our heritage. Through active programming, we communicate a sense of history and identity to both residents and visitors. Strategic partnerships enable these programmes to bring diverse social groups together in shared experiences,

allowing them to celebrate differences, while fostering rootedness in our collective values and Singaporean identity.

In the past five years, Singapore has sought to enhance placemaking through arts and culture. Our efforts to shape and enliven the places we inhabit through cultural programming and partnerships convey our shared histories and traditions, and showcase our distinctiveness and identity to the rest of the world.



Places: Iconic Cities with Distinctive Characters

Many countries around the world recognise the economic and social benefits of arts and culture for their communities. They have revitalised their spaces and communities through the arts and through placemaking. As cultural vibrancy advances, so has tourism and economic growth. Paris, with its many famous museums and galleries, holds a special place in the world's imagination. Similarly, Melbourne—named the most liveable city six years in a row by *The Economist*—regards culture as extending beyond the arts to all sectors, including science, research and education. Creativity and collaboration, promoted across industries and organisations, make Melbourne and Paris attractive global cities in which to work, live and play.

Like Singapore, Seoul's transformation into a booming export economy has made it a model city for other countries to emulate. In the process, Korean pop culture has become a global phenomenon.

With greater cultural diversity and globalisation, there is a need to provide contexts for positive interactions.



SG Heritage Plan Travelling Exhibition
Source: MCCY

But even as Seoul expands its cultural reach internationally, it has also sought to retain its history and traditions. Seoul's Dongdaemun Design Plaza, for instance, was intended to be a centre for fashion and design—but when remains of Seoul's ancient wall was discovered at the construction site, it was turned into a memorial park instead. By preserving the structural integrity of its history, Seoul has provided a cultural anchor for its people amidst the rapid change brought about by globalisation.

► Placemaking in Singapore

Like other global cities, Singapore's multicultural identity and rich history can be reflected in our spaces and places. Our monuments and historic buildings embody the stories of our past and the journey taken by pioneering generations who came before us. In April this year, Grace Fu, Minister for Culture, Community and Youth, launched Our SG Heritage

Plan, the first masterplan for Singapore's heritage and museum sector. The Plan makes recommendations for protecting and promoting Singapore's tangible heritage, by accounting for heritage considerations up front in development plans, and developing new ways of commemorating our historic buildings, sites and structures. The Plan seeks to ensure that our tangible heritage continues to resonate with our people, both as historical markers and as living everyday spaces.

► Masterplanning for Places

Placemaking integrates urban planning, cultural policy and community engagement to collectively shape the distinct characteristics of our urban districts, contributing to a successful and culturally vibrant city.

Singapore's inaugural Conservation Master Plan in 1986 revitalised the 105-hectare



The Civic and Cultural District Master Plan (1988)

Source: Courtesy of the Urban Redevelopment Authority

Civic District. Making the most of the area's wealth of physical assets, including unique European neoclassical buildings, issues such as inaccessible landmarks, disjointed routes and weak landscaping were addressed through improved urban design. Planners studied historical areas in other cities such as Embankment along the River Thames in London and engaged the public for views.

Today, the Civic District is livelier than ever, integrating arts and cultural sites such as the Victoria Theatre and Victoria Concert Hall, and the Esplanade with new infrastructure to reduce traffic

congestion and ease pedestrian flow.

Subsequent masterplans have expanded the reach of culture beyond the Central Area, by locating cultural facilities, such as housing for artists and arts groups, in regional and town centres to make them more accessible. A nationwide stocktaking of existing arts and cultural spaces was carried out, to help agencies formulate a plan for sites to safeguard cultural facilities and identify neighbourhoods the arts might revitalise. The National Arts Council (NAC) and the Urban Redevelopment Authority (URA) have also worked closely to link arts housing with

conservation planning, adapting pre-war bungalows and disused shophouses into art studios. The National Heritage Board (NHB) was involved in the development and management of these conserved buildings. Examples of these sites include historic buildings at Selegie Road and Waterloo Street, which are now occupied by arts organisations such as the Chinese Calligraphy Society of Singapore, Dance Ensemble Singapore, The Theatre Practice and Objectifs. These Arts Belts create opportunities for genuine exchange and sustained interaction between the arts practitioners who are tenants, as well as with residents and businesses in the area, contributing to a more culturally vibrant neighbourhood.

Building upon Singapore's aspiration to become a global cultural centre, we have invested in the rejuvenation of national buildings and historic spaces. Today, many of these have been repurposed as iconic theatres, museums and galleries:

the outcome of a deliberate decision to preserve and bring new relevance to these buildings beyond their architectural and historical significance.

Placemaking through arts and culture, however, has to be balanced against our land needs as a society. The case of the Old School at Mount

Sophia—a multidisciplinary arts and creative hub housed at the former premises of the Methodist Girls' School—illustrates this challenge. When the time came for the Old School to move out so the land could be redeveloped, there was pushback from tenants and the public. This was testament to the Old School's success at authentic placemaking, bringing the community together to rejuvenate shared spaces through arts and culture. In the end, a tradeoff was made: the land was tendered for residential purposes but on condition that three heritage buildings would be conserved, restored and integrated into the new development.

While efforts have been made to adapt historical buildings and expand existing facilities, there has also been a strong push to construct new, specialised infrastructure for arts and culture. Perhaps Singapore's most ambitious project in this direction is the Esplanade. Since its opening in 2002, the Esplanade has hosted and

Esplanade—Theatres on the Bay
Source: Civil Service College



Originally built to house the Municipal Council, the **National Gallery Singapore** in the Civic District also served as the former headquarters of Syonan Municipal Administration and Syonan Supreme Court during the Japanese Occupation in 1942, and bore witness to the Japanese surrender to Lord Mountbatten in 1945. Renamed the City Hall building in 1951, it was where then Prime Minister Lee Kuan Yew and his Cabinet took their Oaths of Allegiance in 1959. Today, it is furnished with modern architectural elements and houses the largest public collection of modern art from Singapore and Southeast Asia.



Source: National Gallery Singapore

HISTORIC TREASURES REPURPOSED



Source: Fullerton Hotel

Built in 1928 as the former General Postal Office, the **Fullerton Building** once played an important role in Singapore's communication with the rest of the world, and also served as a makeshift hospital during the Second World War. After the war, it was used as government offices for the Ministry of Finance, Inland Revenue Department, Economic Development Board and Monetary Authority of Singapore. Today, it has become part of the luxurious Fullerton Hotel.

The Arts House was Singapore's first Parliament House and served as the offices for internal self-governance under Chief Minister David Marshall in 1955. Today, The Arts House is home to the Singapore International Festival of Arts and a centre for literary arts programmes.



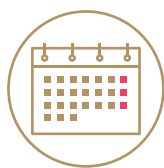
Source: Arts House Limited



The Aliwal Urban Art Festival @ Kampong Glam featured murals by home-grown artists that reference the area's heritage.

Source: Arts House Limited

nurtured some of the best performing arts productions from Singapore and abroad, attracting millions of visitors. The introduction of arts housing within community centres has also brought the arts closer to the heartlands while optimising land use: for example, Marine Parade Community Building was upgraded in 2000 to host a professional theatre company, The Necessary Stage. Together, these projects embody Singapore's urban design guidelines by promoting accessibility and mixing historic and modern developments, rooting culture as an essential component in the economy and a contributor to society's well-being.



Programming: Rejuvenating Our "Hardware" through Cultural "Heartware"

Arts and culture programming contribute towards urban rejuvenation, connecting Singaporeans to our spaces, our history, and our shared future. Good programming fosters shared experiences: in a diverse, multicultural city, it can enhance understanding between communities.

For this to have broader impact, programming has to be accessible. The Esplanade, for example, provides year-round performances in the realms of music, dance, theatre and visual arts. Seven in ten shows are free, allowing everyone to enjoy the arts. Its cultural festivals such as Huayi, Pesta Raya and Kalaa Utsavam are timed to coincide with key cultural celebrations—including Chinese New Year, Hari Raya Puasa at the end of the Muslim holy month of Ramadan, and the Hindu "Festival of Lights", Deepavali. These events showcase Singapore's unique historical roots, and ties to the rest of Asia.

In the Kampong Glam neighbourhood, the royal residence of Singapore's former Malay Sultans in Singapore now houses the Malay Heritage Centre (MHC), showcasing Singapore's Malay heritage and culture and its links to the region. Fitted with wooden friezes from Malay kampong houses and Chinese green-tiled roof-covered walkways, the multi-ethnic façades of Kampong Glam's shophouses embody the area's traditional trades, cultures and practices, passed down from generation to generation. Heritage trails guide tourists around the area,

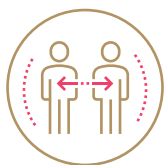


Students viewing a public art show curated by the art collective Vertical Submarine. Works of public art were on display in Jurong as part of the Arts in Your Neighbourhood initiative to bring engaging arts experiences into neighbourhoods in Singapore.

Source: MCCY

regaling them with stories of its past residents and traders. The MHC, together with the nearby Aliwal Arts Centre and neighbourhood association One Kampong Glam, have also organised festivals and events to highlight the district's distinct traditional arts and crafts, integrated with modern performances and youthful energy. Murals from home-grown artists depicting the heritage of the area are also featured along the district's walls. Such placemaking initiatives have brought an increased 40% in footfall to the area over the past three years, reinvigorating historic Kampong Glam with new purpose in the 21st century.¹

has been a growing interest among Singaporeans to participate in arts and cultural programmes within their own neighbourhoods. Initiatives such as PAssionArts,² Arts in Your Neighbourhood,³ as well as public art and heritage trails offer a variety of experiences to citizens, allowing them to connect more closely with the places they inhabit. Common quotidian spaces such as shopping malls, hawker centres, the void decks of HDB flats and community clubs are transformed into stages and exhibition spaces for community artists and interest groups to share their talents and stories with friends and neighbours.



Partnership: Working with the Community

Placemaking can only be successful and sustainable by working closely with stakeholders, which can range from community groups to cultural institutions and agency partners. Placemaking invites people to collectively reimagine and reinvent public spaces at the heart of every community. Indeed, there

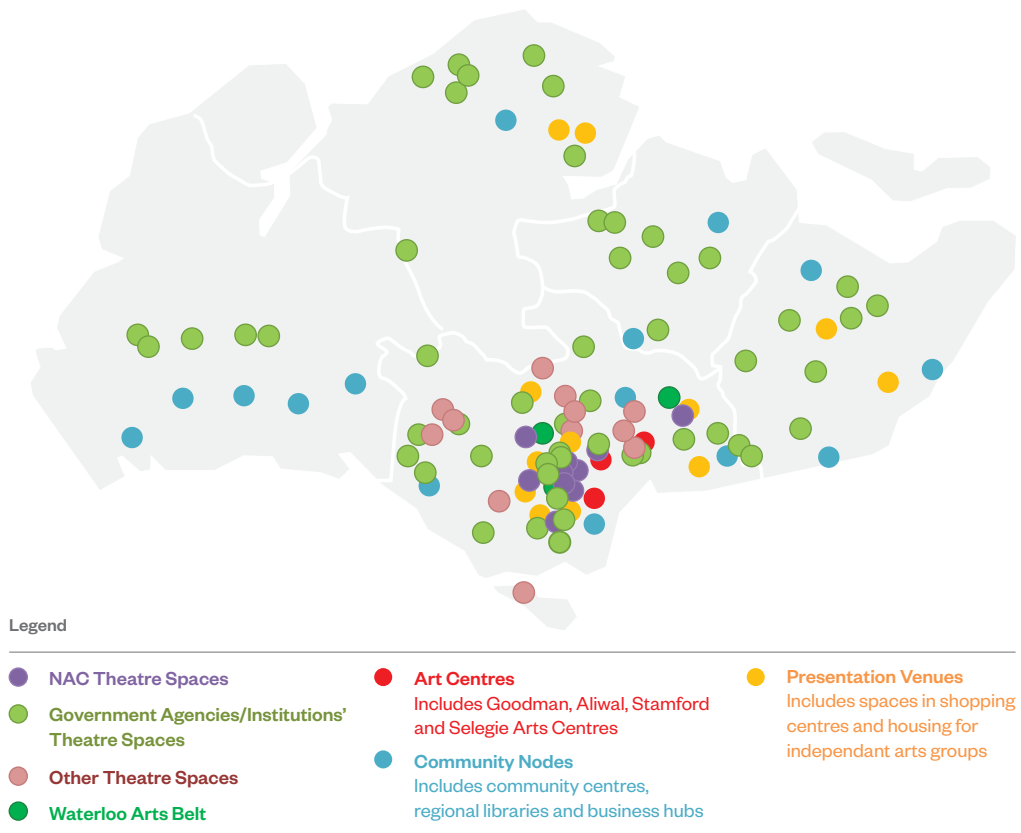
Today, there are nearly 20 heritage trails all around the island, which Singaporeans can experience by themselves or with volunteer guides. Through community partnerships, NAC has also developed a network of 16 arts and culture nodes islandwide that offer residents quality arts experiences all year round, strengthening place identity. For instance, Our Gallery at Taman Jurong fosters appreciation in the visual arts through artist-led community participation projects. A total of 15 artworks, co-created by artists

and residents, have been installed in various parts of Taman Jurong town since the node's inception in 2014. These co-creations help to enhance the environment and instil a strong sense of community and belonging. With these initiatives, everyone—young or old, amateur or professional—can participate and be inspired by arts and culture.

At the grassroots level, placemaking promotes collaboration amongst communities to shape the neighbourhoods they live in. For instance, OH! Open House, a non-profit organisation founded in 2009, places art in everyday spaces such as HDB flats, as an alternative way to experience art outside of museums and galleries

while highlighting some of Singapore's most distinctive neighbourhoods. OH! also collaborates with local artists to experiment with site-specific pieces, giving new meaning to everyday spaces. In this way, OH! challenges audiences to think more deeply about the immediate environment they inhabit, as well as the wider Singaporean context. This method of placemaking capitalises on the character and potential of a local community's assets, creating greater awareness of public spaces and fostering a sense of belonging to the community.

The public has also been encouraged to participate in shaping the spaces they use and live in. The Public Art Trust (PAT)



Locations of arts spaces, community nodes and presentation venues within Singapore

Source: MCCY



24 Hours in Singapore by Baet Yeok Kuan

Source: MCCY

scheme, introduced in 2015, provides tax incentives and dollar-for-dollar matching for private donors and corporations towards the commissioning of public art. To celebrate SG50 (Singapore's Golden Jubilee), three public artworks were commissioned in the Civic District, including *24 Hours in Singapore* by Baet Yeok Kuan—an interactive installation featuring familiar everyday sounds from around the city—prominently located on the Front Lawn of the Asian Civilisations Museum. The PAT has also initiated an online repository to feature and document public artworks in Singapore, and has offered Singaporeans numerous ways to experience public art through curated art trails. By enabling artists to contribute installations to public spaces, and bringing art closer to Singaporeans, PAT has led to increased arts accessibility and the creation of quality artworks in our public spaces that beautify and inspire.

Conclusion

For Singapore to be a true global city, economic and financial success must go hand in hand with a vibrant cultural scene. Our cultural institutions work with economic agencies such as the Economic Development Board and Singapore Tourism Board to profile Singapore's cultural offerings to the world.

Such efforts are bearing fruit. In a 2015 quantified study of the economic and social contribution of cultural and creative industries around the world by UNESCO and Ernst and Young, Singapore was ranked the fifth best city for attracting global creative talent, ahead of Tokyo and Berlin. Singapore is also a UNESCO Creative City of Design and the ninth most creative country in the world, according to the 2015 Martin

Prosperity Institute Global Creativity Index. Singapore is slowly but surely maturing into a more confident and cosmopolitan city, and there is much we can take pride in.

Limited land, space and funding will continue to pose challenges in Singapore, particularly in light of competing sectoral priorities, as well as perennial trade-offs such as between preservation and development. Nevertheless, placemaking strategies have enabled Singapore to strike an effective balance, integrating urban planning, cultural policy and community engagement to create a more distinctive and liveable city.

Good programming makes arts and culture accessible to all as part of daily life, and helps bring diverse social groups together in common spaces. This in turn, helps create contexts for positive interactions and shared experiences,

emotionally anchoring Singaporeans to places, spaces and community.

Successful placemaking that brings out the distinctive characters of each precinct is only possible through partnerships that make the most of the distinctive local character of each place and its people, with ground-up efforts that resonate with the larger community.

Ultimately, the measure of success of our placemaking efforts will be determined less by its physical expression than by the quality and relationships of the communities that come together in the process, and whose value go beyond economic and financial measures. While placemaking can make for a more vibrant, attractive destination for visitors, it is also a way to create a more endearing home for Singaporeans—one we imagine and create together. ■

Notes

1. Katyana Melic, "Kampong Glam: When Old is Also Hip", Centre for Liveable Cities, January 2018, accessed 25 May 2018, https://www.clc.gov.sg/docs/default-source/urban-solutions/urb-sol-iss-12-pdfs/case_study-sg-kampong-glam.pdf.
2. Established by the People's Association with the support of the Ministry of Culture, Community and Youth, PAssionArts was developed to provide a collective identity to community arts in Singapore. It aims to make arts and culture more accessible to the people by bringing it right to the heart of every constituency in Singapore.
3. The Arts in Your Neighbourhood programme, an initiative by the National Arts Council, aims to bring engaging arts experiences to different neighbourhoods in Singapore. The programme comprises a suite of quality arts programmes, performed and facilitated by established artists and arts groups at various locations across the island.

CO-CREATING THE RAIL CORRIDOR'S FUTURE

by **Tan See Nin**

Broad hands-on community engagement has led the design and planning process for a significant stretch of former railway land.



Tan See Nin is Senior Director (Physical Planning) with the Urban Redevelopment Authority. He led the design and completion of the Concept Master Plan and preliminary design of the Rail Corridor.



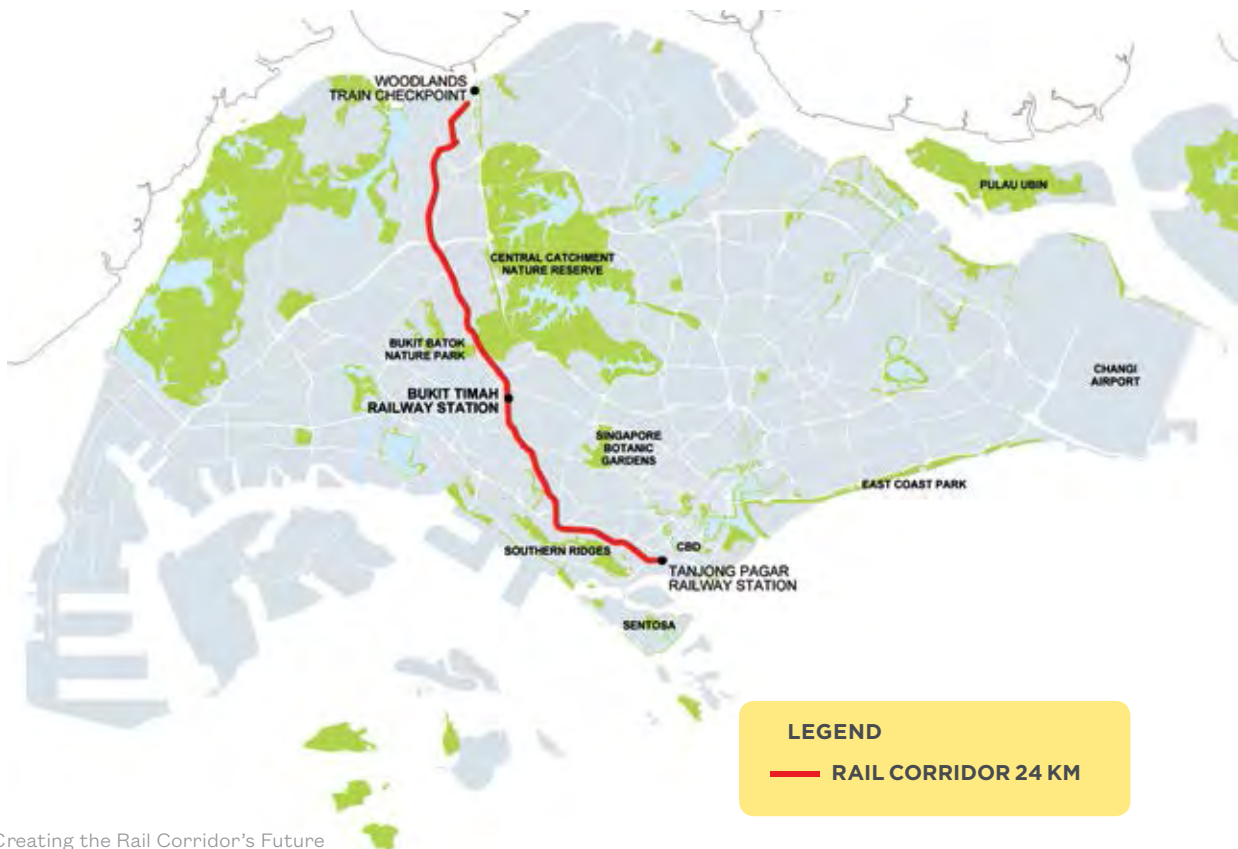
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he Rail Corridor refers to the former railway line that stretches from the north to the south of Singapore. Previously known as the Keretapi Tanah Melayu (KTM) Railway Line, it connected Singapore with Malaysia at the northernmost; at the southernmost was the terminus at the Tanjong Pagar Railway Station, located at the edge of Singapore's Central Business District.

On 30 June 2011, the last train to Malaysia left Tanjong Pagar and the land occupied by the KTM Line reverted to the Singapore

government on 1 July 2011. The Tanjong Pagar station building is now gazetted as a National Monument.

Most of the tracks, sleepers and railway equipment along the former railway line have been removed as part of the land return agreement. The Rail Corridor has become a swath of wilderness landscape and an informal public space. Popularly called the "green corridor", it stands out in contrast to the dense urban environment found in most parts of the island.





A Special Corridor with Immense Opportunities

Source: URA

The Rail Corridor is very long, covering a distance of 24 km and across the entire width of the country. This makes the Rail Corridor unique: there is no other extensive community space in the world that connects communities across a nation from end to end.

It is estimated that 1 million people live within 1 km of the Rail Corridor in public housing estates, condominiums and landed private housing. There are also work places providing jobs and amenities adjacent to the Rail Corridor. These include offices, retail areas, business parks, industrial estates, a hospital, schools and other educational institutions. When the train was running, the railway was a barrier that divided and separated these communities from each other. With the freeing up of the railway land, there is now an opportunity to link up communities across the island.

Beyond its obvious ecological value as a green corridor, the Rail Corridor could function as a multi-use recreational corridor that is integrated with the life and urban fabric of the surrounding communities. Where the Rail Corridor runs next to lands that have yet to

be developed, the Corridor could be developed and integrated with adjacent uses in creative ways that optimise land use while preserving its seamless connectivity, heritage and special green identity.

As a community space that threads through the nation, ample room could be set aside for people to participate in various community activities, sports and the arts—it is a unique public space for people from all walks of life to enjoy and develop shared experiences and memories. In the process, the Rail Corridor can help foster a sense of community, strengthen social bonds and resilience, and enhance communal well-being.

It has been important for URA to work with the community to develop a shared vision for the Rail Corridor. This effort will guide the establishment of appropriate design goals and the formulation of a robust and comprehensive Master Plan for the Rail Corridor—striking a balance between meeting the public's aspirations to retain the green character and heritage of the Rail Corridor, while allowing part of it to be sensitively developed.



The Public Engagement Journey

▲ Intense public interest after the railway stopped operations.

Source: URA

Since it was announced that the railway line was to be discontinued and the land returned to Singapore, the public has shown great interest in the fate of the railway land. Fearing that the Rail Corridor would be lost to development, the Nature Society of Singapore (NSS) sent in a proposal for the preservation of the railway line as a continuous “green corridor”—the proposal enjoyed widespread support on social media.

Recognising this broad public interest, Urban Redevelopment Authority (URA) embarked on a comprehensive community engagement exercise to reach as wide a segment of the population as possible, *before* drawing up plans. The approach was both broad-based and targeted, with the aim to develop a shared vision and a set of planning and design goals to guide the future development of the Rail Corridor.

A variety of platforms were used to reach out to the public, including community walks, visioning workshops, design charrettes as well as public exhibitions and an online portal. “Journey of Possibilities”, an Ideas Competition for the Rail Corridor that was open to the public, was held in 2011–2012. In 2015, URA launched a Request for Proposal (RFP) to develop a Concept Master Plan and Concept Proposals for the Rail Corridor.

Rail Corridor Partnership

A significant first step in community engagement was the formation in July 2011 of the Rail Corridor Consultation Group (RCCG).

An informal people-government partnership to seek views from experts as well as those who were passionate about the Rail Corridor, the RCCG was helmed by then Minister of State for National Development Tan Chuan-Jin. RCCG participants included members of interest groups such as the Nature Society of Singapore (NSS), the Singapore Heritage Society (SHS), the founder of “We Support the Green Corridor” Facebook page, founding members of the “Friends of the Green Corridor”, a popular blogger on heritage issues, an avid cyclist, academics in

Rail Corridor Communication & Feedback Portal



environmental sciences and conservation and an architect who is an authority on butterflies.

The RCCG was crucial in providing well-informed feedback and suggestions to the URA, in charting the development plans for the Rail Corridor. It helped to review ideas and proposals from the public and advised the URA on how to make its public engagement more effective. The RCCG's role was subsequently expanded to support public interest in uses of the Rail Corridor for community-related activities and events, for which public input could be incorporated with the Corridor's design specifications. To this end, RCCG membership was expanded and it was renamed the **Rail Corridor Partnership (RCP)**.



▲ Then Minister of State for National Development Tan Chuan-Jin walking the Rail Corridor with RCP members.

Source: URA



▲ Built atop a disused railway line in the east of Paris, the Promenade Plantée is a linear park spanning 4.7km.

Source: URA

Leveraging widespread online interest in the Rail Corridor, the URA launched a dedicated Rail Corridor website offering historical information on the railway line, walking maps of the Rail Corridor and timing of infrastructure works affecting the Corridor. It also featured overseas examples of other disused railway corridors that have been re-purposed into well-loved community spaces in their respective cities, such as the Promenade Plantée in Paris and the High Line in New York.

The website became an avenue for the public to post their personal photographs and memories of the railway line and an online forum allowed the public to post ideas for the Rail Corridor, as well as comment on and vote on these ideas. This provided URA with a good overall sense of what people value and the attributes and features they would like to see at the Rail Corridor.

Community Visioning Workshops & Exhibitions

Friends of the Green Corridor was an early civil society group formed to discuss the future of the Rail Corridor. The group was invited to hold its community visioning workshop on URA premises. The outcomes were later showcased as “Re-imagining the Rail Corridor”, a public exhibition at the URA City Gallery.

URA also reached out extensively to youths in Singapore, as the future

beneficiaries of the Rail Corridor plan. Tertiary education institutions were invited to embrace the Rail Corridor as part of their design curriculum. Close to 2,000 students, including many from secondary schools near the Rail Corridor, took part in hands-on workshops, site visits and lectures. Some of these students would later become passionate ambassadors, leading guided walks along the Rail Corridor.



Open and Youth Ideas Competition

Public feedback made it clear that many more people wanted to contribute in a more tangible way towards the future plans for the Rail Corridor. Between 2011 and 2012, URA held an Ideas Competition titled “Journey of Possibilities” for the public to propose innovative solutions and ideas through the use of drawings, sketches and diagrams. These were based on five themes that had surfaced as key challenges for the Rail Corridor:

- 1 Biodiversity and Sensitive Development
- 2 Inclusiveness, Accessibility and Resolving Use Conflicts
- 3 Community Ownership, Pride and Sense of Well-being
- 4 Celebrating Heritage
- 5 Extraordinary Ideas for a Public Space

The competition also featured a Youth Challenge: young participants from schools were encouraged to come up with new ideas and proposals that would surprise and excite Singaporeans. This was to reflect the interests and aspirations of the younger generation, and how the Rail Corridor could be especially meaningful to them.

URA received more than 200 submissions in total. Apart from professionals such as landscape architects, the competition attracted interest from local schools and tertiary education institutions. It also attracted overseas submissions from Australia, the United Kingdom, Denmark, the Netherlands and the United States. The ideas and proposals were exhibited at the URA City Gallery and the winners were invited to present their proposals in a public seminar.



Engaging with Community Partners

URA worked with community partners to establish specific user requirements that could be incorporated into the future design and Master Plan of the Rail Corridor. Various events and activities were considered for the use of the trail as well as the defunct Tanjong Pagar Railway Station. While the objective was to discover the practical constraints and challenges of using the Rail Corridor for community activities, it was also an opportunity to expose more local residents to the Rail Corridor first-hand.

URA also reached out to private sporting and event management companies to make use of the Rail Corridor, which led to the inaugural Green Corridor Run in 2013. This cross-country run covered half the length of the Rail Corridor starting from Tanjong Pagar Railway Station and ending at the Bukit Timah Railway Station. The event attracted more than 6,000 runners who had to be flagged off in three waves. In subsequent years, the Green Corridor Run attracted even larger number of participants. From observing these events, URA was able to assess what

▲ Journey of Possibilities winning entry:
Tiger's Garden by Oculous
Source: URA

facilities were needed for community events to be held at the Rail Corridor in future. For instance, large-scale events such as the Green Corridor Run required big staging areas at the start and end-points to hold participants and spectators, with areas for bag collection, refreshment points, pop-up kiosks, a first aid post, service vehicle drop-offs and parking for logistical purposes. Such learning experiences informed the desired outcomes and requirements incorporated in the subsequent Request for Proposal (RFP) Design Brief for the Rail Corridor.

To ensure that the former Tanjong Pagar Railway Station was put to good interim uses, the Singapore Land Authority (SLA) rented out the building for a range of short-term uses, including a fashion runway show, art exhibitions, performances, flea markets, Heritage Week events and school activities. The popularity of many of these events with the public made a case for the building to be re-purposed for various multi-function and community-related uses in future.



▲ 2015 Green Corridor Run
Source: URA

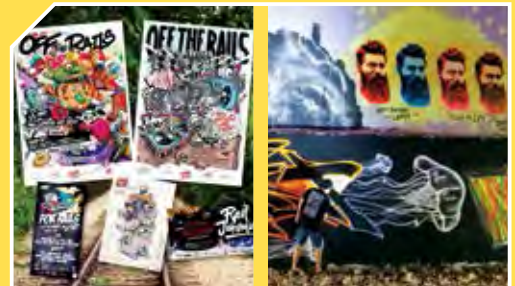


▲ A fashion show at the Tanjong Pagar Railway Station in 2012.
Source: URA



▲ Street art events—ArtSpace@Rail Corridor
Source: URA

URA, with the National Arts Council, engaged a local street artist collective to enhance a section of the Rail Corridor underneath Commonwealth Avenue West viaduct. This was to test-bed part of the Rail Corridor as an inclusive arts destination, channelling creative energy into the “right place” along the Corridor. The ArtSpace@Rail Corridor became a successful model of collaboration, with a group of community partners and artists taking co-ownership and responsibility for managing a covered part of the Rail





Corridor as a unique and interactive arts venue. It became so popular that it hosted a renown international street art festival called the Meeting of Styles in 2014. Street jams turned the ArtSpace into a lively art and music event venue at night (Noise Festival) in 2015 and 2016. These successful outcomes from working with a self-regulating artist community helped anchor the idea that the arts could become one of the permanent features of the Rail Corridor in future.

Shared Vision:

9 Planning and Design Goals

Engaging the public and working with community partners brought new perspectives on how the Rail Corridor could be developed into an endearing and inclusive community space. From the values and aspirations shared by the public, URA distilled a set of Planning and Design Goals, reflecting a shared vision for the Rail Corridor. These goals were incorporated into the design brief to guide the conceptualisation and design of the Rail Corridor:

- 
- 1 Retain the Green Corridor Identity
 - 2 Establish Seamless Connectivity
 - 3 Enhance Bio-diversity and Ecology
 - 4 Celebrate Sense of Place and Memories
 - 5 Develop Inclusive and Safe Space
 - 6 Promote Leisure and Spirit of Discovery
 - 7 Foster Community Ownership and Stewardship
 - 8 Encourage Healthy Lifestyle
 - 9 Create Innovative Design Solutions for Urban Integration

Request for Proposal (RFP) for the Rail Corridor

In March 2015, URA launched the RFP to develop a Concept Master Plan and Concept Proposals for the Rail Corridor. It sought design solutions and desired outcomes that were consistent with the aspirations that both government and the public had for the future of the Rail Corridor.

The RFP called for the transformation of the Rail Corridor into an “Inspired and Extraordinary Community Space”. It included concept designs for a number of key activity nodes, smaller community nodes, and plans for the adaptive re-use of the Tanjong Pagar Railway Station into a multi-functional community building and anchor node for the Rail Corridor.

The RFP also called for innovative design typologies and creative concepts to

integrate a new housing precinct with the Rail Corridor, while enhancing the latter’s green identity and user experience. The concept for this housing site should also demonstrate how the Rail Corridor, together with adjacent elements of greenery and water, could be integrated in a comprehensive design that would serve as a future model for sustainable high quality affordable housing in other similar green settings. Two of the RCP members were invited to join the team of local and international experts on the jury panel for the RFP.

In November 2015, Nikken Sekkei won for its proposal for the 24 km Rail Corridor Concept Master Plan; MKPL Architects and Turenscape won for its Concept Proposals for the adaptive re-use of Tanjong Pagar Railway Station and the new housing precinct.





▲ Trail and nodes in the winning proposal for the 24 km Rail Corridor Concept Master Plan
Source: Nikken Sekkei

The winning proposals were exhibited at the URA City Gallery for public feedback. In addition, URA took a further step in public engagement by bringing the highlights of the exhibition to seven community centres near the Rail Corridor so that residents who live closest to the Corridor could also offer their views. These roving exhibitions were accompanied by a series of community workshops held in 2016 that targeted different groups of residents, including seniors, families with young children and the physically challenged.

Public inputs from the exhibitions and workshops were used to refine the Concept Master Plan¹ and Concept Proposals and to develop the Preliminary Design for the 4 km “signature stretch” of the Rail Corridor at Bukit Timah Railway Station—identified as the first stage of the Rail Corridor—to be completed in 2019. The rest of the Rail Corridor trail will largely be developed by 2021.



Source: MKPL Architects & Turenscape



▲ Concept proposals for the adaptive re-use of Tanjong Pagar Railway Station
Source: MKPL Architects & Turenscape

Rail Corridor Co-creation as Social Infrastructure

The future plans for the Rail Corridor will impact many people's lives, by virtue of the fact that it spans the entire width of the country. From the onset, URA sought to develop a robust plan for the Rail Corridor that is able to meet most people's aspirations, while making sure that land use is optimised. With optimal land use, not only can the Rail Corridor be retained and enhanced but more people will be able to enjoy its intrinsic attractiveness, unique greenery and rich heritage. The Rail Corridor will create a new space identity that gives urban residents the sensations of nature in the heart of the city. The future of the Rail Corridor had to be visionary, sensitive and pragmatic at the same time.

To ensure that the plan would be relevant to the community, it was important to first find out what people valued most about the Rail Corridor and what their own aspirations for the future of this very special place were. URA wanted to co-create the future of the Rail Corridor with the public.

URA began by touching base with stakeholder groups representing nature and heritage interests, as they were the first to provide feedback and suggestions to the government. But sensing that the "silent majority" of Singaporeans may not have been exposed to the Rail Corridor, and there could be different voices and opinions about the shaping of this space in future, URA decided to reach out to the wider community for inputs, particularly those living near the corridor.

From the beginning, it was clearly recognised that there are no set formulas to be used in the planning and design of this space given its special nature, and the government should seek the best ideas for the site. Guided by the overarching planning goals and design principles formulated from public feedback, URA was able to demonstrate that with creativity and sensitive design, the planning objectives of optimal land use could be balanced with aspirations to preserve the Rail Corridor as a unique green corridor and transform it into an extraordinary community space.



Source: MKPL Architects & Turescape



Source: MKPL Architects & Turescape



▲ Concept proposal for housing precinct integration with the Rail Corridor

Source: MKPL Architects & Turescape

The government did not just take a proactive role in engaging the community. URA was driven to match the passion and deep seated interests from civil society, built trust with stakeholders, and together develop a shared vision for the Rail Corridor. Throughout this process, URA as the land use planning authority needed to lead with vision, initiate actions and carry out plans with the support and advice of an equally committed Rail Corridor Partnership. The Partnership became a trusted and constructive “sounding board” for URA to test out ideas and seek views on proposals before going public. At times, they helped clarify URA’s views to the public.



▲ Artist's impression of the "4 km signature stretch"

Source: URA

Community engagement goes beyond simply soliciting feedback and ideas from the public to inform the project. By nurturing community interest, URA also hopes to build up stewards that will look after the Rail Corridor in future.

The focus of public engagement for the Rail Corridor was "co-creation", with the government working closely with stakeholders and the community from the onset to achieve consensus on a shared vision and desired outcomes for the Rail Corridor. This contrasts with the government seeking buy-in or acceptance from stakeholders after plans have already been formulated.

For the Rail Corridor, co-creation was

an important approach: beyond its physical form as a linear green space, the Rail Corridor plays a unique role as a piece of social infrastructure with the potential to bring people together. It socialises the community by creating a common space for people to develop shared experiences and memories and form community relationships with each other.

If the Rail Corridor is planned well, developed and programmed properly, it will become not just a green haven and a leisure corridor, but a shared space for community bonding and social integration for people from all walks of life. Open spaces like the Rail Corridor are great social levellers—anyone and everyone



can enjoy it. With a connection to nature running through the heart of our urban city-state, this project will improve the quality of life for all residents. It fosters a strong sense of community ownership, civic engagement and pride which will support its sustainability as a public space. Ultimately, it is our hope that the transformed Rail Corridor will be frequently visited and loved by the community and be a source of inspiration and national pride that holds a special place in the hearts of all Singaporeans. ■

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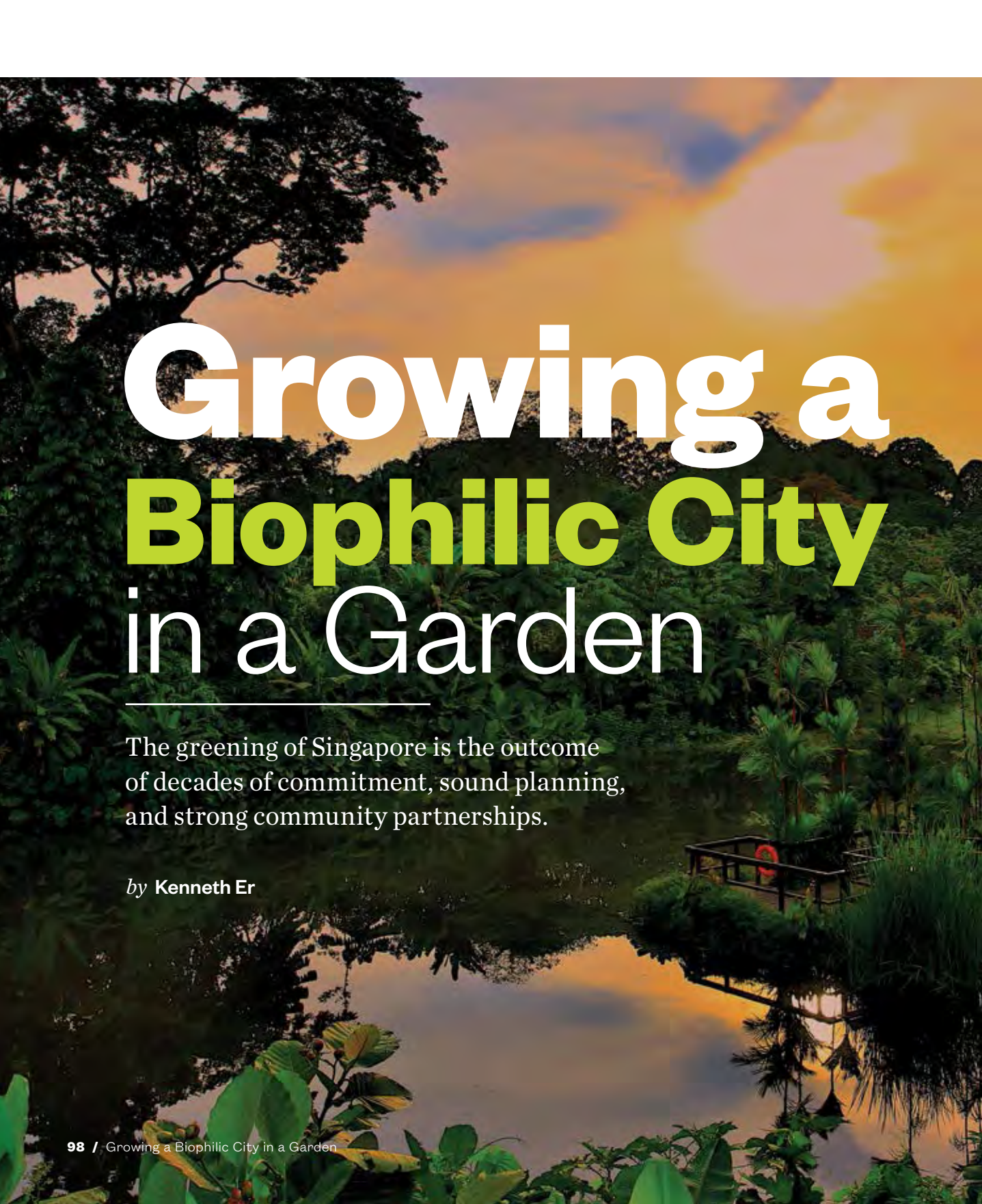
Beyond its physical form as a linear green space, the Rail Corridor plays a unique role as a piece of social infrastructure with the potential to bring people together.

”

Note

- 1 The Concept Master Plan for the Rail Corridor won two awards for URA and the Nikken Sekkei Design Team: the UK Landscape Institute 2017 Award for Urban Design and Master Planning,

and the International Federation of Landscape Architects (IFLA) 2017 Asia Pacific Region “Outstanding Award” for Analysis and Master Planning.

A lush garden scene with a pond, trees, and a sunset sky. The title 'Growing a Biophilic City in a Garden' is overlaid on the image. The word 'Biophilic' is in a bright green color, while the other words are in white. The background shows a dense garden with various plants and trees, and a small wooden bridge over a pond in the lower right.

Growing a **Biophilic City** in a Garden

The greening of Singapore is the outcome of decades of commitment, sound planning, and strong community partnerships.

by Kenneth Er



Kenneth Er is Chief Executive Officer of National Parks Board (NParks), the lead agency overseeing greenery and biodiversity conservation in Singapore's City in a Garden. He began his career in NParks and has been involved in the planning, development and management of gardens, parks and streetscapes in Singapore over the past 20 years. He is a forest ecologist by training, with research interests in conservation biology, forest ecology, avian ecology and ecological modelling.

The author wishes to thank Toh Wan Ting for assisting with the content research and Dr Leong Chee Chiew for reviewing this article.



Singapore is widely recognised as one of the greenest cities in the world. Once an unsanitary port city, it has become a green and liveable First World metropolis

in the span of just a few decades. This remarkable transformation is testament to the farsighted vision and strong political will of Singapore's leadership, as well as to the efficiency and pragmatism of its governance.

From the beginning, there was clear direction that greenery provision was to be integral to our socioeconomic and national infrastructure development. In 1963, former Prime Minister Lee Kuan Yew directed that a tree planting campaign be launched across Singapore. He personally chaired the Garden City Action Committee, which was set up within the Ministry of National Development in 1970. The Committee would spearhead the formulation of a greening policy, as well as direct, coordinate and monitor the course of the campaign.

Mr Lee felt that making Singapore green was the most visible way to impress upon foreign dignitaries and businessmen that our city-state was well-organised and had a committed and efficient government—a factor that attracted investments into Singapore. But he also

saw greening not just as an economic imperative, but as a social leveller. He believed that making greenery accessible to all Singaporeans would give them a shared stake in the country's wellbeing, and bind them together as one.

After over 50 years of greening, Singapore is today not just a Garden City, but a biophilic City in a Garden—a green oasis comprising an interconnected network of verdant streetscapes, gardens, parks, nature reserves and vertical greenery. Singapore has transitioned from greenery provision to the development of a sustainable urban ecosystem and a closer affinity with nature in the city.

“Greening raised the morale of the people and gave them pride in their surroundings. We taught them to care for and not vandalise the trees. We did not differentiate between middle-class and working-class areas. The British had superior white enclaves in Tanglin and around Government House that were neater, cleaner and greener than the ‘native’ areas. That would have been politically disastrous for an elected government.”

— Lee Kuan Yew¹



City in a Garden



Singapore's green cover

Source: NParks

An aerial photograph of a city landscape. In the foreground, a large, dense green park area is visible, with a river or canal winding through it. The park is surrounded by urban development, including residential buildings and commercial structures. The background shows a hazy city skyline under a clear sky.

Establishing the Urban Ecosystem

Source: NParks

Greenery, green spaces and natural habitats continue to be the foundations of our City in a Garden, and are key elements of the landscape matrix that make up Singapore's urban ecosystem. Over the past decade, we have sought to further connect and enhance these elements, to strengthen the health of the ecosystem. Nature is also better integrated into the built landscape. This is a first step towards building a more biophilic environment. Several key initiatives have brought this to bear.

Safeguarding our nature reserves as refugia of biodiversity

Today, Singapore has in its midst four nature reserves—Bukit Timah Nature Reserve, Central Catchment Nature

Reserve, Sungei Buloh Wetland Reserve and Labrador Nature Reserve. They represent the range of natural habitats forming the main sources of biodiversity: from primary to secondary lowland rainforests to freshwater swamp forest, mangroves and mudflats.

To bolster the resilience of the nature reserves, a network of nature parks has been set up to buffer against the impacts of urbanisation. These parks mitigate edge effects by reducing wind and heat, and serve as barriers against invasive species. They also provide complementary habitats for native biodiversity. More importantly, the parks allow for compatible nature-based recreation, such as hiking, and alleviate visitorship pressure on the nature reserves.

Nature Parks as Buffer Parks

Nature reserves are protected areas of rich biodiversity that are representative sites of key indigenous ecosystems. To safeguard the native flora and fauna in these areas, there are special restrictions on the activities that can be carried out.

As part of a holistic conservation approach, nature parks have been established on the margins of the Nature Reserves to act as green buffers. NParks enhances the habitats within these buffers so that

they remain rustic and forested, while serving as an alternative venue for the public to enjoy recreational activities. Nature parks also buffer the nature reserves against developments that abut the reserves. The map below shows the nature parks abutting the Bukit Timah and Central Catchment Nature Reserves. For instance, over at Sungei Buloh Wetland Reserve, a 31-hectare extension to its east acts as its buffer.



Source: NParks

In the same way that we have conserved terrestrial habitats, the Sisters' Islands Marine Park was established in 2014 to provide a refugia for marine biodiversity. Agent-based modelling demonstrate that Singapore's southern islands appear to be a closed system with sea currents pushing out from the Sisters' Islands. The re-population of corals in the Marine Park means it can serve as a source of coral propagules that could disperse and regenerate other coral populations in the Southern Islands.

Enhancing ecological connectivity across the island

To further build up the resilience of the urban ecosystem, we have started to focus

on ecological connectivity between areas of high biodiversity in Singapore. Least-resistance pathways for fauna have been modelled using GIS (Geographic Information System) technology to identify corridors that will allow east-west and north-south ecological connectivity via the Central Catchment Nature Reserve, as well as coastal connectivity in the northern and southern coasts. These corridors include nature ways and park connectors. The park connectors and nature ways take the form of forest garden landscapes and are planted with a diversity of native flora. Special attention is placed on native birds and butterflies. Within these corridors, natural habitats within parks are further enhanced so that they become important ecological "stepping stones" for native biodiversity.

Determination of **Ecological Networks** in Singapore

To enhance ecological connectivity, the National Parks Board worked with the Urban Redevelopment Authority and National University of Singapore to identify ecological networks to connect habitat patches in the landscape. The researchers incorporated ecological information of target fauna species

through multiple-criteria decision analytics into GIS models, and projected ecological networks that animals are likely to use. The researchers have also developed landscape planning design guidelines to incorporate this ecological network into urban greening plans.

Transforming Kallang River



Source: NParks

Previously a concrete canal, the stretch of Kallang River running through Bishan-Ang Mo Kio Park has been transformed through a joint collaboration between NParks and PUB, under the ABC Waters Programme. Today, it is a lush meandering natural river that not only functions as a floodplain, but is also an attractive place for people to enjoy and wildlife to thrive.



Example of least-resistance corridors for the Crimson Sunbird

Source: NParks, Urban Redevelopment Authority and National University of Singapore

Ecological connectivity, however, does not merely mean providing for the movement of biodiversity. It is also about restoring ecological processes, such as waterways and groundwater, so that sustainable cycles can continue to function within the ecosystem. A major step in this direction is national water agency PUB's Active, Beautiful, Clean Waters (ABC Waters) Programme, in which seamless land-water interfaces are created by naturalising canal walls.

Replicating a naturalistic structure within the urban landscape

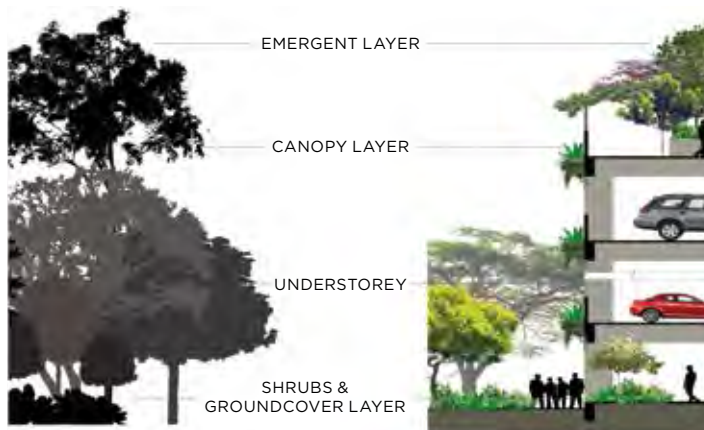
Having established the nature reserves, nature parks and ecological corridors within the landscape, it is equally important that they are re-vegetated to replicate the structure of the tropical rainforest. This brings about a landscape more amenable to living in an equatorial climate. It reduces the heat island effect generated by urban development and further ensures a more sustainable landscape.

Over the last decade, more species of native trees and shrubs have been introduced, some of which have been propagated from seeds collected from within our native habitats. Plantings

along streetscapes and parks are now more natural in look, with the adoption of a tiered structure. This extends into the built environment in the form of vertical and rooftop gardens that mimic epiphytic plants that adorn the trunks of dominant trees and emergent tree cover respectively.

Restoring and curating habitats in the city

Beyond the physical development required in establishing the ecosystem, a restoration programme is underway to enhance habitats within our urban gardens and parks. A species recovery programme targeted at almost 100 flora and fauna species under threat is also beginning to yield results in rescuing species that were once thought to be extinct or at the brink of extinction. There are also efforts to better curate landscapes to provide a more immersive experience with nature. The recently completed Singapore Botanic Gardens Learning Forest is an example of this. A historical water catchment was reinstated, restored and curated as a lowland forest and wetland habitat. As an extension of this work, we have also pioneered the design and development of nature-inspired therapeutic gardens and are now working on biophilic playscapes.



Replicating the tropical rainforest structure in our urban landscape
Source: NParks

Under NParks' species recovery programme, specific conservation strategies are developed and employed to help recover the populations of endemic, rare or threatened native species in Singapore. There have been encouraging results in some cases, such as that of the Oriental Pied Hornbill. These cases give hope that with concerted effort, we can help our currently vulnerable species to recover and thrive as well.



Oriental Pied Hornbill
(*Anthracoceros albirostris*)

Source: NParks

The Singapore Hornbill Project started in 2004 as a collaboration by a few naturalists with the National Parks Board and Jurong Bird Park. Artificial nest boxes were installed throughout the island for the hornbills to breed. During the study, high-tech sensors and CCTVs were installed to monitor and record the hornbills' breeding behaviour. The study and provision of these artificial nest boxes and improved habitats have led to the increase in the hornbill population from a few individuals on Pulau Ubin in 1994, to about 100 throughout Singapore at present.

Recovery of Species under Threat



Singapore Kopsia (*Kopsia singaporensis*)

Source: NParks

This plant is native to Singapore and bears the same colour as our national flag, earning it its name. It occurs locally in Nee Soon Freshwater Swamp and has been successfully propagated and reintroduced into our nature reserves, parks and gardens.



Neptune's Cup Sponge (*Cliona patera*)

Source: NParks

This species was rediscovered in Singapore's waters in 2011 after being absent from our waters for more than a century. Ongoing conservation efforts include transplanting individuals to locations that will give them proximity to each other so as to increase the opportunities for them to reproduce sexually.

Singapore Botanic Gardens Learning Forest

The 10-hectare Learning Forest is an extensive restoration project of the lowland forest and wetland habitats that used to surround the Singapore Botanic Gardens. Detailed site surveys were conducted and reference was taken from early 19th century maps to restore these former habitats. The Learning Forest is home to more than 100 species of birds, 20 species of amphibians and reptiles, 19 species of butterflies, 7 species of mammals and over 500 species of plants.



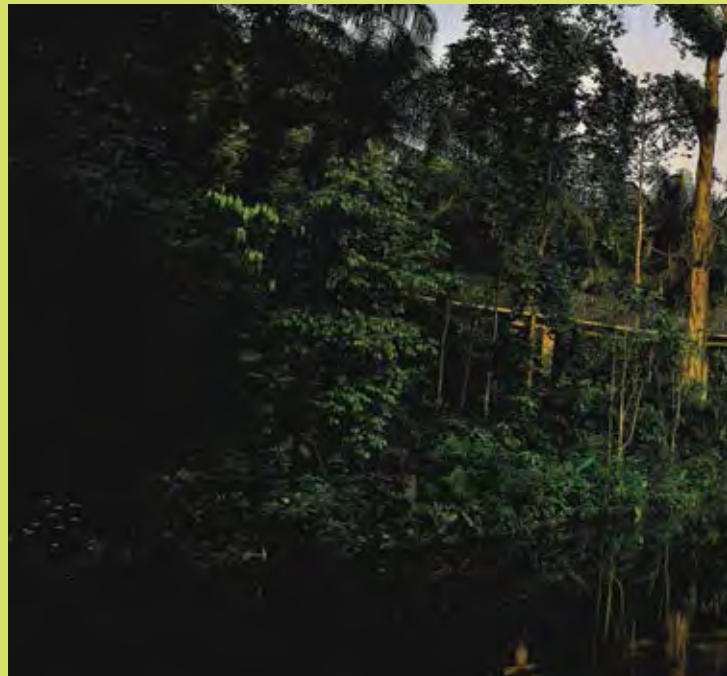
SPH Walk of Giants

Source: NParks



Keppel Discovery Wetlands

Source: NParks



The Learning Forest

Source: NParks

Nurturing a Biophilic Community

Being a biophilic city goes beyond just having nature in the built environment. It is also about how communities become part of the ecosystem and stewards of nature. From the onset of Singapore's greening efforts, we have recognised how a virtuous cycle can be established between the flourishing of our green spaces and the enhancement of civic ownership. In the past decade, the community has been at the centre of our work in greening and conservation.

Through various programmes and opportunities, the NParks community today comprises more than 40,000 volunteers. This involvement has evolved beyond community outreach and participation to active stewardship of our natural heritage.

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Seeding community involvement

To nurture community involvement, it is imperative that gardens, parks and nature reserves must first be well-loved. This can only happen if people are learning about them or visiting and appreciating them. Each year, more than 3,000 educational and outreach programmes that cater to an extensive range of interests are organised across various gardens, parks and nature reserves. This shifts the focus from just providing green spaces for respite to activating green spaces to cater to lifestyle needs and wellbeing. Many of these programmes also help to inculcate an interest and passion in greenery, and beyond our green spaces, there are programmes that reach out to schools and neighbourhoods as well.

The “Every Child a Seed” programme reaches out to every cohort of Primary Three students in Singapore. The schoolchildren are provided with a plant starter kit so that they can experience the joy of growing their own plants, while learning to appreciate the challenges involved.

A love for gardening is also fostered through the Community in Bloom (CIB) programme, which encourages communities to start up their gardens in public spaces. NParks provides training and horticultural tips, such as how to grow edibles or native plants, to drive interest. This is complemented by the allotment garden programme, where individuals can rent spaces in parks to do gardening.

Citizen science programmes are made available to the public and school groups, engaging the community to participate in scientific research. Data derived from these projects helps to guide conservation strategies and hence involve the community in the conservation of our natural heritage.

**To nurture community
involvement, it is
imperative that gardens,
parks and nature reserves
must first be well-loved.**



Source: NParks

Community in Bloom Initiative

- Over 1300 community gardens under Community in Bloom (CIB) programme
- Over 160 groups under CIB Indoor Gardening programme
- 700 allotment garden plots have been launched in 9 parks



Source: NParks

Community in Nature Initiative

Citizen science encourages the public to learn more about our natural heritage, and play an active role in contributing to organised research efforts through the collection of large quantities of data. Awareness of Singapore's rich natural heritage is raised through public participation in NParks' Community in Nature Biodiversity Watch Programmes. The programmes encourage stewardship of nature amongst Singaporeans, while concurrently collecting information that will inform the development of long-term conservation management strategies. The Biodiversity Watches include Intertidal Watch, Heron Watch, Garden Bird Watch, Butterfly Watch, Dragonfly Watch and BioBlitzes.

Fostering active stewardship

Moving from community participation to active stewardship, the Friends of the Parks initiative is a prime example of how community ownership can bring people together to build consensus, as well as to manage and run programmes in our green spaces. Various stakeholders—ranging from researchers, conservation and heritage enthusiasts to regular park goers—come together to activate and energise each green space, for the benefit of all.

Some in the nature community have also formed working groups to discuss and tackle issues related to conservation and management of several fauna species. These groups generally comprise a variety of stakeholders, including agencies, academics and members of the community. They help raise awareness of human-wildlife interactions, a key aspect of nurturing biophilic communities.

Friends of Ubin Network and Otter Working Group

The Friends of Ubin Network (FUN) was formed in 2014, and comprises a broad network of stakeholders who are passionate about Pulau Ubin, are keen to share their ideas and to take personal action by being involved in initiatives and projects. They include biodiversity experts, conservation activists, history buffs, socio-anthropologists, students, volunteers and Ubin community leaders and residents.

The Network's discussions centre around five broad themes: Biodiversity conservation, Heritage, History and Community, Sustainable Design & Practices, Education & Research, and Nature-based Recreation. The aim is to develop ways to further enhance the island and get more Singaporeans involved.

For example, FUN members have developed a code of conduct for environmentally and socially responsible behaviour on Pulau Ubin. Known as the "Ubin Way", the code of conduct was inspired by the kampung spirit that Pulau Ubin residents embody and is centred on the innate motivation to care for the environment.



Source: NParks

Otter Working Group

Established in April 2016, the group comprises members from non-governmental organisations, government agencies, academics, Otterwatch (a community volunteer group), as well as individuals. The group monitors movements of the native otters around Singapore, meets with stakeholders to resolve otter issues, and actively educates the public on otters and what to do when they encounter them.

In November 2017, the group successfully isolated, treated and released an otter that was injured by a rubber ring around its body, in an operation that was the



Source: NParks

first of its kind in Singapore. The success came after three weeks of detailed planning, observations and attempts, and required the support and expertise of various members of the working group—from insights on otter behaviour to technical knowledge of how to build a corral structure.

Towards the future

NParks received the UNESCO Sultan Qaboos Prize for Environmental Preservation in October 2017 in recognition of its efforts in promoting biodiversity conservation in a highly urbanised and land scarce city-state. Through its Nature Conservation Masterplan (NCMP), it has conducted significant conservation biology research that has also resulted in the discovery of new endemic plant and terrestrial invertebrate species, and the results have been used to design better management plans and facilitate science-based decision-making.

The award is a landmark achievement for Singapore. Years of carefully balancing development and conservation has given us a highly liveable city. Growing land constraints and urbanisation will be challenges in the coming years, but they will be met with renewed commitment and innovation. We will draw on our knowledge and experience to further strengthen urban ecosystems, and build community ownership and stewardship, to ensure that we continue to grow a biophilic City in a Garden. ■

Notes

1. Lee, Kuan Yew, *From Third World to First: The Singapore Story—1965–2000* (Singapore: Times Editions, 2000).

