

Chapter 11

Realising Smart Cities

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Cities' Role in Improving Quality of Life

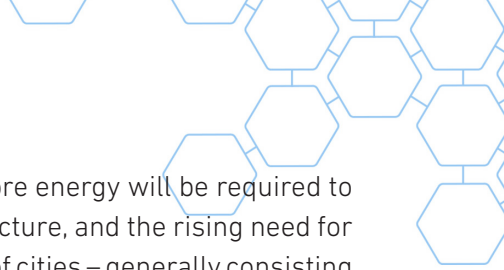

Cities are spaces of great opportunity and challenge. About half of the population of the Association of Southeast Asian Nations (ASEAN) and East Asia lives in urban areas, and cities will drive most of the region's future growth. Economic activities and social interactions are centred around cities, where innovations not only thrive, but also where environmental pressures such as emissions and pollution are prevalent. New technological and digital solutions could relieve these pressures, deliver integrated services efficiently, and maximise social inclusion.

Smart cities are where challenges with the second and third unbundling and solutions meet. They are a nation's centre of trade, innovation, and skills education; and the gateway to globalisation. With Southeast Asia and East Asia rapidly urbanising, cities will grow in importance. In 2017, the ASEAN Smart Cities Network (ASCN)¹ was opportunely established, as more and more cities are exploring smart solutions to address economic, environmental, and social challenges. There are many challenges on this smart city journey, while experimenting with new technological solutions, developing performance indicators, and devising viable financial mechanisms. The urban population is expected to double between 2020 and 2050. This creates urgency to solve our most pressing challenges and create opportunities for reducing communication, trade, travel and meeting costs – enhancing human power by capitalising on migration and accommodating fragmented production costs to enhance the quality of city dwellers' lives. In this critical reflection looking at the ASCN and other similar movements in China, India, and Japan, this chapter tries to understand whether information and communication technology (ICT) infrastructure development at the city level brings smart service delivery or smart cities are part of holistic urban planning solutions that would lead to improve the quality of life.

Economic and Social Dividends of Cities

Cities are complex, organic, self-organising, and non-linear systems, so they evolve and change constantly. Contemporary cities can be considered as a large number of interconnected citizens, businesses, transport and communication networks, services, and utilities. Between now and 2030, the number of city dwellers in ASEAN and East Asian countries is projected to rise from about 500 million to 900 million. Urbanisation

¹ The 26 pilot cities of that network have developed their vision in the process of crafting city-specific action plans.





at this rate will significantly increase energy demand, as more energy will be required to support greater economic activity, expanded urban infrastructure, and the rising need for municipal services. Barles (2010) explained the metabolism of cities – generally consisting of the input of goods and the output of waste – with consistent negative externalities, which amplifies people’s well-being.

Urban challenges – such as planning, economic development, resilient water supply, integrated data and security systems, responsive transport networks, environmental protection, sustainable resources management, risk management, sustainable waste management, energy management, emission control, education, social care and support, and the provision of local services – are putting immense pressure on cities, their infrastructure, and governance. Over the past five decades, the complexities and the speed of change, together with the need for integrated solutions, have been major challenges for local authorities, which have traditionally tackled such issues in silos. To ensure that such growth is sustainable, the ASEAN Socio-Cultural Community Blueprint 2025 (ASEAN, 2016) recommended enhanced coordination with relevant sectors to create environmentally sustainable cities and strengthen the capacity of local governments in conducting the greenhouse gas inventory. The blueprint also recommended strengthening the efforts of governments, the private sector, and communities to reduce emissions and pollution for an improved standard of living. Like many of the previous urban infrastructure visions – liveable cities, environment-friendly cities, and low-carbon cities – the concept of smart cities calls for tackling the challenging question of how alternative digital infrastructure choices can help in better managing their resources (Centre for Liveable Cities, 2018).

Smart Cities, Urban Amenities, and Digital Solutions for Well-Being

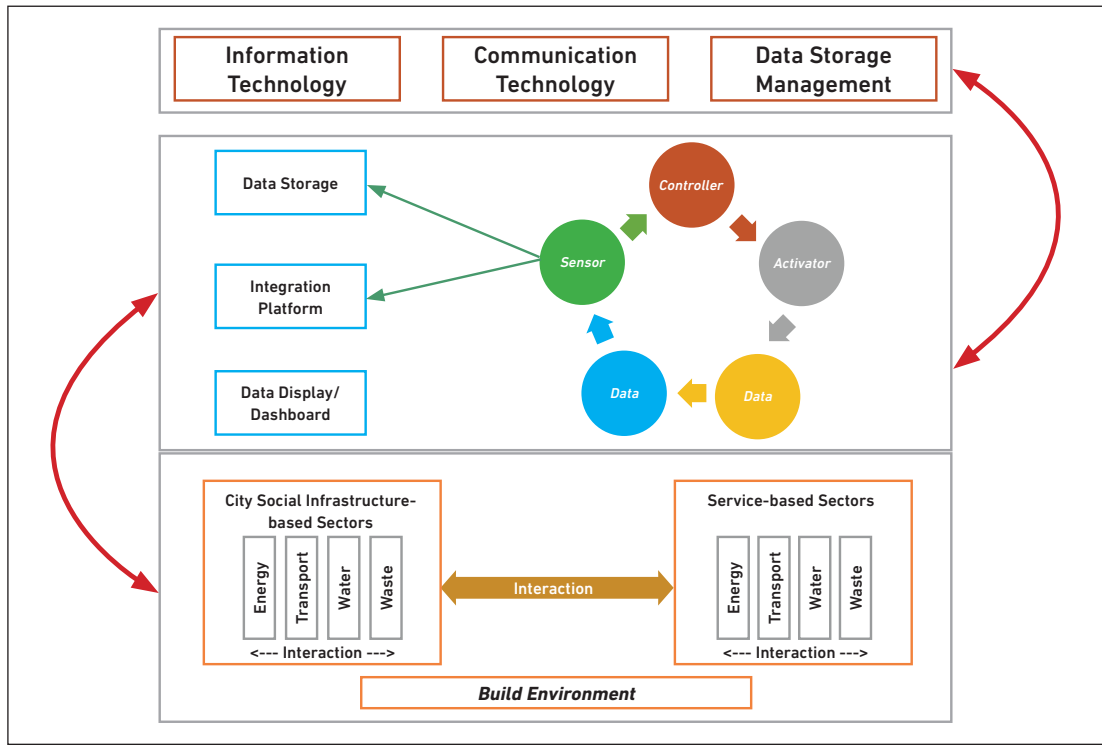
The conceptualisation of smart cities varies from city to city and from country to country. So far, leading the smart city pack in ASEAN and East Asia are Singapore, the Republic of Korea (henceforth, Korea), Malaysia, India, and China:

- (i) Under the Smart Nation initiative, Singapore aims to harness the use of digital and smart technologies to become a more economically competitive and liveable global city. The Smart Nation plan outlines several key enablers such as an e-payment gateway, smart urban mobility, and a national digital identification system which would help to fulfil its low-carbon ambitions.

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- (ii) The Korean cities of Seoul and Busan have been placing emphasis on incorporating the internet of things (IoT) into the daily lives of their residents. They have also bundled government utility services for delivery via an e-platform as part of their digitalisation. To bolster such programmes, the government relies heavily on big data analytics to understand its citizens better and to fine-tune its initiatives so that they better serve city populations in an environmentally sustainable way.
 - (iii) Malaysia, on the other hand, has turned to artificial intelligence (AI) to solve its urban congestion woes and to herald a new era of smart city development in the country. The project will essentially give authorities eyes in the sky as they leverage data mining and video and image recognition capabilities to track and optimise traffic flows. It is scheduled to be first launched in the country's capital, Kuala Lumpur.
 - (iv) India's smart cities programmes focus more on electronic service delivery, waste-to-energy conversion, and the introduction of smart metres for energy efficiency improvement.
 - (v) China's smart cities programme is designed to accomplish the goals of renewable energy generation, sludge solidification, and the recovery of resource use through energy recapturing.

Thus, the emerging concept of smart cities embeds an element of urban design that uses highly advanced technologies, wherein energy service is becoming one big and highly complex cyber-physical system, in which computer-based algorithms improve the quality of life of the city residents and build a sustainable and clean environment for them. The smart city architecture represents ICT-enabled service delivery, as illustrated in Figure 11.1.

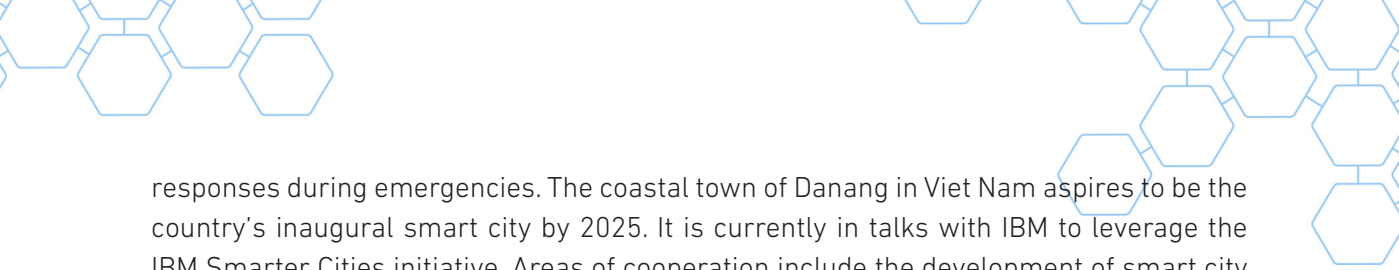
Figure 11.1 Smart City Architecture for Improving Service Delivery



Source: Authors.

The basic framework conditions are that city services such as energy, transport, water, and waste management are changing with digital technology driven concepts and tools, such as sensors, instrumentation, mobile phones, geospatial information, open data, big data, IoT, and geographic information, which define the governance structure of the administration.

ASEAN Member States are in this smart city race. Indonesia, which is the largest economy in the region, is working to develop Jakarta into a smart city. Amongst the initiatives launched are the Jakarta One Card, a rubbish truck tracker, and a smart street lighting system. Thailand, in collaboration with tech giants Dell and Intel, is combatting the problem of an ageing population via the Saensuk Smart City project. Davao City in the Philippines, alongside prominent tech player IBM, has implemented IBM's Intelligent Operations Centre to support public safety and security. The centre allows real-time monitoring of city operations, which improves energy use efficiency and provides timely



responses during emergencies. The coastal town of Danang in Viet Nam aspires to be the country's inaugural smart city by 2025. It is currently in talks with IBM to leverage the IBM Smarter Cities initiative. Areas of cooperation include the development of smart city infrastructure, efficient waste management, and air quality control.

This enthusiasm for smart cities is based on the belief that the application of digital technologies has the potential to become a panacea for urban problems and provide more efficient services. Such careful considerations require a common framework of reference, as shown in Figure 11.2, to enable the stakeholders in a smart city to discuss, decide, and then plan to become smart. From Figure 11.2, it is clear that data and ICT will play a large part in smart future urbanism. If that happens, smart cities will be an effective integration of physical infrastructure, digital technology, and human systems to deliver a sustainable, prosperous, and inclusive future for their citizens. In that sense, being smart or deploying ICT is not an end in itself, but rather can be an enabling condition that may lead to other desirable, social, economic, and environmental outcomes. City officials need to have a better understanding about both the benefits and costs involved.

Smart City Domain and Architecture

Smart cities were conceptualised during the past two decades in various parts of Europe and Asia, but they have different visions, as observed in the 26 ASCN cities (see Appendix). Nonetheless, smart cities continue to be an essential part of urban infrastructure planning. This is changing with technology-driven concepts and tools such as open data, big data, IoT, urban sensors, volunteered geographic information, and electronic democracy. These concepts and tools are redefining the city and how to manage and govern it. While ICT is only one option for addressing urbanisation and environmental concerns, it can be a powerful one. For example, the recent application of mobile-based applications for organising city events and controlling road traffic shows the potential for altering urban infrastructure planning, where smart urbanism is designed with more availability of user-generated data for better city governance. There is no doubt that ICT will play an important role in making cities smarter in delivering essential services. However, how cities are utilising ICT and aggregated data for the specific needs and requirements of the improved well-being of city residents is as important as the technology implementation in smart city progress.

To reveal the typology of smart cities, six application areas defined by the vision documents of the ASCN are explored, where smart cities are based on domains and subdomains (Table 11.1).

Table 11.1 Six Application Areas of Smart Cities

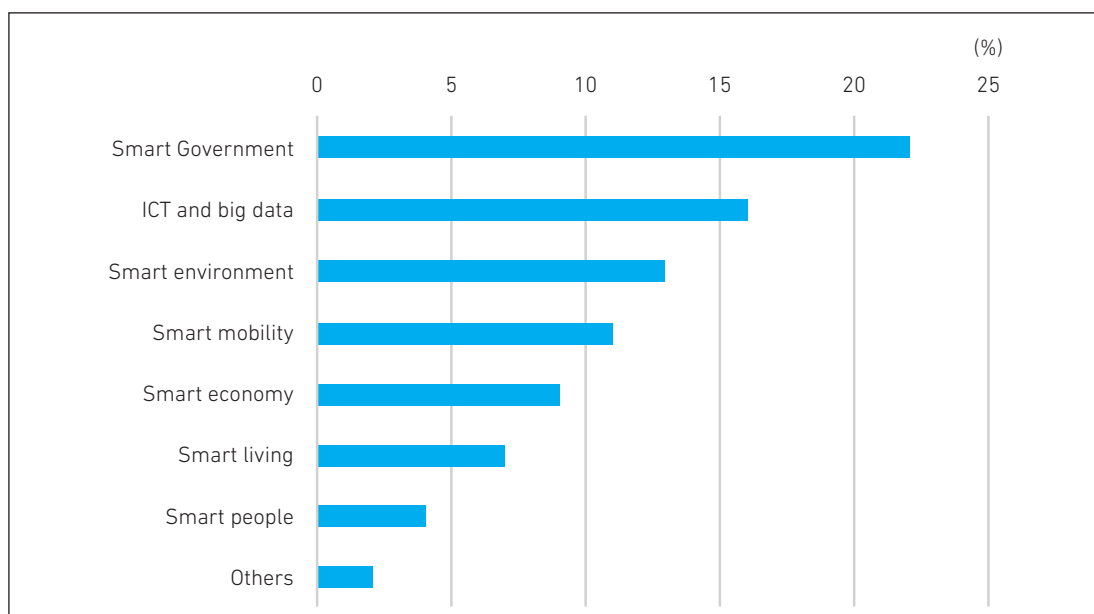
Smart Economy Competitiveness	Smart Environment Natural resources	Smart Mobility Transport and ICT
Smart Government Participation	Smart People Social and human capital	Smart Living Quality of life

ICT = information and communication technology.

Source: Authors.

A detailed review of smart city initiatives (ERIA, 2020) indicated that there are two different approaches to developing smart cities – top down and bottom up. A typical top-down approach can be observed in India’s Smart Cities Mission prepared by the Ministry of Housing and Urban Affairs. China’s 14th five-year plan encompasses a new type of urbanisation plan for 2021 – 2025. The previous five-year plan, 2016–2020 also planned investment in Chinese smart city projects and programmes, with more focus on technological issues compared with the Indian smart city programme. An ERIA survey on the ASCN found that apart from the six application areas mentioned in Table 11.1, different smart city application types are also in operation (Figure 11.2). It should be pointed out here that many of the ASEAN smart cities analysed have more than one smart city application.

Figure 11.2 Smart City Application Types in ASEAN



ASEAN = Association of Southeast Asian Nations, ICT = information and communication technology.

Source: Anbumozhi and Kumar (2019).

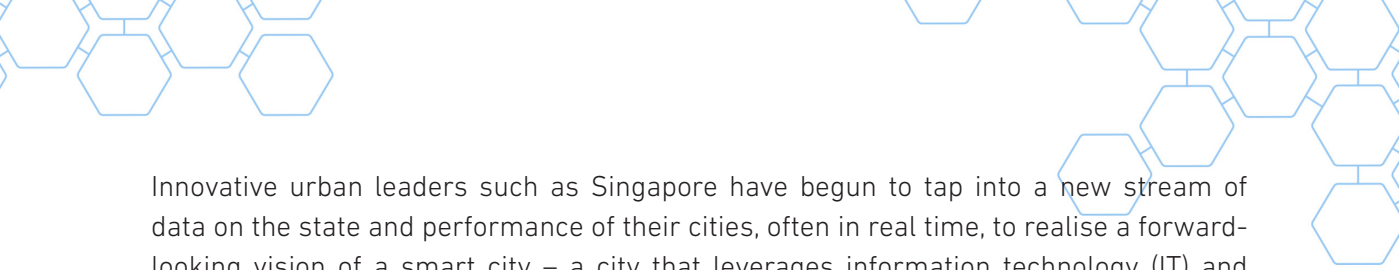
Based on the definition and operational application types, it is possible to create a taxonomy with four large branches: (i) business-related categories, (ii) citizen-related categories, (iii) environment-related categories, and (iv) government-related categories. Table 11.2 presents a domain taxonomy that can be used to categorise different smart city approaches.

Table 11.2 Domain Taxonomy of Different Smart Cities

Domains	Subdomains
Business-related smart city domains	Entrepreneurship Enterprise management Logistics Transactions
Citizen-related smart city domains	Education Healthcare Public transport Smart traffic Tourism
Environment-related smart city domains	Renewable energy Smart grid Building and housing Waste management Water management Pollution control Public space
Government-related smart city domains	Emergency response E-government Public safety Public service Transparency

Source: Thompson (2017).

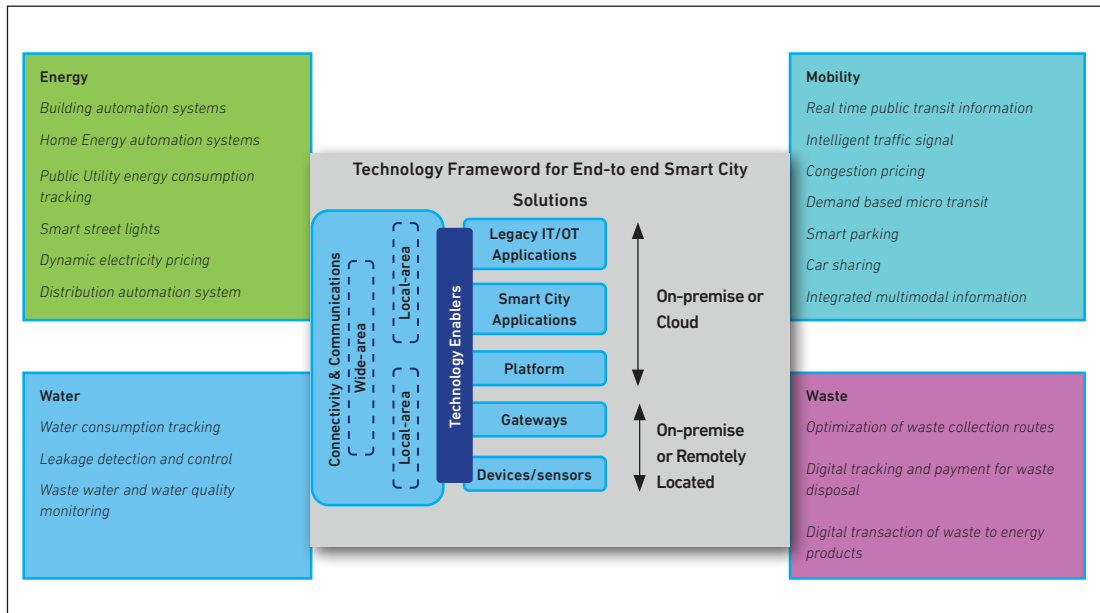
Tackling the dual challenges of governing urbanisation and increasing resource consumption remains the priority of smart city development, and these challenges need to have a direct relationship with the demands from citizens.



Innovative urban leaders such as Singapore have begun to tap into a new stream of data on the state and performance of their cities, often in real time, to realise a forward-looking vision of a smart city – a city that leverages information technology (IT) and communication technology and connectivity to make better decisions on reducing the trade costs and achieving better delivery of services and to improve the quality of life, which are aspirations of urban citizens. Smart city programmes are complex and diverse endeavours that encompass various existing and emerging technologies, environmental designs, and humanistic innovations. Their common outlook on technologies is illustrated in Figure 11.3. They include the domains of energy, mobility, water, and waste, which are fully integrated with or by IoT. Specifically, smart cities collect a lot of data through instrumentation, bring these data together through integration, and then analyse the integrated data for intelligence on how to improve a city's services for the third unbundling.

In an IoT-enabled smart city ecosystem, devices can be aggregated according to their geographical position and assessed by an integrated system. Sensor services and instrumentation devices for gathering specific data for service domains such as energy, transport, waste, and water can be used to monitor their resource consumption or the movement of people. The interlinking of enabling technologies through a platform provides a substructure that facilitates enhanced service provision to the consumers/users connected to each other. In Figure 11.3, the interconnection amongst the four service domains through IoT consequently integrates the different aspects of citizens' lives by creating cost-effective city services, enhancing public transformation, and reducing traffic congestion. At the national level, it could play a vital role in environmental and energy policymaking, e.g. pollution reduction, energy conservation, monitoring systems, and needed urban infrastructure. Thus, it would help to supply systems with more efficiency, lower costs, and more secure operations through energy conservation rules, economic competitiveness, and reliability levels (Gubbi et al., 2013).

Figure 11.3 Technology Applications and Enablers of Smart Cities



IT = information technology, OT = operations technology.

Source: Anbumozhi and Kumar (2019).

Quality of life has many dimensions, from the clean air residents breathe to the quality water they drink. Several IoT applications address these kinds of practical and very human concerns. Woetzel et al. (2018) and Anbumozhi (2020a) found that cities could improve some key quality of life indicators by 10%–30%, which translates into lives saved, reduced crime, shorter commutes, a lower health burden, and carbon emissions averted.

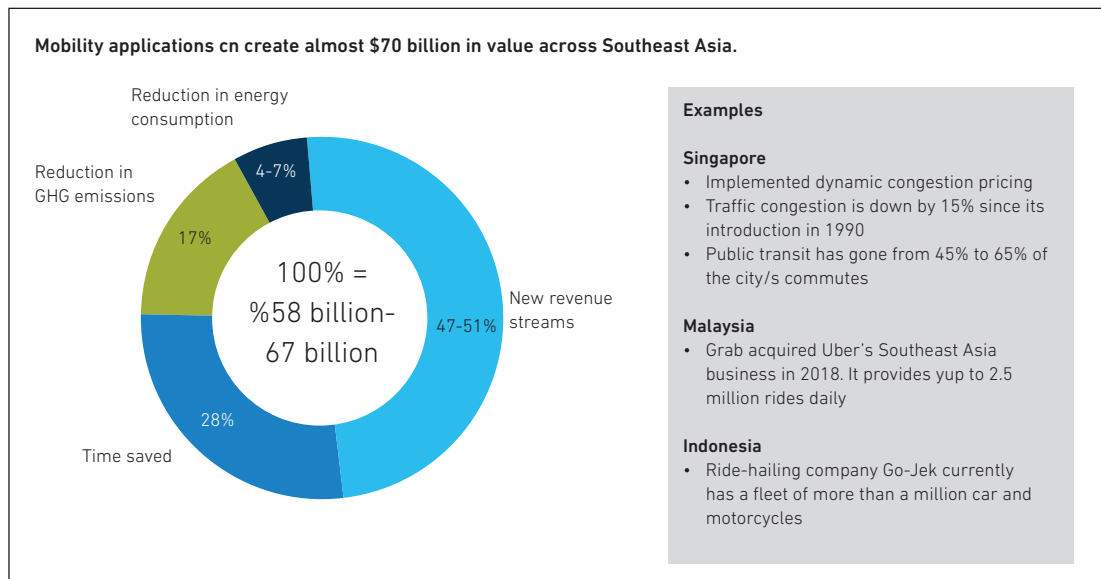
Despite widespread enthusiasm and appreciation of the benefits, however, most cities in ASEAN struggle to understand how best to invest in smart city infrastructure and connectivity to deliver long-term value (Hilton and Marsh, 2017). While evidence of a sustained impact remains elusive, governments allocate significant budget to smart city projects. China has launched a reported \$70 billion smart city credit line and an \$8 billion investment fund. India is aiming for the home-grown IT industry to construct 100 smart cities, with a yearly budget of \$1.2 billion (Federation of American Scientists, 2011).

Pragmatically, in ASEAN – through a network – old and new cities alike have begun to incorporate smart technologies into the everyday fabric and complexity of their existing urban centres to drive greater economic efficiencies in city operations; provide a platform for innovations on a citywide scale; and promote social inclusion through heightened accountability, citizen empowerment, and smarter governance.

Achieving Efficiency and Improving Quality of Life Through Smart Cities Based on Technology and Data

By collecting large amounts of data and translating these data into insights, cities could boost the efficiency and responsiveness of their operations. The integration of smart technologies – ICT, AI, automation, sensors, etc. – can help cities to match the supply of public services with real-time needs and to uncover emerging problems such as energy blackouts, clogged water supply, and congested traffic before crises emerge. Smart technologies make this possible in several ways, with many quantitative benefits (Figure 11.4).

Figure 11.4 Well-Being Benefits of Smart City Technological Applications



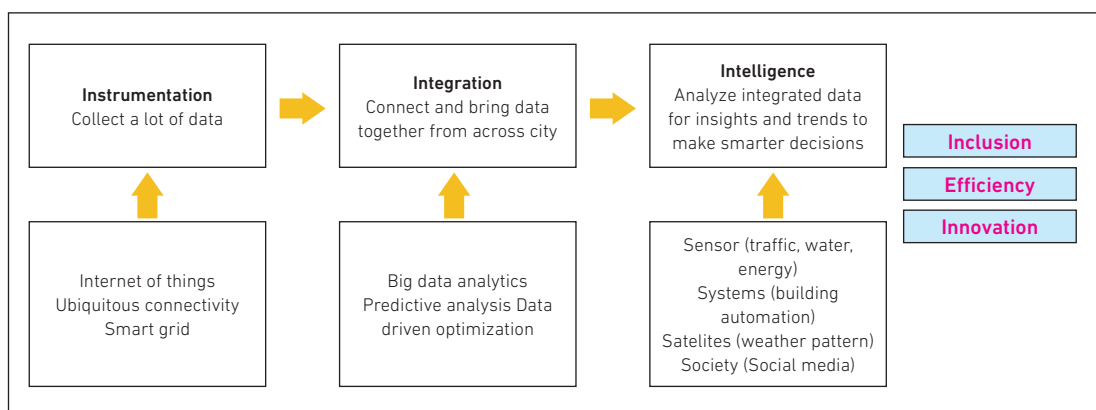
GHG = greenhouse gas.
Source: Woetzel et al. (2018).

Automated optimisation translates data from cameras, sensors, and anonymised cell phone records into intelligence, e.g. to help optimise traffic flows in real time. Predictive analysis uses such data to track and predict everything from rainfall to landslides during typhoons, thus contributing to strengthening business continuity plans. Evidence-based decision-making and planning can continuously monitor milestones and targets to ensure that cities can quickly take corrective action as needed to achieve productivity goals in a cost-effective way.

Innovation and Inclusion Through Smart Collaboration

Most smart innovations have their origins in the private sector (Yarime, 2018). Indeed, a city is essentially a complex economic system of production systems, and each of the systems generates data that can be analysed to make the third unbundling feasible. But for individual smart systems to add up to a smart city, innovations must be on a citywide scale. That requires contributions and ideas not just from commercial firms but also from governments and citizens through ‘public–private–people partnership’ in three stages, as illustrated in Figure 11.5.

Figure 11.5 Smart Cities – From Data to Intelligence for Well-Being



Source: Author.

Open data, social media, and cell phones enable governments, firms, and citizens to exchange vast amounts of information at virtually no cost – making it easy to share knowledge and ideas throughout society. These tools also enable real-time collaboration, allowing governments to view their citizens and firms not just as passive customers of public services, but as key partners in innovative problems (Anbumozhi, 2020b). Singapore, Seoul, Takamatsu, Jakarta, and Mandalay have begun to use this collaborative approach to bring together city residents, businesses, and city governments to experiment with innovations to reduce their city’s environmental footprint, increase economic efficiency, and enhance social inclusion.



Governments can benefit by facilitating innovations through three platforms (Talari et al., 2017; Hilton and Marsh, 2017). Through local open data, cities share local data with the public, promoting transparency, accountability, and collaborative problem-solving. Through living labs, governments designate parts of the city as test beds to pilot-test new ideas collectively. Through incubation centres, cities partner with local universities and industries to seed transdisciplinary research centres with systematic access to local city data.


City leaders should focus smart city efforts on the needs of all residents (Hilton and Marsh, 2017). Three valuable emerging experiences in the region are worth noting. First, using data to target the most vulnerable, as Singapore is doing by developing a comprehensive geographic database of socio-economic and physical indicators to prioritise housing investments. Second, opening up data to promote accountability, including grassroots initiatives such as the mapping of facilities, pollution, and community needs as in Salem. Third, tapping mobile connectivity and civic participation, as Jakarta is doing for participatory governance and for crowdsourcing the identification of polluting vehicles.

Conclusion

The diffusion of smart technologies and explosion of data will give rise to the third unbundling. Cities could stimulate this process by becoming living laboratories for smart innovations that translate local experiments into global knowledge and global knowledge into local solutions. Accelerating this progress will require actions at all levels. Cities in ASEAN and East Asia could work together to establish open standards for IoT devices and data collection protocols. This would avoid becoming locked in to a few big technology companies. It would also make it easier to share solutions such as a community-developed application programming interface in, say, Jakarta, which can be rapidly deployed in Kuala Lumpur through mutual recognition agreements. Local governments could address the often-fragmented structure of their bureaucracy and outdated rules that are incompatible with the design and implementation of an integrated ICT system that facilitates the movement of people, knowledge, and ideas across city/national boundaries.

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Appendix. ASEAN Smart Cities Network (ASCN)

Brunei

1. Bandar Seri Begawan

Objectives of smart city action plan	Not applicable
Priority project 1	Revitalisation of Kampong Ayer (water village) National Development Plan for housing in the water village
Priority project 2	Clean River Management Projects Cleaning of the Brunei River around Bandar Seri Begawan
Other projects in the pipeline	Not applicable
Support needed	<ul style="list-style-type: none"> • Learning good practices from other successful smart cities • Overseas consultants for planning and strategy formulation of smart cities • Sharing of capacity building on technological and digital expertise/learning

Cambodia

2. Battambang

Objectives of smart city action plan	In 2015, the Land Use Master Plan of Battambang Municipality, which is aimed at sustainable development, focused on six main pillars: (i) city of good governance and administrative management; (ii) green and healthy city; (iii) heritage, culture, and tourism city; (iv) regional centre of commerce and services; (v) regional centre of agricultural product processing and trade; and (vi) regional centre of education and knowledge.
Priority project 1	Capacity Development in Marketing to Investors <ul style="list-style-type: none"> • To improve marketing capacity to investors interested in projects to enhance Battambang's local economy and environment • Investors play an important role where the local government has limited budget to provide public services and to build infrastructure such as transport networks
Priority project 2	High-Level Expertise Building To build up capacity and skills for the implementation of future smart city plans
Other projects in the pipeline	Night Market (improvement of sanitation and support to vendors); Wastewater Treatment; River Embankment
Support needed	<ul style="list-style-type: none"> • Funding • Advisory support • Technical expertise in the smart and sustainable urbanisation domain • Strategic spatial planning

3. Phnom Penh

Objectives of smart city action plan	<ul style="list-style-type: none"> • To have sustainable development • To promote the city's potential for investment • To create a liveable city for future generations • To have an open and connected city • To have a peaceful and secured city
Priority project 1	<p><u>Smart Public Spaces</u></p> <p>11 important boulevards in Phnom Penh city taken as pilot projects for development into smart public spaces</p>
Priority project 2	<p><u>Public Transit Development</u></p> <p>Implementation of bus, tramway, skytrain, and waterbus</p>
Other projects in the pipeline	Affordable Housing Programmes; Waste Management System; Poverty Reduction; Clean Urban Environment
Support needed	<ul style="list-style-type: none"> • Capacity building • Action plan for efficient master plan implementation • District plan for local development • Creating urban regulation in detail

4. Siem Reap

Objectives of smart city action plan	<ul style="list-style-type: none"> • Urbanisation of City Development Plan • Smart Street Light and Control System
Priority project 1	<u>Security and Public Order</u>
Priority project 2	<u>Waste Management</u>
Other projects in the pipeline	Smart and Secure System for Tourist Sites; Infrastructure Quality
Support needed	<ul style="list-style-type: none"> • Technical support • Financial support • Regional framework and supported system

Indonesia

5. Makassar

Objectives of smart city action plan	Strengthening coordination and integration of data and information services, faster emergency services, and responsive collaboration for an inclusive government in expressing the smart city vision of Makassar City to create a liveable world-class city for all.
Priority project 1	<p><u>Technopark Development</u></p> <ul style="list-style-type: none"> • A tool for the city government to educate society through technology development • To facilitate the need for the growth and development of industries, especially innovative small- and medium-scale industries, the provision of services to industries within a specially prepared area, and increased productivity and competitiveness
Priority project 2	<p><u>Online Integrated Tax System</u></p> <p>Assist the implementation of an integrated online tax system and improve the convenience for taxpayers in fulfilling their tax obligations</p>
Other projects in the pipeline	Big Data Analytics; Integrated Public Service Access; Management Information System Asset City of Makassar (SAMATA); PTSP 5 Star; SMART RTH; Data Center Health; Disaster Response Alert in Hallway
Support needed	<ul style="list-style-type: none"> • To overcome implementation barriers: <ul style="list-style-type: none"> ◦ Building a high literacy community ecosystem (education) ◦ Realising the environmental community security system (resilient city) ◦ Sensing, coordinating, and networking for improved quality and the impacts of new social media ◦ Developing partnerships with the tech sector ◦ Engaging citizens through open-source apps

6. Banyuwangi

Objectives of smart city action plan	<ul style="list-style-type: none"> • Providing a digital platform and practical implementation of regional development plans based on the smart city concept • Providing guidance on development planning of Banyuwangi based on six dimensions of smart cities (smart governance, smart economy, smart society, smart branding, smart living, and smart environment) • Preparing smart city development priorities in the short term (1 year: 2017–2018), medium term (5 years: 2018–2023), and long term (10 years: 2018–2028)
Priority project 1	<u>Improvements to Public Service Access to Remote Areas</u>
Priority project 2	<p><u>Improvements to the Education System</u></p> <ul style="list-style-type: none"> • Improve access to education for all communities • Reduce dropout rates • Equip students with skills and knowledge on digital media

Other projects in the pipeline	Not applicable
Support needed	<ul style="list-style-type: none"> • Funding for the implementation of technology in education, health, and environment • Technical expertise in waste processing

7. Jakarta

Objectives of smart city action plan	To achieve the desired standard of living for the citizens of Jakarta while ensuring responsible natural resources management by utilising integrated information and communication technology in all public sectors
Priority project 1	<u>Oke Otrip</u> One-for-all payment card for integrated public transportation in Jakarta
Priority project 2	<u>Jaki</u> Mobile phone applications and website for information related to Jakarta, where people can also submit a report about problems they face
Other projects in the pipeline	Okemart; Developing Affordable Housing Programmes
Support needed	<ul style="list-style-type: none"> • Additional technical expertise • Cooperation with each ministry and related agencies in implementing smart city programmes • Funding from the regional budget

Lao PDR

8. Luang Prabang

Objectives of smart city action plan	Not applicable
Priority project 1	<u>Wetland Environmental Improvement Project</u> <ul style="list-style-type: none"> • Preservation of natural ponds and wetlands to protect green spaces • Construction of urban drainage network/storm drainages to protect the city centre from flooding
Priority project 2	<u>Construction of Concrete Alleyways and Footpaths</u> <ul style="list-style-type: none"> • To improve and upgrade the existing dirt paths in the city centre to concrete • To lay bricks for sidewalks in the city centre to improve accessibility
Other projects in the pipeline	Improvement of Waste Landfill Site, Improvement of Riverbanks, Construction of Public Toilets and Wastewater Treatment Units, and Construction of Sludge Treatment Site
Support needed	<ul style="list-style-type: none"> • Financial support • Capacity building

9. Vientiane

Objectives of smart city action plan	To develop a smart and sustainable city
Priority project 1	<u>Faecal Sludge Management Project</u>
Priority project 2	<u>Major Development Sites along 450th Anniversary Road</u>
Other projects in the pipeline	Nongping Project; Vientiane Expressway Project; Latsavong Project
Support needed	Funding support

Malaysia

10. Johor Bahru

Objectives of smart city action plan	Smart City Iskandar Malaysia is a tool to accelerate Iskandar Malaysia vision to become a strong and sustainable metropolis of international standing.
Priority project 1	<p><u>Iskandar Malaysia Urban Observatory</u></p> <ul style="list-style-type: none"> • A central data centre to collate, update, analyse, manage, and disseminate data and information in Iskandar Malaysia • A knowledge hub to improve the region-wide base of urban knowledge on Iskandar Malaysia • A monitoring and assessment centre to monitor the progress of Iskandar Malaysia in implementing the Comprehensive Development Plan (CDP), its urban condition, and trends • Technical services that help to monitor programmes and provide capacity building in implementing policies at the local level
Priority project 2	<p><u>Management of Water Resources & Distribution</u></p> <ul style="list-style-type: none"> • Rollout of Integrated Urban Water Management Blueprint • Includes sourcing of new water solutions, enhancement of service delivery and distribution, and optimisation of water resources through technology to cater for future population and business needs
Other projects in the pipeline	Global District Energy in Cities; Building Efficiency Accelerator; Low-Carbon Society; Smart City Action Plan for Local Authorities in Iskandar Malaysia; Integrated Transport System
Support needed	<ul style="list-style-type: none"> • Strong government support on implementation and monitoring • Integration and coordination amongst stakeholders • Enhanced public-private partnerships • Continuous research and development (R&D), innovation, and creativity

11. Kuala Lumpur

Objectives of smart city action plan	<ul style="list-style-type: none"> • Development plans (Kuala Lumpur Structure Plan 2020 and Draft Kuala Lumpur City Plan 2020): Vision to be a World Class City by 2020 – to be achieved through four principles: world-class working, living, and business environment, and city governance • Kuala Lumpur Low Carbon Society Blueprint 2030: Vision to be a World Class Sustainable City 2030: 70 by 30 A Greener Better Kuala Lumpur – through 10 actions: green growth, energy-efficient spatial structure, green mobility, sustainable energy system, community engagement and green lifestyle, low-carbon green building, green and blue network, sustainable waste management, sustainable water management, and green urban governance • Draft Kuala Lumpur Competitive City Master Plan: Vision to be a World Class Competitive City by 2030
Priority project 1	<p><u>Low-Carbon Society Blueprint</u></p> <p>This blueprint will provide Kuala Lumpur City Hall with a strategic direction and clear framework for coordinating related policies and programmes towards the reduction of greenhouse gas emissions for Kuala Lumpur</p>
Priority project 2	<p><u>City Competitiveness Master Plan</u></p> <ul style="list-style-type: none"> • This master plan takes into account the competitive advantage of the city in consultation with the private sector, civil society, and other relevant stakeholders • The development of a city competitiveness master plan will ensure that the city remains economically advanced and is a great place to live for urban residents of all socio-economic levels
Other projects in the pipeline	<p>Heritage Trails in City Centre; Green Enterprise Zone in City; Green and Blue Network Study</p>
Support needed	<ul style="list-style-type: none"> • Funding • Advisory support • Technical expertise, especially in information and communication technology (ICT) areas, to achieve a smart and sustainable city vision and objectives

12. Kota Kinabalu

Objectives of smart city action plan	<p>Goal: To transform Kota Kinabalu into a clean, green, and liveable city</p> <p>Vision: To administer Kota Kinabalu City through efficient and effective services with sustainable development.</p>
Priority project 1	<p><u>Tanjung Aru to Universiti Malaysia Sabah -Pedestrian Walkway and Cycleway</u></p> <p>A world-class pedestrian walkway and cycleway that is safe, interesting, and provides a variety of experiences for recreational cyclists and commuters</p>
Priority project 2	<p><u>Sembulan River Beautification</u></p> <p>To restore a vital city resource by restoring and regenerating the Sembulan River corridor so that it becomes an essential 'greenway' for recreation and leisure, and a focal point for wildlife and special recreation; provides excellent opportunities for multiuse waterfront development; improves social interaction; and creates a sense of community</p>
Other projects in the pipeline	Safe City Programme, Anti-Litter Bug Campaign, Reduction of Plastic Bag Usage Campaign, Mottainai KK, Program Kasih Sayang Pulau Gaya, KK Green City Action Plan, Smart Cities Action Plan
Support needed	<ul style="list-style-type: none"> • Technical expertise to advise on various sectors of smart/sustainable development initiatives, including the preparation of the action plan and the involvement of local or international investors to implement the programmes set in the action plan • A regulatory framework to allow the collaboration of the city and investors implementing the smart/sustainable development programmes

13. Kuching, Sarawak

Objectives of smart city action plan	Improving the quality of life and achieving the status of smart state through digital transformation
Priority project 1	<p><u>Transport & Smart Mobility</u></p> <p>Establish comfortable and safe mobility for commuters using smart technologies</p>
Priority project 2	<p><u>Flood Management and Response System</u></p> <p>Undertake:</p> <ul style="list-style-type: none"> • integrated smart development planning • stormwater management programme • flood information management system
Other projects in the pipeline	Smart Water Supply Services, Smart Solid Waste Management System
Support needed	Not applicable

Myanmar

14. Nay Pyi Taw

Objectives of smart city action plan	<p>The city's five visions are:</p> <ul style="list-style-type: none"> • to be environmentally sustainable • to be green and liveable • to be a knowledge hub • to be an international aviation transit, cargo, and logistics hub • to be climate change resilient
Priority project 1	<p><u>Improvement of Nay Pyi Taw City Master Plan</u></p> <ul style="list-style-type: none"> • Nay Pyi Taw city was established by combining three old townships (Pyinmana, Lewe, and Tatkone) and surrounding villages and farmlands. The whole territory will be developed by urbanising the villages and farmlands and through resettlement. • The Smart City Initiative Project will be implemented partially at the Diplomatic Zone, Hotel Zone, and proposed International University zone (the first in Myanmar to be constructed in cooperation with the Republic of Korea). • The Hotel Zone has completed infrastructure while the other two zones have established basic infrastructure (e.g. roads, electricity and water supply, and communication networks), but improvements are needed.
Priority project 2	<p><u>Affordable Housing Development</u></p> <ul style="list-style-type: none"> • Construction of medium-rise low-cost affordable housing for government employees • Pilot project construction was completed in 2017 through government construction and investment from public-private partnerships.
Other projects in the pipeline	<p>Logistics Hub, Innovative Improvement of Nay Pyi Taw Infrastructure Project</p>
Support needed	<p>Not applicable</p>

15. Mandalay

Objectives of smart city action plan	Not applicable
Priority project 1	<p><u>Waste Management Systems</u></p> <ul style="list-style-type: none"> • Goal A: Maximise municipal solid waste collection and recycling in the city • Goal B: Improve final treatment and disposal system in the city • Goal C: Maximise proper collection and disposal of industrial and hazardous waste • Goal D: Maximise proper disposal and treatment of wastewater • Goal E: Capacity development, awareness raising, and advocacy • Goal F: Ensure services remain sustainable through review, monitoring, innovation, and improvement
Priority project 2	<u>Affordable Housing Programme</u>
Other projects in the pipeline	Traffic decongestion
Support needed	Not applicable

16. Yangon

Objectives of smart city action plan	Not applicable
Priority project 1	<p><u>Low-Cost Rental Housing and Transport-Oriented Development</u></p> <ul style="list-style-type: none"> • Low-cost rental houses for targeted groups • To develop growth characteristics, highway bus terminal for smooth transportation between Yangon and Ayeyarwady division, and to link it strongly with Yangon Public Transportation (Yangon Bus Service) • To establish dry port zone for easy flow of goods • To develop public rental housing system to upgrade the socio-economic state of the homeless and workers who are in need of housing
Priority project 2	<p><u>Conservation of Yangon City Downtown Area</u></p> <ul style="list-style-type: none"> • Preserve Yangon's unique heritage and image • Become an economic hub through well-balanced development in city functions • Become a sustainable city where citizens can live and work peacefully • Create a systematic and sustainable developing city style and good social environment in Yangon • Define construction design and land use according to zoning for a reduction of damage caused by natural disasters
Other projects in the pipeline	Bo Ba Htoo Affordable Housing Project, Industrial Zone
Support needed	Not applicable

Philippines

17. Cebu

Objectives of smart city action plan	Not applicable
Priority project 1	<u>Automated Citywide Traffic Control Systems</u>
Priority project 2	<u>Transport Expansion Plan</u>
Other projects in the pipeline	Cebu Bus Rapid Transit; Call Centre City; Long Life Programme; Extension/Expansion of the Cebu Bus Rapid Transit System
Support needed	<ul style="list-style-type: none"> • Access to capital funds and technical assistance • Advisory support • High level of technology transfer to allow initiative and creativity at the local level to continue and sustain all programmes and projects

18. Davao City

Objectives of smart city action plan	<ol style="list-style-type: none"> 1. To improve the quality of life of citizens, especially those who are underprivileged 2. Improve public service delivery, bureaucracy, and governance through the use of the latest management information systems 3. To ensure the public's safety and security, and efficiently address the current traffic conditions in the city, with the aid of modern information technology 4. To have a healthy, safe, and secured environment 5. Provide linkages and collaboration with local, national, and international agencies to achieve sustainable development <p><u>Action Plan:</u></p> <ol style="list-style-type: none"> 1. Creation of Davao City General Development Direction by identifying key priority areas of concern 2. Creation of Davao City Government ICT Policy and Enterprise Architecture Plan (EO 20 series of 2016)
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Priority project 1

Intelligent Transport and Traffic System and Security

- The smart traffic system, along with traffic surveillance monitoring, has been fully operational since 2010. 'No contact apprehension' has been implemented to sanction traffic violators.
- However, due to the ever-growing challenges of traffic management, the City Government of Davao is looking to enhance traffic management capabilities by leveraging the latest technological innovations available.
- The city government would also like to give equal weight to safety and security, ensuring that the traffic and transportation solution to be adopted is inclusive, with security mechanisms.
- The city government will implement the following traffic and transport projects: (i) High Priority Bus System (funded by the Asian Development Bank), (ii) Railway System (funded by the Japan International Cooperation Agency), and (iii) Traffic Signalization System Upgrade (funded by the Department of Transportation).
- Technology needed: smart traffic signalisation upgrade, smart high-priority bus system, and smart railway system
- Considerations: cost of investment, cost of maintenance, scalability, integration amongst the different systems to be implemented, compatibility with the existing traffic signalisation system

Priority project 2

Converged Command and Control Center

- In the Philippines, Davao City is the only civil government to have a Public Safety and Security Command Center (PSSCC) specifically tasked to orchestrate all undertakings relative to safety and security.
- The PSSCC is a centre for all coordination efforts to ensure maximum efficiency of all resources involved in safety and security operations within the city, and leads multi-agency mechanisms whenever there are incidents beyond the capacity of a single agency.
- A converged command and control solution will enable the PSSCC to easily link to other agencies and acquire near-, if not real-time, information that is critical in the planning and implementation of particular safety and security standards.
- Technology needed: video and data analytics, video management systems, unified communication systems, unified open platform
- Considerations: cost of investment, cost of maintenance, scalability, interoperability

19. Manila

Objectives of smart city action plan	To achieve the desired standard of living for the citizens of Manila while ensuring responsible natural resources management by utilising integrated information and communication technology in all public sectors
Priority project 1	Creating a smart city with a smart grid that allows artificial intelligence to monitor the consumption, production, and transportation of energy efficiently. The SMART Grid is a revolutionary infrastructural and utility grid that enables artificial intelligence to effectively monitor the consumption, production, storage, and transportation of energy. At the same time, it will provide flexibility for localised consumption.
Priority project 2	Provide a green and sustainable building environment and enhance the quality of life for residents; design a city with residential, commercial, healthcare, educational, recreational, retail, and all other types of facilities and services that are all efficiently connected.
Other projects in the pipeline	<ul style="list-style-type: none"> • Enhanced Flood Monitoring and Prevention • Traffic Management • Manila Resident ID Issuance
Support needed	<ul style="list-style-type: none"> • Additional technical expertise • Cooperation with each ministry and related agencies in implementing smart city programmes • Funding from the national budget

Singapore

20. Singapore

Objectives of smart city action plan	Singapore's Smart Nation is not intended to be just a technology project, but a whole-of-nation journey to fundamentally remake the nation through technology, with strong collaboration between the public, private, and people sectors. The goals include (i) building a leaner and stronger public sector, where agencies are at the global leading edge of service delivery, transformation, and innovation; (ii) building a vibrant economy that remains attractive to foreign investment and talent, with competitive local enterprises and opportunities for Singaporeans, and with companies leveraging digital technologies to reinvent their processes and production; and (iii) making services more accessible to all, and connecting people and communities better, to encourage a sense of optimism and confidence in the opportunities that the future Singapore brings.
Priority project 1	<u>E-Payments</u> Providing seamless and integrated e-payment platforms and options
Priority project 2	<u>National Digital Identity</u> Digital identity and authentication for all citizens

Other projects in the pipeline	Smart Nation Sensor Platform; Moments of Life (one-stop platform for citizens to interact with multiple government agencies); Smart Urban Mobility; Smarter Estate Planning & Management; Digital Health
Support needed	<ul style="list-style-type: none"> • Industry support to find and develop the best use cases for the Smart Nation initiatives • Development of business models for various initiatives to be successfully implemented and adopted

Thailand

21. Bangkok

Objectives of smart city action plan	To drive the projects/programmes in the action plan in a suitable timeframe
Priority project 1	<u>Development in Bang Sue Area</u> <ul style="list-style-type: none"> • Bang Sue will be the next transportation hub of Thailand. • This project will be overseen by the State Railway of Thailand.
Priority project 2	<u>Smart City Plan and Investment Plan</u>
Other projects in the pipeline	Not applicable
Support needed	<ul style="list-style-type: none"> • Advisory support from other countries on smart cities • Interest in private enterprises to invest in areas which house pilot smart city projects

22. Chonburi

Objectives of smart city action plan	Key performance indicators by 2040: <ul style="list-style-type: none"> • 30% renewable energy + energy storage • Reduce energy consumption by 20% • Reduce carbon dioxide emissions by 30% • Energy self-reliance • Smart grid system
Priority project 1	<u>Smart Grid Project</u> Partnership with AMATA Corporation PCL to manage electrical network, generation systems, transmission systems, and power distribution system, with energy management and storage system
Priority project 2	<u>Waste to Energy</u> Partnership with AMATA Corporation PCL to convert waste in Amata Nakorn industrial estate to energy (electricity)
Other projects in the pipeline	Not applicable
Support needed	Technological support in waste management

23. Phuket

Objectives of smart city action plan	<p>Building sustainable tourism in Phuket that will consist of seven smart areas:</p> <ol style="list-style-type: none"> 1. Smart Tourism: Income distribution 2. Smart Safety: Phuket safe city 3. Smart Environment: Sustainable environment for tourism growth 4. Smart Economy: Hub of creative economy 5. Smart Governance: Sustainable city 6. Smart Education: Smart learning community 7. Smart Healthcare: Digital healthcare
Priority project 1	<p>City Data Platform</p> <ul style="list-style-type: none"> • The City Data Platform builds big data for city management and makes the data available for local governments and start-ups • Data include local data from both private and public sources (e.g. CCTV, internet of things (IoT) sensors, log files of free Wi-Fi/wristbands/bike sharing, VISA spending). Data from the central government are also available (e.g. weather radar and GPS from public transport). • The data will be cleaned, anonymised, quality assured, and categorised before being opened via an application programming interface (API), with defined security and access levels. • The platform will work like a marketplace of city data and anyone can retrieve the data for their business analyses and planning.
Priority project 2	<p>CCTV Safe City</p> <ul style="list-style-type: none"> • To invest in 3,500 cameras for full area coverage in Phuket • Since 2017, video analytics have been implemented and CCTVs have been integrated (from various Visitor Management Systems), with the control centre at city hall. • The analytics include law enforcement, licence plate recognition (LPR), and face recognition. • These are customised to fit the requirements of the traffic police to enforce red-light violation, speeding, vehicle counting, and classification and illegal parking. • The project aims to extend the CCTV coverage to the whole Phuket area.
Other projects in the pipeline	<p>Phuket Intelligent Operation Centre; Proof of Concept (POC) Safe Beach; Environment IoT Sensors; Maritime Safety; Airport Light Rail</p>
Support needed	<ul style="list-style-type: none"> • Master plan study for public–private partnership investment and business model for smart cities • Funding for proof-of-concept projects and investment master plan development

24. Da Nang

Objectives of smart city action plan	To improve the quality of life and efficiency of urban services and activities; to improve competitiveness while ensuring the needs of the present and future generations in economic, social, environmental, and cultural terms
Priority project 1	<p><u>Bus Rapid Transit (BRT)</u></p> <ul style="list-style-type: none"> • Smart bus station • Real-time traffic information system • Bus management system • Customer information system • Signal priority traffic system
Priority project 2	<p><u>Intelligent Traffic Control System</u></p> <ul style="list-style-type: none"> • Upgrade Transport Control Center • Completion of network and camera installation • Software to detect traffic flow and violations
Other projects in the pipeline	Intelligent Operation Control Center; Smart Citizens
Support needed	<ul style="list-style-type: none"> • Funding • Technical support

25. Hanoi

Objectives of smart city action plan	<ul style="list-style-type: none"> • Developing e-government closely associated with administrative reform, raising the quality and efficiency of state agencies, contributing to raising the city's competitiveness, developing the knowledge economy, and providing the best public services for people and businesses • Developing basic components of the smart city to raise the efficiency and effectiveness of the social administration work of state management agencies; step-by-step improvements to the quality of life of people and competitiveness of the city
Priority project 1	<p><u>Intelligent Operations Center</u></p> <ul style="list-style-type: none"> • Building of component centres: <ul style="list-style-type: none"> ◦ Supervision, traffic control, and crime prevention in public ◦ Centre for reception and processing of emergency information, fire prevention, and search and rescue ◦ Data Analysis Center ◦ Security Monitoring Center ◦ Center for Monitoring of Administrative Services

Priority project 2	<u>Development of Intelligent Transportation</u> <ul style="list-style-type: none"> • Traffic control and supervision • Management of public transport • Traffic instructions • iParking card management • Electronic tickets
Other projects in the pipeline	Building E-government; Smart Tourism
Support needed	<ul style="list-style-type: none"> • Capital and budget support • Access to knowledge, information, and experience on creating an intelligent city • Enablers to make intelligent city development decisions in accordance with Hanoi's conditions (through workshops, trainings, and experiential learning) • Support for human resources training (management and implementation) • Introduction to qualified partners in intelligent city building

26. Ho Chi Minh City

Objectives of smart city action plan	<p>Vision under Ho Chi Minh City's Smart City Master Plan Towards 2025: Ho Chi Minh City will attain rapid and sustainable economic development through optimal resource utilisation and citizen-centric governance</p> <p>General objectives of Ho Chi Minh City's Smart City Master Plan for 2017–2025:</p> <ul style="list-style-type: none"> • Maintaining economic growth towards a knowledge economy and a digital economy • Enhancing urban management efficiency through forecasting • Improving liveability and workability • Increasing citizen participation
Priority project	<u>Integrated Operations Center (IOC)</u> Development of a technology framework and model
Other projects in the pipeline	Shared Data Warehouse and Corresponding Integration of Data and Technical Guidelines; Topography and Cadastral Maps; Citizen Database; Enterprise Database; One-Stop Service E-Portal for the Public; Security Operations Center
Support needed	<ul style="list-style-type: none"> • Financial support • Sharing of best practices, policies, and solution technologies in the field of smart cities through site visits • Technical and consulting assistance for developing and implementing important projects such as a Forecasting Center, economic policies and development strategies, and Intelligent Operations Center