ASEAN Smart City Planning Guidebook

Prepared by Ministry of Land, Infrastructure, Transport and Tourism (MLIT) in Japan

In Consultation with the ASEAN Smart Cities Network (ASCN) and the ASEAN Secretariat (ASEC)

March 2022

The guidebook has been developed, by leveraging insights from discussions with ASEAN cities, in addition to leveraging reports developed in ASEAN and Japan.

ASEAN Smart City Planning Guide Book: Table of Contents

Key Information Source

● Primary Source ○ Supplementary Source

Chapter	Subchapter	Concept Note (ASEAN Secretariat-MLIT)	Reports by Association of Southeast Asian Nations (ASEAN) [1]	Interviews with ASEAN Cities	Reports from Japan [2]
Introduction	• Introduction (e.g. objective, expected readers, structure) • How to use the guidebook	●			
1. Basic Understanding of Smart Cities	1.1 Background and Objectives for Smart City Development		●		○
	1.2 Principles and Frameworks for Smart City Development		●		●
2. Priority Areas for Development of Smart Cities	2.1 Overview and Examples for the Priority Areas		●	●	○
3. Process and Enablers for Smart City Development	3.1 Process for Smart City Development		○	●	●
	3.2 Key Enablers for Smart City Development		○	●	●

Insights provided in the interviews with the ASEAN cities has been primarily used for the examples in each section.

Note:
[1] Key reports includes the 'ASEAN Sustainable Urbanisation Strategy (ASUS)'
[2] Key reports includes the 'Smart City Guidebook' and 'Smart City Reference Architecture Whitepaper'

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Table of Contents

The guidebook will include both the framework and examples, regarding the priority areas, processes, and enablers for smart city development.

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Concept Note for the ASEAN Smart City Planning Guidebook

Background and Objectives:
- The Master Plan on ASEAN Connectivity (MPAC) 2025 sets out ASEAN's vision to achieve a seamlessly and comprehensively connected and integrated ASEAN that will promote competitiveness, inclusiveness and a greater sense of Community.

- MPAC 2025 identifies "Sustainable Infrastructure" as a strategic area, with increasing the deployment of sustainable urbanisation models across ASEAN to address the challenges and opportunities associated with rapid urbanisation as one of its strategic objectives. In this context, the ASEAN Smart Cities Network (ASCN) can contribute to the achievement of this objective by enabling the sharing of best practices in sustainable urbanisation within the ASEAN region, such as the ASEAN Sustainable Urbanisation Strategy (ASUS).[1]

- The ASCN was established by the ASEAN Leaders at the 32nd ASEAN Summit in April 2018. It is a collaborative platform where cities work together towards the common goal of smart and sustainable urban development. The ASCN has 26 pilot cities, including the capitals, from all ASEAN Member States.

- In light of this situation, this project aims to develop a guidebook that can be used as a reference for ASEAN cities to promote "Smart and Sustainable Urbanisation" by introducing best practices in the ASEAN region.

In preparing the guidebook, the following points will be taken into consideration:
- The ASEAN Smart Cities Framework, including its six development focus areas, as the overarching structure of the document.
- Smart cities planning and development require an integrated approach to physical, digital and human systems.
- As digital technology is expected to be used as an enabler to solve urban problems, the guidebook would consider data generation, distribution and management.
- From the perspective of attracting investment in the project, it is important to include consideration of multilateral banks and investors as well as the local community.
- The guidebook could address common barriers or challenges identified under the ASUS, such as information failures, return on investment, fiscal capacity, implementation capacity, and coordination.
- The preliminary draft guidebook was shared at the 3rd ASEAN-Japan Smart Cities Network High-Level Meeting held in October 2021.
- Case Studies (examples) will also be conducted for this project, including by using the guidebook, to deepen the knowledge on the implementation of smart and sustainable urbanisation across the region. The Case Studies (examples) can be based on the 7 priority sub-areas and 8 priority actions for sustainable urbanisation identified under the ASUS[2].
    - ASUS 7 priority sub-areas are: (1) Inclusive & Equitable Growth; (2) Housing & Home; (3) Personal Safety & Security; (4) Water, Waste, and Sanitation; (5) Mobility; (6) Urban Resilience; (7) Education.

[1] For more information on the Strategic Area of Sustainable Infrastructure, please see https://connectivity.asean.org/strategic-area/connecting-asean-an-overview/
[2] For more information on the ASUS priority sub-areas and actions as well as the common barriers to implement sustainable urbanisation actions, please see https://asean.org/storage/2018/11/ASEAN-Sustainable-Urbanisation-Strategy-ASUS.pdf

Introduction

The guidebook aims to provide practical insights including frameworks and examples, to support stakeholders involved in smart city development in ASEAN.

Expected Readers

- This guidebook was developed, primarily for the following readers which are involved in smart city development in the ASEAN region:
  - **Local government members**
  - **National government members**
  - **Other members in the public sector involved in smart city development**
  - **State owned enterprises**
  - **Stakeholders in the private sector for smart cities (e.g. Primary Promoters, Service Providers, and Investors)**

Guidebook Structure

- **Section 1:** Provides a basic understanding of what a smart city is, including the background, objectives, core principles, and frameworks for smart cities.

- **Section 2:** Provides examples based on the 7 sub-priority areas in the ASUS Framework.

- **Section 3:** Provides an overview of the business process and the key enablers for smart city development, and best practices for each process and enabler.

How to Use the Guidebook

This guidebook will address various questions regarding smart city development, ranging from what a smart city is, to the efficient ways of developing smart city.

Example of Use Cases

Basic Questions regarding Smart Cities

Relevant Contents in Guidebook

Level of Progress

What is a smart city?

→ **1.1 Background and Objectives for Smart City Development**

Background and objectives on why a smart city needs to be developed in the ASEAN Member States.

1.2 Principles and Frameworks for Smart City Development

Principles and frameworks for smart city development, and examples from actual cities.

How to develop smart cities efficiently?

→ **2.1 Overview and Examples for the Priority Areas**

Overview on the priority areas, actions which can be taken in the priority areas, and examples.

3.2 Key Enablers for Smart City Development

Overview and examples of the effective usage of the 5 key enablers for smart city development.

Where should I start, for smart city development?

→ **3.1 Process for Smart City Development**

Step-by-step explanation on how to develop smart cities, and examples for each of the steps.

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Urbanisation is expected to continue across ASEAN Member States, which will be primarily driven by the growth in middleweight regions.

Background: Rising Urbanisation in ASEAN	• Urbanisation is expected to continue across all ASEAN Member States in the future, resulting in an additional 70 million urban residents from 2015 to 2025 in total within the ASEAN region. • In particular, urbanisation is rising in middleweight regions with population between 500,000 and 5 million, in addition to mega cities such as Bangkok* and Jakarta.

Urban Share of Country's Population (Unit: %)

Legend: ■ 2015 ■ 2025

Country	2015	2025
Singapore	100	100
Brunei	77	80
Malaysia	74	80
Indonesia	53	60
Thailand	48	55
Philippines	46	49
Vietnam	34	41
Laos	33	40
Myanmar	30	33
Cambodia	22	27
ASEAN Total	47	53

Additional 70 mn people from 2015-2025
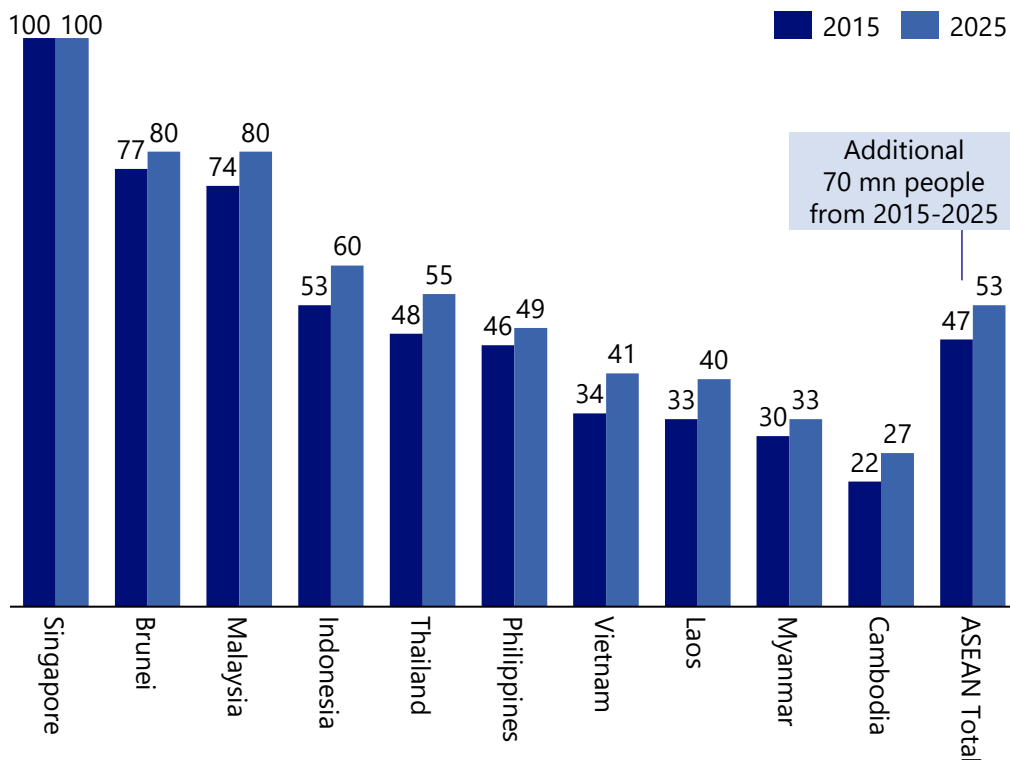
Economic Growth by Size of Region

Legend: ■ 2010-2015 ■ 2015-2020

Compound Annual Growth Rate (CAGR) of Real Gross Domestic Product (GDP) Growth (Unit: %)	2010-2015	2015-2020	Share of Real GDP (2015)	Share of Population (2015)
Mega Regions (5 mn people and above)	5.0	5.5	33%	11%
Large Middleweights (1-5 mn people)	5.7	6.9	32%	48%
Small Middleweights (500K-1 mn people)	4.8	5.8	16%	22%
Small Regions (300K-500K people)	5.0	6.0	8%	9%
Rural Regions (Below 300K people)	4.2	5.5	11%	10%
Total	5.1	6.0		
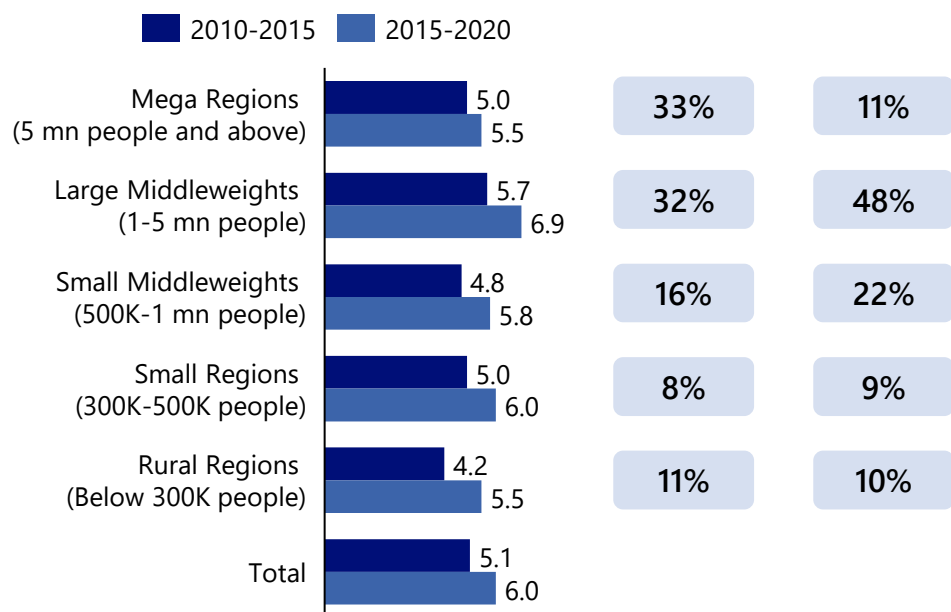
*Note: The Office of the Royal Society (ORST) has recently (specifically on February 16, 2022) announced the change of the official name of Thailand's capital, from Bangkok to "Krung Thep Maha Nakhon."
Source: ASEAN Sustainable Urbanisation Strategy

A smart city leverages digital infrastructure across business areas, to address the urban challenges observed across ASEAN Member States.

Objectives and definition of smart city	• Rapid urbanisation has caused issues and challenges in the ASEAN Member States, for areas including the quality of life for the residents, environment, and infrastructure. • Smart cities in ASEAN aims to address such issues and challenges and provide new value to the citizens, by leveraging digital infrastructure and data as an enabler.

Issues and Challenges caused by Rapid Urbanisation

City Congestion	Insufficient public transport infrastructure and services, and traffic congestions.
Water / Air Quality	Increased water demand causing strains on the existing water infrastructure.
Security and Safety	In addition to traditional threats, non-traditional threats such as cyber threats.
Urban / Rural Divide	Less opportunities for residents residing in rural areas compared to urban residents.
Rising Inequalities	Economic inequality, further accelerated by the digital technology adoption as a result of the Corona Virus Disease (Covid-19).

Overview of Smart Cities in ASEAN

Digital Infrastructure

- Inclusive & Equitable Growth
- Housing & Homes
- Personal Safety & Security
- Water, Waste & Sanitation
- Mobility
- Urban Resilience
- Education

Usage of Data Across Cities

Other Cities

Source: Smart City Guidebook (Japan), ASEAN Sustainable Urbanisation Strategy

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Smart city should be developed in alignment with the key principles and guidelines, to ensure that the city enhances the quality of life for the citizens.

Key Principles and Guidelines for Smart City Development

3 Key Principles

Prioritize the Citizens
Focus on the well-being of the citizens, and promote the participation by the citizens.

Focus on the Vision and Issues
Aim not only to implement new technology, but focus on solutions which resolves the issues.

Collaborate across Business Areas and Cities
Work across different business areas and cities, to address challenges which are complex and arise across cities.

5 Key Guidelines

Fair and Inclusive
Achieve a smart city which all citizens can participate and access the service equally.

Ensure Privacy
Ensure that the privacy of citizens is maintained, when using data.

Sustainable Finance and Management
Secure sustainable finance and management system, to ensure that the city can grow sustainably.

Security and Resilience
Ensure that security is maintained, and a resilient infrastructure is developed, for emergency situations.

Transparent and Interoperable
Develop digital infrastructure which the data can be used in a transparent and interoperable manner.

Source: World Economic Forum: Global Smart Cites Alliance, Smart City Guidebook (Japan)

ASEAN Smart Cities & ASUS

ASEAN Smart Cities Framework and ASUS below provide key components for the guidebook. Both frameworks share the 6 Focus Areas, in which ASUS further defines 7 Priority Sub-Areas and 8 Priority Actions.

ASEAN Smart Cities Framework and ASUS used in the ASEAN Smart City Planning Guidebook

Key components for ASEAN Sustainable Urbanisation

	Civic & Social	Health & Well-being	Security	Quality Environment	Built Infrastructure	Industry & Innovation
6 Focus Areas						
7 Priority Sub-Areas	• Inclusive & equitable growth	• Housing & home	• Personal safety & security	• Water, waste & sanitation	• Mobility • Urban resilience	• Education
8 Priority Actions	• Introduce and improve access to **digital payment solutions** to enhance financial inclusion.	• Develop and expand **affordable housing solutions.**	• Introduce **digital solutions** to enhance safety and security in cities.	• Enhance solid **waste management** systems.	• Introduce and improve **Bus Rapid Transit (BRT)** systems. • Develop and enhance **traffic management** systems. • Develop **flood management** systems.	• Develop **digital skills** through "industry boot camps."

ASEAN Smart Cities Framework / *ASUS*

Source: The ASEAN Secretariat Jakarta - ASEAN Sustainable Urbanisation Strategy

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Smart City Development Framework (Process and Enablers)

The framework on the approach to smart city development is also provided, to support the ASEAN Smart Cities Framework and ASUS.

- Information in this guidebook is organized by the key frameworks "Five Steps for Smart City Development" and the "Six Points (Enablers) for Smart City Development", to summarize the issues and solutions for the development of smart cities in ASEAN cities.

Framework on Approach to Smart City Development used in the ASEAN Smart City Planning Guidebook

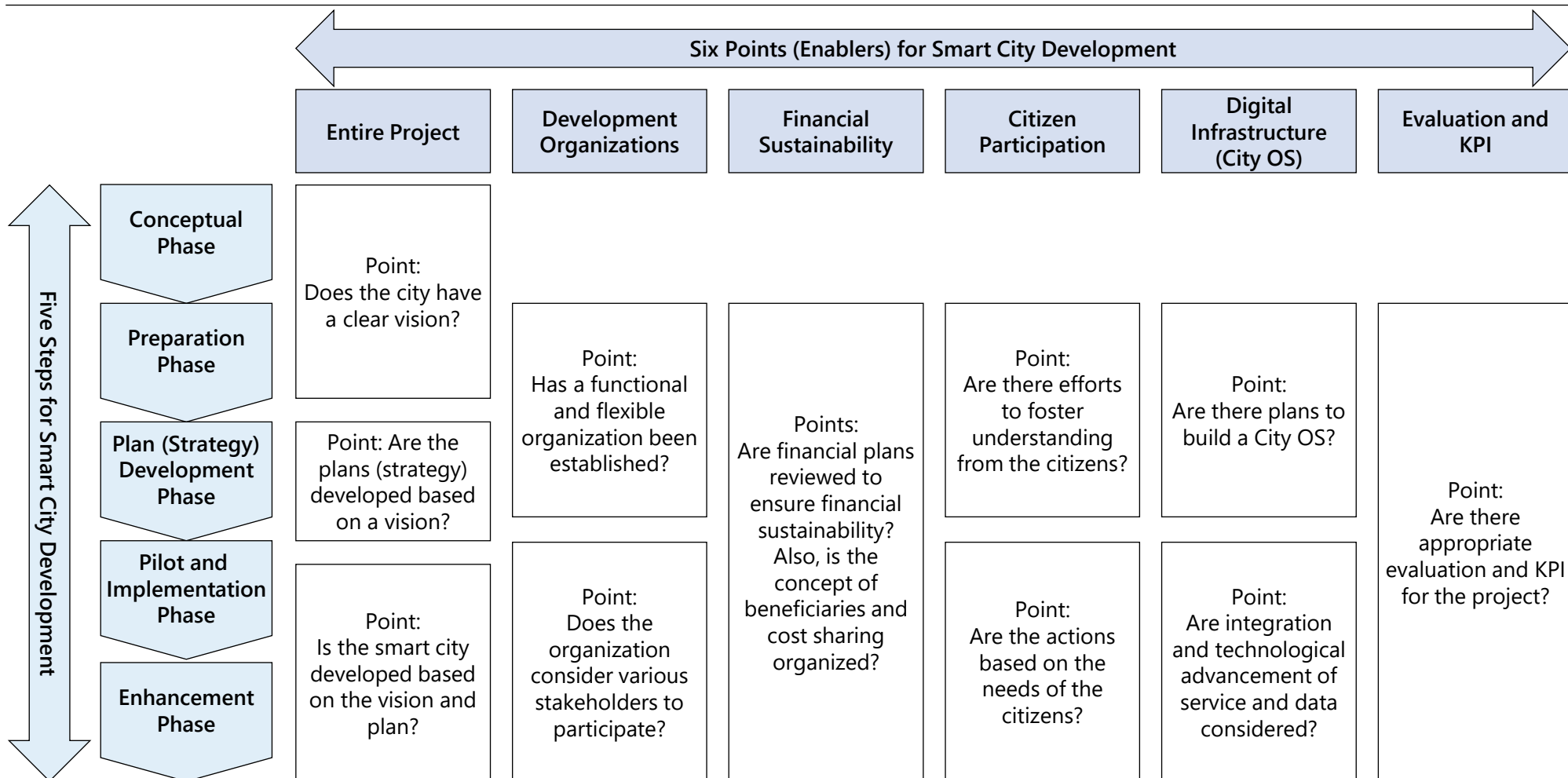| Six Points (Enablers) for Smart City Development					
Entire Project	**Development Organizations**	**Financial Sustainability**	**Citizen Participation**	**Digital Infrastructure (City OS)**	**Evaluation and KPI**

Five Steps for Smart City Development

- Conceptual Phase
- Preparation Phase
- Plan (Strategy) Development Phase
- Pilot and Implementation Phase
- Enhancement Phase

Entire Project
- Point: Does the city have a clear vision?
- Point: Are the plans (strategy) developed based on a vision?
- Point: Is the smart city developed based on the vision and plan?

Development Organizations
- Point: Has a functional and flexible organization been established?
- Point: Does the organization consider various stakeholders to participate?

Financial Sustainability
- Points: Are financial plans reviewed to ensure financial sustainability? Also, is the concept of beneficiaries and cost sharing organized?

Citizen Participation
- Point: Are there efforts to foster understanding from the citizens?
- Point: Are the actions based on the needs of the citizens?

Digital Infrastructure (City OS)
- Point: Are there plans to build a City OS?
- Point: Are integration and technological advancement of service and data considered?

Evaluation and KPI
- Point: Are there appropriate evaluation and KPI for the project?

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Priority sub-areas and actions have been identified based on common needs.

6 Focus Areas	7 Priority Sub-Areas	8 Priority Actions	Objectives
Civic & Social	• **Inclusive & Equitable Growth**	• Introduce and improve access to **digital payment solutions** to enhance financial inclusion.	• Increase the number of city residents with access to financial services through digital financial instruments.
Health & Well-being	• **Housing & Home**	• Develop and expand **affordable housing solutions.**	• Improve access to adequate, safe and affordable housing in the city.
Security	• **Personal Safety & Security**	• Introduce **digital solutions** to enhance safety and security in cities.	• Take advantage of relevant digital technologist to help reduce the incidence of crime and threats to public safety.
Quality Environment	• **Water, Waste & Sanitation**	• Enhance solid **waste management** systems.	• Improve the overall management of waste collection, segregation, treatment, and recovery in cities.
Built Infrastructure	• **Mobility**	• Introduce and improve **Bus Rapid Transit (BRT)** systems.	• Improve the quality and efficiency of public transport and reduce congestion.
		• Develop and enhance **traffic management** systems.	• Reduce traffic congestion and the incidence of traffic accidents in the city.
	• **Urban Resilience**	• Develop **flood management** systems.	• Reduce the incidence, damage and disruption caused by flooding across a city through introducing, or improving, integrated urban flood management and other flood management solutions.
Industry & Innovation	• **Education**	• Develop **digital skills** through "industry boot camps."	• Increase the level of digital skills amongst the population in line with requirements of the local industry, resulting in a reduction in skills gaps, fewer vacancies, and more placements in higher value-added employment.

Source: The ASEAN Secretariat Jakarta - ASEAN Sustainable Urbanisation Strategy

Real-time payment system via QR code and mobile numbers, and enabling mobile apps for top-ups can help drive cashless payment in every-day lives.

Singapore: PayNow – Online Banking System

- Consumers and business entities can send and receive money directly from the bank account, by using a quick response (QR) code, entering the mobile number / unique entity number (UEN), etc., in an easy, fast, and safe manner.

- Cross-border payment to Thailand was introduced in 2021 by connecting with PromptPay, Thailand's payment system, and linkage with Unified Payments Interface (UPI), India's payment system, is planned in 2022.

Phnom Penh: City Bus Card – Cashless Bus Payment

- Phnom Penh developed the City Bus Card in 2018, which enables cashless electronic payment within the bus through the card.

- The card can be charged digitally, including top-up by phones, bill payment, online payment.

- Through the mobile app, the remaining balance can be easily observed as well.

Source: The Association of Banks in Singapore, the Straits Times, Wing Bank

Aiming to be ASEAN information technology (IT) and innovative hub, Thailand Digital Valley with 5 digital infrastructures will be established.
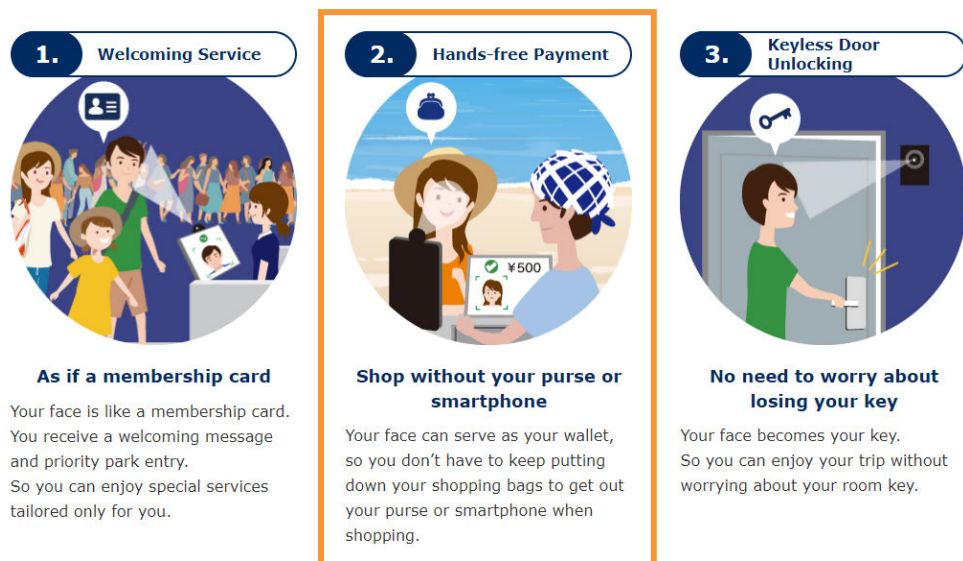
Chonburi: Thailand Digital Valley

Digital infrastructure	Image	Objective	Size (sqm.)
Digital One Stop Service		• Serve as one stop service for investor, intelligent operation center and office of Digital Economy Promotion Agency.	• 1,500
Digital Startup Knowledge Exchange Center		• Become a center for digital knowledge exchange including co-working space, office and commercial area.	• 4,500
Digital Innovation Center		• Serve as a center of digital innovative facilities; next-generation telecommunication testing lab, A.I. (artificial intelligence) lab, mixed reality center, Internet of Things (IoT) design center, Prototyping fabrication lab and mechatronics & robotics lab.	• 40,000
Digital Edutainment Complex		• Provide space for education and entertainment activities including robotic school, robot fighting area, drone school and drone racing arena.	• 20,000
Digital Go Global Center		• Enable designing and testing of technology and innovation and become a startup incubator for global expansion through product innovation and development.	• 20,000

Source: Thailand Digital Economy Promotion Agency (DEPA)

Digital technology will help enhance the local payment system, by promoting a cash-less and convenient transaction experience for the residents and visitors.
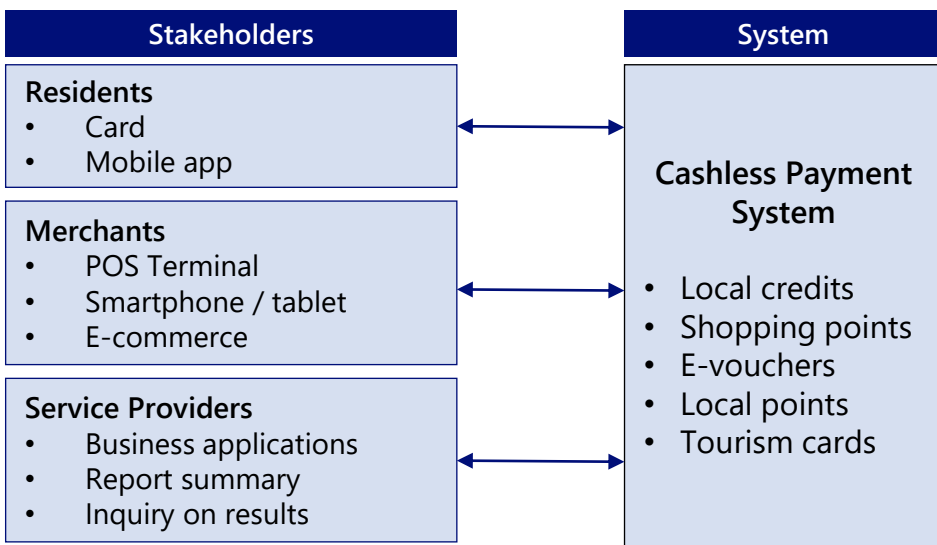
Nanki-Shirahama (Wakayama): Face Recognition Payment

- By registering your face and credit card details, the user can make payment through facial recognition system, without a wallet and smart phone.

- The payment service can be used in the airport, hotel, restaurants, amusement parks, etc.

1. Welcoming Service

As if a membership card

Your face is like a membership card. You receive a welcoming message and priority park entry. So you can enjoy special services tailored only for you.

2. Hands-free Payment

¥500

Shop without your purse or smartphone

Your face can serve as your wallet, so you don't have to keep putting down your shopping bags to get out your purse or smartphone when shopping.

3. Keyless Door Unlocking

No need to worry about losing your key

Your face becomes your key. So you can enjoy your trip without worrying about your room key.

Okaya City (Nagano): Local Cashless Payment System

- Payment system is digitalized into a local payment ecosystem, which enhances cashless payment and the development of the local economy.

Okaya Pay

Stakeholders	System
Residents • Card • Mobile app	**Cashless Payment System**
Merchants • POS Terminal • Smartphone / tablet • E-commerce	• Local credits • Shopping points • E-vouchers • Local points • Tourism cards
Service Providers • Business applications • Report summary • Inquiry on results	

Source: NEC, Toppan Printing

Providing digital platforms such as mobile apps and websites, can support the easy access to information regarding affordable housing programs.

DKI Jakarta: Rusunawa – Affordable Housing Program

- Department of Public Housing and Settlement Areas within DKI Jakarta government works together with several developers and banks, to rent out affordable housing for low-income residents within Jakarta.

Leverages Mobile App and Websites for Easy Usage

- Citizens can communicate and obtain information about Rusunawa housings through the mobile app and website 'Sirukim'.

- Platform can be used to obtain information on billing for Rusunawa rentals, registering for rental units, and to provide complaints.


Source: DKI Jakarta Government

Energy management can enhance energy efficiency within residences through visualization of usage patterns, and interconnectivity within the area.

Fujisawa City (Kanagawa): Home Energy Management System (HEMS)

- Leverages Home Energy Management System (HEMS), for the households in the city to have the function of creating, storing, and utilizing energy efficiently.

- The system visualizes the energy flow through monitors in digital devices.

Source: Fujisawa SST, Hitachi

Kashiwa-no-ha (Chiba): Area Energy Management System (AEMS)
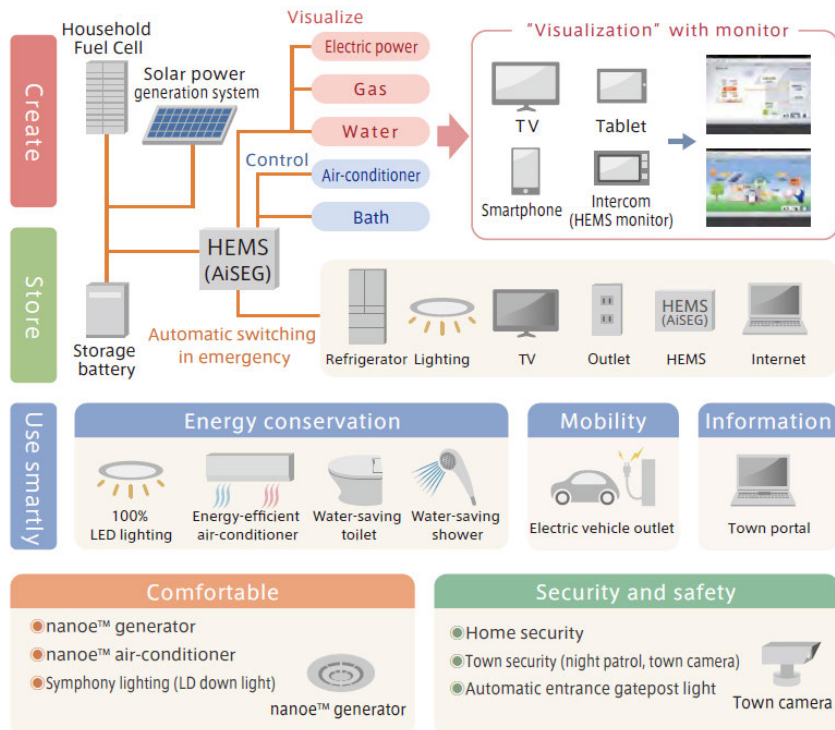
- Leverages Area Energy Management System (AEMS) to visualize the usage of utilities, to make the entire area including residences, offices, and commercial buildings energy efficient.

- Also, it allowed electrical power to interchange across city and ward lines for the first time in Japan, in which solar power and batteries were leveraged as the energy source.

BEMS : Building Energy Management System
HEMS : Home Energy Management System
PV : Photovoltaic (Solar Power Generation)
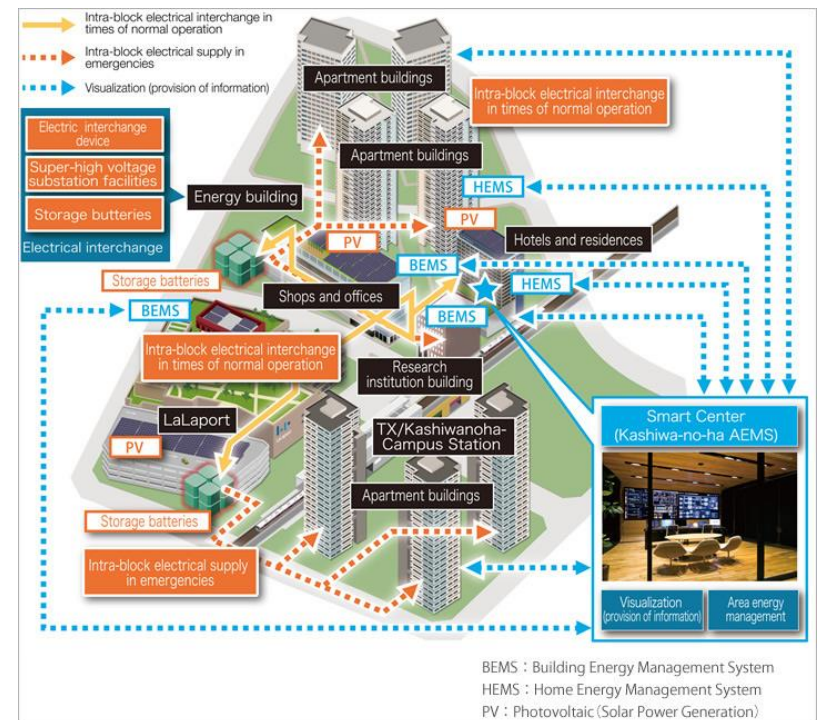
Providing a centralized office with digital and intelligent solutions will help reduce the incidence of crime and threats to public safety.

Davao City: Public Safety and Security Command Center (PSSCC)

- Public Safety and Security Command Center (PSSCC) is a division under the Office of the City Mayor, developed to provide protection, security, safety and risk management to the people of Davao City.

- The organization operates through coordinative approach to address the different issues of safety and security by leveraging information, people, technology, and intelligent solutions. As part of the service, the organization provides closed-circuit television (CCTV) viewing or a copy of CCTV footages for video requests.

- PSSCC collaborates with various organizations including the Davao City Police Office (DCPO), the Task Force Davao (TFD), the Traffic Management Center (TMC), the Central 911, the Davao City Disaster Risk Reduction and Management Council (DCDRRMC), the Barangay Officials and other law enforcement agencies.
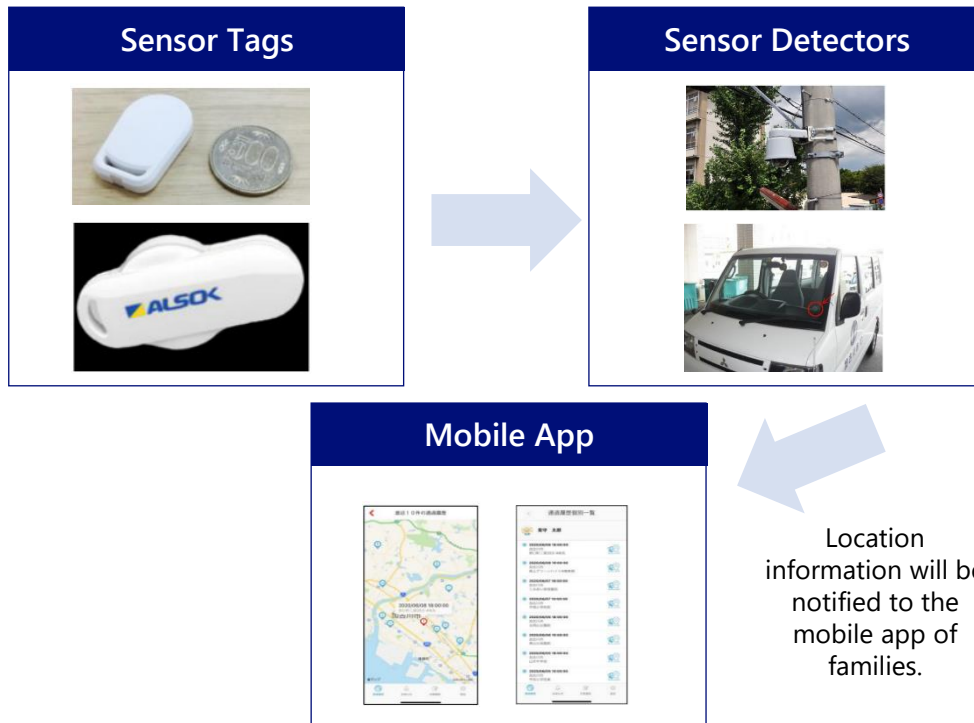
Coordination Structure
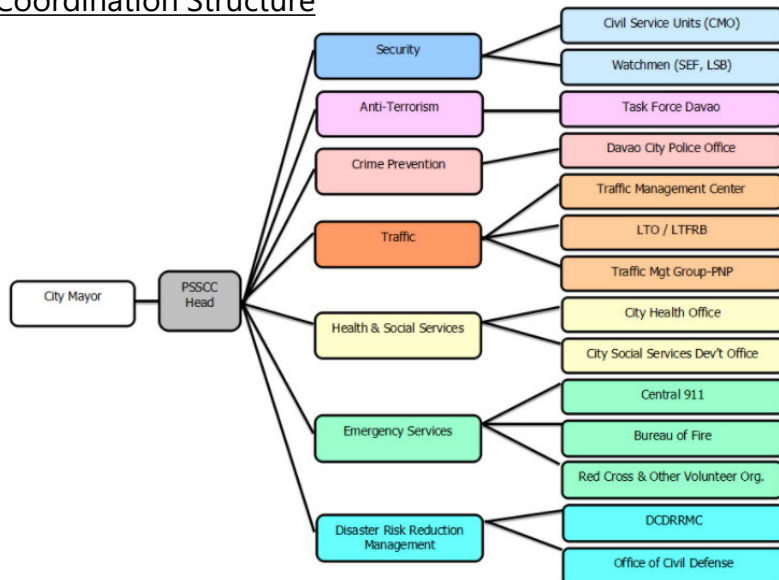
Source: Davao City

Leveraging items and services which are used within daily lives as a means to identify the location and condition of vulnerable residents can enhance safety.

Kakogawa City (Hyogo): Location Services by Sensor Tags and Detectors

- Sensor tags are provided to children and elderly residents, and sensor detectors are placed throughout the city, including cameras and cars.

- The sensor detectors help provide the location of the children and elderly residents to the families, in which the location can be viewed in a mobile app.

Ina City (Nagano): Monitoring Service by Cable TVs

- For cable TV subscribers, if the elderly subscriber has not viewed cable TV for a specific amount of time, a message will be delivered to the families.

- Also, messages from the family can be viewed on the TV screen as well, for easy and efficient communication regarding the safety of the residents.

Sensor Tags

Sensor Detectors

Mobile App

Location information will be notified to the mobile app of families.

Source: Kakogawa City, Smart City Guidebook (Japan)

To enhance waste management, engagement and education of the citizens will drive transformation.

Battambang: Programs to Improve Waste Management System

- In 2011, Battambang launched a participatory waste management initiative, aimed at setting up community-based planning and implementation of waste management based on a reduction, reuse and recycle (3R) approach.

- The above resulted in the waste management situation in Battambang gradually improving over the years.

- Currently, there is another ongoing pilot project 'Battambang Smart Solid Waste Financial Management (Phase 1)' to further enhance the waste management in the city.

(Before)   (After)

Initiatives to Raise Citizen Awareness and Engagement

- In the participatory waste management initiative launched in 2011, a series of programs to raise awareness was conducted, including distribution of brochures, announcements, and community workshops.

- A street cleaning campaign was also organized with the participation of students from local schools, staff from public organizations and local business enterprises as volunteers, to engage the citizens.

Source: UN Environment Program, NRI based on interview and questionnaire

Digital technologies to monitor the water consumption, can help the city to utilize water resources more efficiently, and improve costing within the city.

Bandar Seri Begawan: Smart Meters for Efficient Water Consumption

- To increase financial sustainability of several public services, the city strives to improve cost controllability.
- An example of proposed initiatives includes the consolidation of water and electricity meters, allowing households to monitor and manage their usage online as well as potentially reducing government subsidies.

Source: The 3rd ASEAN - Japan Smart Cities Network High Level Meeting

Efficient waste management, waste-to-energy, and waste reduction schemes can be considered as a solution to solve issues regarding waste within the cities.

City Name	Activity Type	Description
Kota Kinabalu	Waste Management	• As a sub-plan of the smart city, the city has developed the Green City Action Plan, which includes integrated waste management and green energy. • The project for integrated solid waste management system was initiated, with an aim to transform the city into a clean, green and livable city, which has a sustainable waste management system. • There are also initiatives to enhance citizen participation in waste management by gathering opinions/issues from the citizen in the targeted areas.
Chonburi	Waste-to-Energy	• In 2019, the feasibility study of a waste-to-energy power plant in worth THB 1.8 billion was initiated, to sell electricity to Provincial Electricity Authority (PEA) and other buyers. • The target is to convert non-hazardous industrial waste of 100,000 tons per year, using environmentally sustainable waste burning technology, and high-standard air emission control systems.
Makassar	Waste Reduction	• The city developed Makassar Waste Bank Program, which waste management is conducted by purchasing recycled waste at the 'Waste Bank Units', which are located in every sub-district in Makassar City.

Source: NRI based on interview and questionnaire results, ASCN Smart City Action Plans, Bangkok Post

To reduce traffic congestion and increase efficiency, Bus Rapid Transit and traffic monitoring system are introduced in Makassar City.

Makassar: Bus Rapid Transit (BRT)

Bus Rapid Transit by Makassar City

Purpose	: To reduce traffic congestion problem in the city.
Operator	: Perum Damri, a state-owned enterprise.
Launch year	: 2015.
Passenger	: 70 people.
Fare	: Rp. 5,000 per corridor.
Feature	: With control center, WiFi / global positioning system (GPS) equipped, the vehicle can be monitored centrally and data is collected to solve traffic congestion.

Traffic monitoring system

|	
Purpose	: Government can now get data about the best routes, vehicle usage hours, driver behaviour and speed limit which increases overall security, effectiveness, and operational efficiencies.
Operator	: Telkomsel.
System	: Telkomsel IoT FleetSight.

Feature	: 1. Driver Status Monitor (DSM)s
	   An advanced driver behaviour warning artificial intelligence (AI) mechanism.
	2. Advanced Driver Assistance System (ADAS)
	   A real-time situation detector and warning system.

Source: Asian Development Bank, Telkomseliot

MaaS applications can enhance the tourist's experience in the city, by providing a more flexible and efficient mobility infrastructure via digital technologies.

Phuket and Siem Reap: MaaS Application to Enhance Tourism Experience

City Name	Mobility Issues	MaaS Solutions
Phuket	• Public transport system is not very convenient, whist traffic congestion are a major issue. • Although there is a data platform, the data platform is not efficiently interconnected with the public services.	• Partnered with Japanese companies through the Smart City supported by Japan ASEAN Mutual Partnership (Smart JAMP) initiative by MLIT, to create a robust platform and mobile application that integrates real-time data from multiple types of transportation in order to optimize urban mobility from the first to last mile. • Aims to expand the service to include land, sea, and air travel throughout the Andaman area, including Krabi and Pang-Nga Provinces.
Siem Reap	• Room for improvement regarding the flexibility of tourist itineraries, since most go through the recommended route. • The service providers and the government are not getting enough information on the movements and flow of the tourists.	• Partnered with Japanese companies and Japan External Trade Organization (JETRO) to introduce a tourism MaaS application in Siem Reap, which allows a flexible itinerary, especially as visitors prefer to travel in small groups during Covid-19.

Application Image for MaaS Solution in Siem Reap
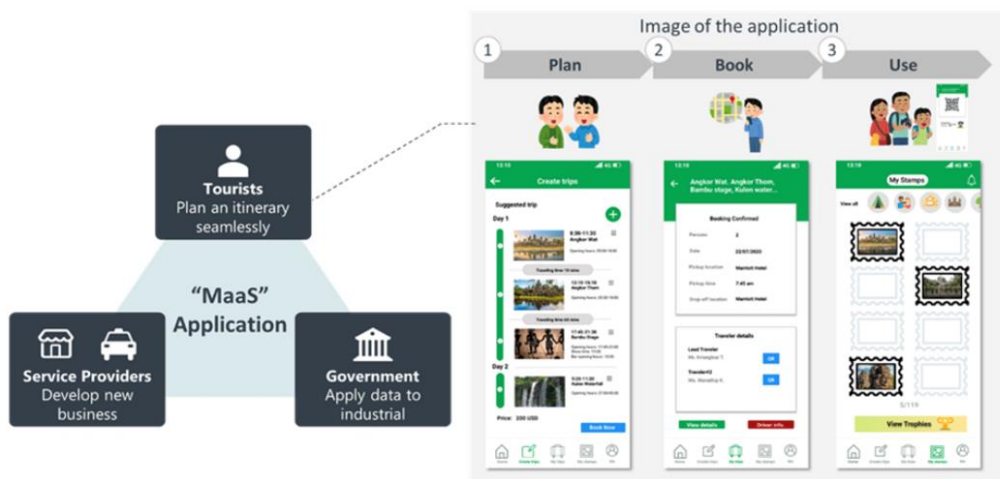
Source: NRI based on interview and questionnaire results, MLIT, AMEICC
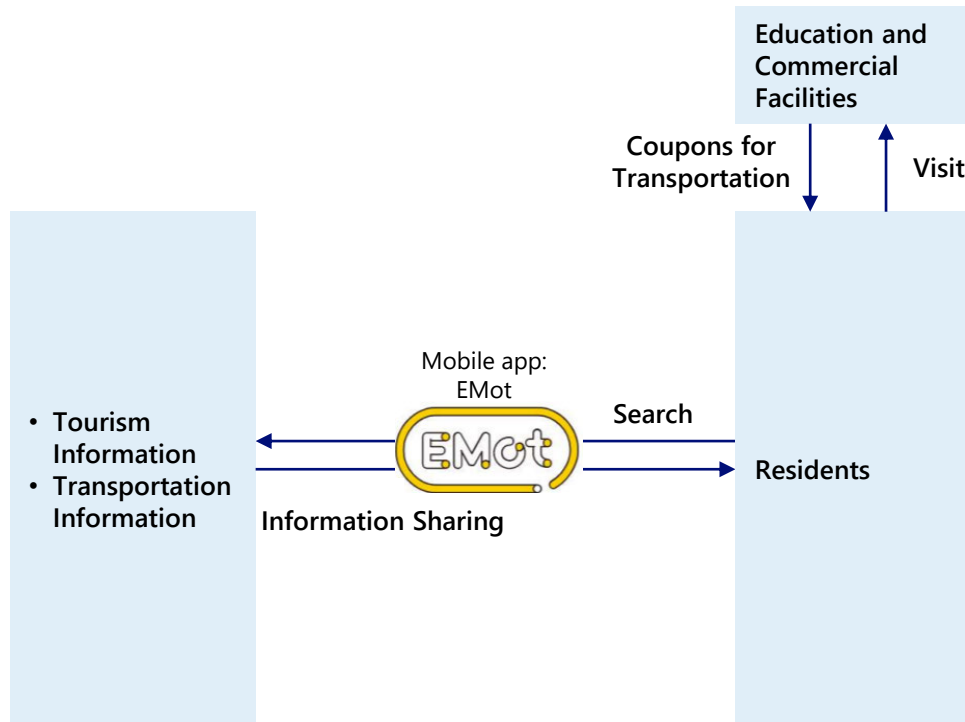
Example: Mobility

Digital technology such as smart traffic lights and database infrastructure will help address traffic issues such as traffic congestion and violations.

City Name	Description
Kuching	• Installed smart traffic light, in which during early 2021, the first phase has been implemented where the light was installed at around 50 junctions within the city. • Also, the city has completed the construction of integrated operation center facility, with a plan to install more CCTVs. The center is equipped with the computing power of big data to assist on several smart city tasks related to traffic, security and disaster monitoring etc.
Mandalay	• Traffic management systems includes 63 automatic number plate recognition (ANPR) systems. • According to budget allocation, plans on expanding the traffic management system to the whole city, which includes the planning to enhance the ANPR CCTV systems to monitor the traffic violations.
Cebu City	• The city has issues with traffic congestion, in which the efforts to address this challenge includes the establishment of smart traffic control systems through procurement of intelligent traffic light systems. • Other digital technology leveraged includes sensors, monitoring equipment and database infrastructure to operate an intelligent traffic control system, improve traffic regulation enforcement, information collection and sharing, aiming to ultimately enhance public safety.
Ho Chi Minh City	• Developed an Intelligent Operation Center (IOC), which functions as the hub to collect and analyze information from the CCTV, which enables facial recognition, action towards traffic accidents, as well as managing information on utilities (e.g. electricity) through GIS system.
Da Nang	• CCTV and surveillance systems are being implemented, with new functions such as vehicle and people counting, leveraging the usage of AI technology.
Vientiane	• An expressway in Vientiane is being developed to mitigate the congestion in the city center. • Also, a rapid transit system is being designed, along with a organized parking area to reduce the on-street parking within the city.

Source: NRI based on interview and questionnaire results, ASCN Report by Centre for Liveable Cities, JETRO, Da Nang Today

Leveraging mobile applications and autonomous driving technology can enhance the convenience of the residents within the city.

Kawasaki City (Kanagawa) – Shinyuri MaaS

- Residents can search for real-time information of schedule and congestion regarding the transportation, and also request for transportation through the app.
- Also, the city will partner with education and commercial facilities, in to promote the usage of public transportation within the city.

Education and Commercial Facilities

Coupons for Transportation

Visit

Mobile app: EMot

Search

EMot

- Tourism Information
- Transportation Information

Information Sharing

Residents

Town of Sakai (Ibaraki) – Autonomous Bus Vehicles

- First autonomous bus which run on a fixed schedule and stops in Japan.
- The bus runs automatically in a distance of approximately 6km, as a round trip, in which the bus is free of charge.


シンパシーホール
西南医療センター
キッズハウス
郵便局
境小学校入口
境町役場入口
常陽銀行
干し芋カフェ
河岸の駅さかい
道の駅さかい

Source: MLIT, Town of Sakai

Infrastructure to manage flooding can be used as a solution to resolve other issues and challenges such as traffic congestion.

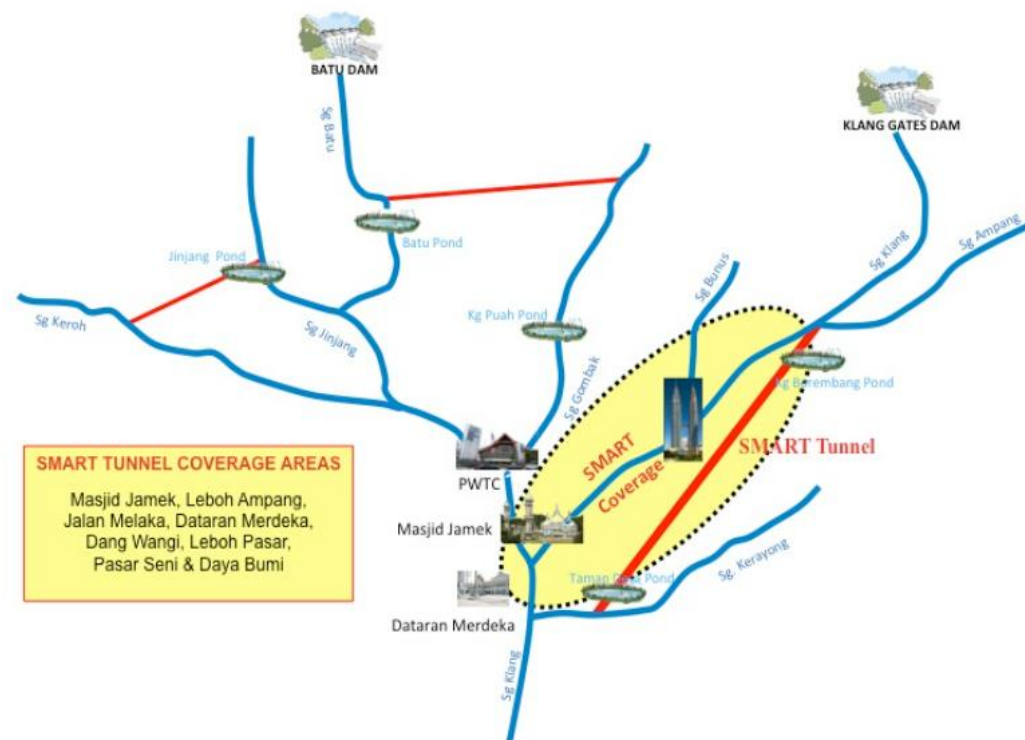**Kuala Lumpur: Stormwater Management and Road Tunnel (SMART) – Solution to Mitigate Flooding**

- The SMART tunnel was built to alleviate the flood problem in Kuala Lumpur.

- The tunnel diverts the water to go through the tunnel, to reduce the amount of water entering flood prone areas within the city.
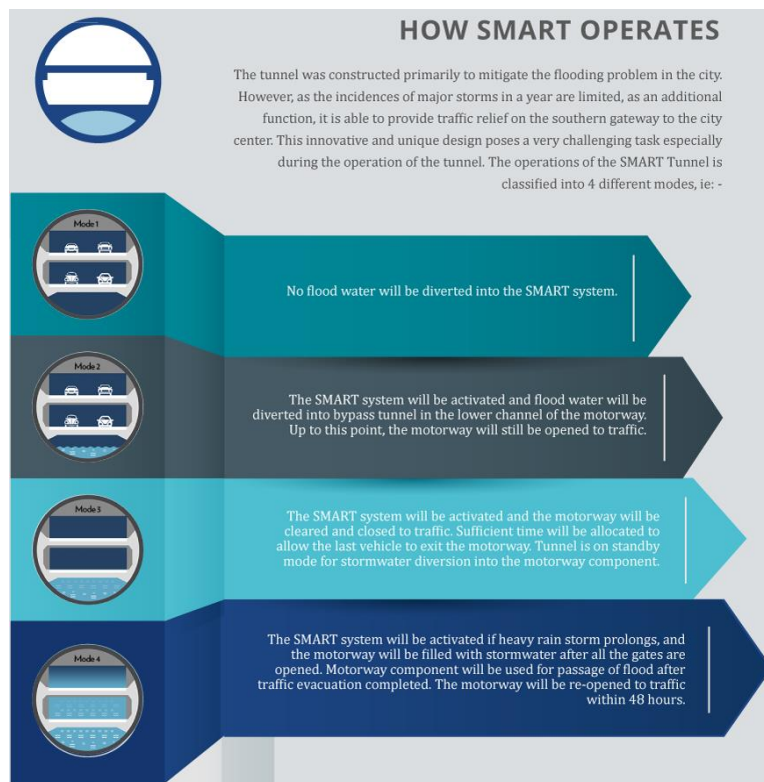
Impact on Traffic Congestion Reduction

- In addition to mitigating flood issues, the tunnel also helps reduce traffic congestion, by providing an alternative route for motorists, to travel around the city centre.

HOW SMART OPERATES

The tunnel was constructed primarily to mitigate the flooding problem in the city. However, as the incidences of major storms in a year are limited, as an additional function, it is able to provide traffic relief on the southern gateway to the city center. This innovative and unique design poses a very challenging task especially during the operation of the tunnel. The operations of the SMART Tunnel is classified into 4 different modes, ie: -

Mode 1 — No flood water will be diverted into the SMART system.

Mode 2 — The SMART system will be activated and flood water will be diverted into bypass tunnel in the lower channel of the motorway. Up to this point, the motorway will still be opened to traffic.

Mode 3 — The SMART system will be activated and the motorway will be cleared and closed to traffic. Sufficient time will be allocated to allow the last vehicle to exit the motorway. Tunnel is on standby mode for stormwater diversion into the motorway component.

Mode 4 — The SMART system will be activated if heavy rain storm prolongs, and the motorway will be filled with stormwater after all the gates are opened. Motorway component will be used for passage of flood after traffic evacuation completed. The motorway will be re-opened to traffic within 48 hours.

SMART TUNNEL COVERAGE AREAS

Masjid Jamek, Leboh Ampang, Jalan Melaka, Dataran Merdeka, Dang Wangi, Leboh Pasar, Pasar Seni & Daya Bumi

Source: SMART webpage

Leveraging a 3D city model, can help understand how disasters may impact the city, and what is the optimal escape route for citizens, to minimize the risks

MLIT and Various Cities in Japan – Project Plateau

- MLIT provides a 3D urban city model in Japan, in which the platform is open publicly as open data. The data for each city can be accessed freely by the cities, and can be used for various use cases, which includes simulation to enhance urban resilience.

## Tottori City (Tottori) – Use Case: Simulation for Flooding

- Pilot program for simulation on how the water spreads during flooding was conducted, using Plateau data platform.
- Results were shared in a seminar which included local university, city office, and local residents, in which discussion on how to optimize the escape route leveraging the technology was discussed.
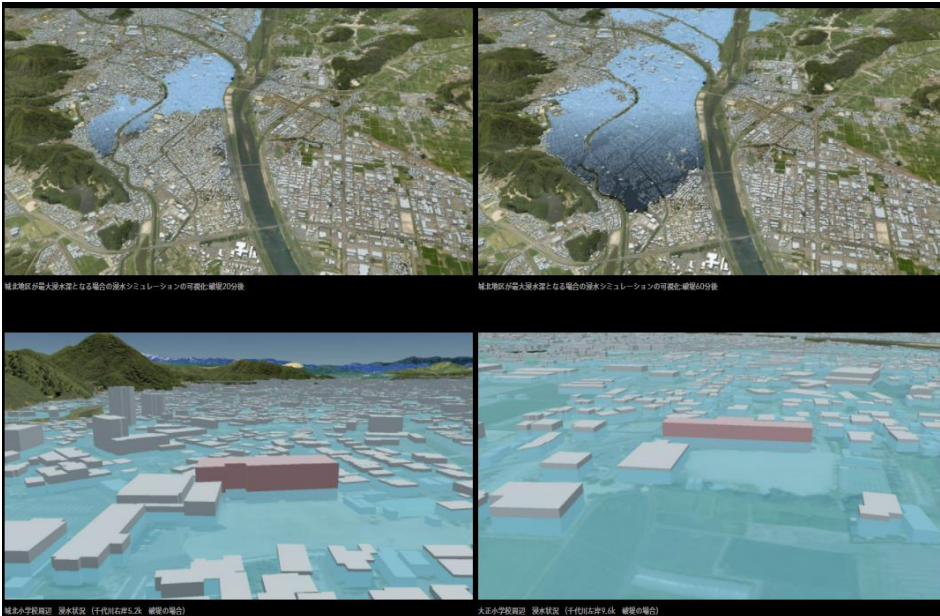
Toranomon Area (Tokyo) – Use Case: Escape Route Simulations

- In the business district Toranomon area, 3D visuals on the building data by the construction year (e.g. red: built before 1970) was developed, using the Plateau data platform.
- The data was used to understand what is the optimal escape route, as data to support companies, when conducting disaster escape practice.

Source: MLIT
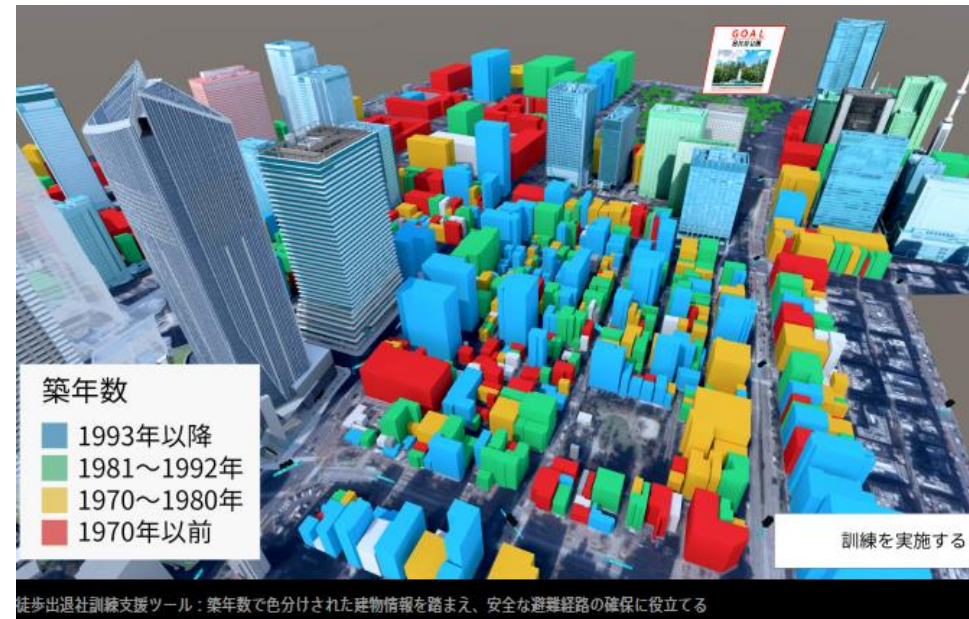
Partnership with external organizations in terms of funding and expertise, will help drive the development and implementation for digital skills.

DKI Jakarta, Kuala Lumpur, and Manila: Education Programs to Enhance Digital Skills

City Name	Program Name	Organizers	Program Contents

DKI Jakarta	JSC Academy	• Jakarta Smart City
		• External Partners
		  o Private companies (e.g. PT Telkom, Go-Jek, Grab)
		  o NGOs
		  o Universities
		  o International Organizations
			• Program for provision and development of digital platforms in the field of education and training to support digital transformation.

	JakPreneur	• Department of Social
		• External Partners
		  o Private companies (e.g. Go-Jek, Grab, Shopee, Tokopedia)
		  o Financial Institutions
			• Program for the creation, facilitation, and collaboration of MSME (micro, small & medium enterprises) development through the entrepreneurial ecosystem, such as start-ups, educational institutions, and financing institutions.

Kuala Lumpur	Reducing digital & information and communication technology (ICT) gap for the community	• LA21KL (Unit from the City Hall of Kuala Lumpur)
		• External partners
		  o NGOs
		  o Bank Rakyat Foundation
		  o Malaysian Communication and Multimedia Commission
			• Robotics education for kids.
			• SASBADI Online - Software sponsored by Bank Rakyat as ICT-based learning aid for students from B40 groups.

	Online marketing upskilling program		• Program to help citizens from marginalized groups such as single mothers and low-income households, by providing skills to sell products online.
Manila	Providing tablets and wifi for public schools	• City Government of Manila • Globe Telecom	• 110,000 tablet devices equipped with Globe SIM cards and 11,000 laptops paired with Globe pocket WiFis were provided for the city educators, in partnership with Globe telecom.

Source: NRI based on interview and questionnaire; Globe Telecom

Partnering with the local universities will help increase local digital talents, and address local issues by leveraging data and digital partnerships.
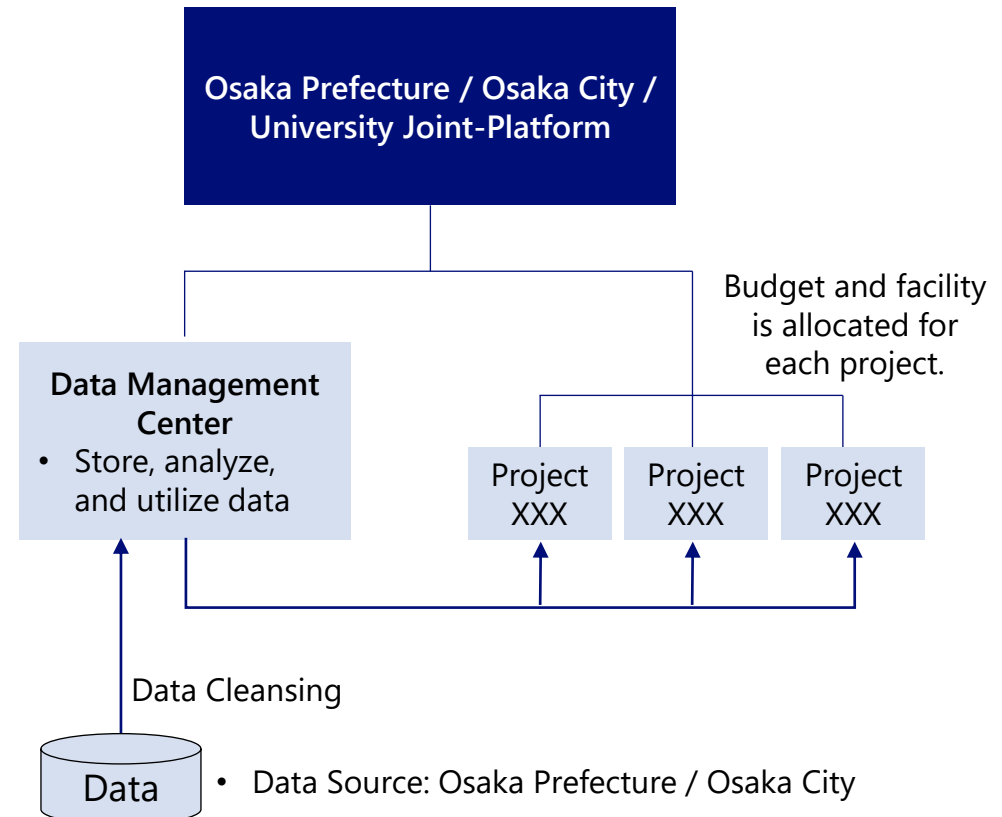
Aizuwakamatsu City (Fukushima) – IT Skills Improvement

- Collaborates with Aizu University, a university specialized in the research, innovation, and development of analytics talent for ICT, to educate analytics talents in the city.
- Many of the graduates are recruited to work in the city office as well.

Osaka City (Osaka) – Partnership Platform between Academic and Public Sector

- Osaka City University and Osaka Prefecture University plans on becoming integrated into a new university, in which a joint platform between the new university and the local administration is planned to be developed, to leverage data to address local challenges.

会津大学先端ICTラボ
LICTiA
Laboratory for leading-edge ICT in Aizu

Osaka Prefecture / Osaka City / University Joint-Platform

Budget and facility is allocated for each project.

Data Management Center
- Store, analyze, and utilize data

| Project XXX | Project XXX | Project XXX |

Data Cleansing

Data • Data Source: Osaka Prefecture / Osaka City

Source: Laboratory for leading-edge ICT (LICTiA), Osaka Prefecture, Smart City Guidebook (Japan)

Agenda

Business process for smart city development can be categorized into 5 key steps, spanning from the conceptual phase to the enhancement phase.

Process for Smart City Development

	Overview of the steps	Actions to be taken within each step
Conceptual Phase	To initiate smart city development, and align on the objectives of building the smart city.	• Clarify the background and objectives of smart city development. • Strengthen the organizational structure within local government.
Preparation Phase	To decide on the overall direction, and share the vision with the citizens.	• Develop the partnership structure of core stakeholders. • Share the structure and vision to the citizens of the city.
Plan (Strategy) Development Phase	To develop the organizational structure for smart city development, and share the vision with the citizens.	• Develop the primary promoter for the smart city project. • Develop the detailed plan to achieve smart city development.
Pilot and Implementation Phase	To conduct pilot projects, and gradually implement the solutions within the smart city.	• Conduct pilot programs, to enhance the plan, check the feasibility, and receptiveness by the community. • Implement the plan, based on the plan and the pilot project results.
Enhancement Phase	To monitor the implementation and enhance the services.	• Monitor the implementation, to ensure that the services take root in the community. • Continuously update and refine the services, based on the monitoring results.

Five Steps for Smart City Development

Source: Smart City Guidebook (Japan)

35

Johor Bahru identify the issue / difficulty, capability, funding, and outcome at first.

- **Overview of the phase:** To initiate smart city development, and align on the objectives of building the smart city.
- **General actions:**
  1. Clarify the background and objectives of smart city development.
  2. Strengthen the organizational structure within local government.

Johor Bahru: Actions in the Conceptual Phase

Items to consider	Overview of the actions

Issue / difficulty	• Use focus group discussions to ask each city what are the issues or difficulties the city is facing which can be mitigated using smart city solutions.
	• Current 3 key projects:
	   o 1) Big data platform: utilized in healthcare sector, transportation etc.
	   o 2) Integrated transportation system.
	   o 3) River monitoring and management tool: a consultant is currently doing feasibility study.

Capability readiness	• Consider capability readiness. • The strategy to drive the smart city development is to encourage public and private collaboration where the private sector provides fund and public sector facilitates operation.

Funding	• Consider funding.
	• The strategy for each city depends on their size and economic / financial conditions in which the development can be divided into 3 categories;
	   o 1) Small project - focus on low-cost development such as green sustainability project e.g. recycling program.
	   o 2) Intermediate – add in technology but may not necessarily connected to the operation center / device.
	   o 3) Big program – the project where every equipment / infrastructure being developed is connected to the city data platform e.g. smart traffic light whose data is gathered at the center and used to form decision.

Outcome	• Consider outcome (level of impact). • Current situation: Pilot projects are being implemented on a small scale where successful projects could be expanded to other cities.

Source: NRI based on interview and questionnaire

A government-wide support system for the dispatch of experts have been established, and some municipalities have set up a DX strategy office.

Support system for the dispatch of experts by Government

- The Ministry of Internal Affairs and Communications (MIC) has commissioned experts who are familiar with solving regional issues through ICT and data utilization as **"Regional Informatization Advisors"** and dispatches them upon request from local governments.

- Applicants can receive up to three days of dispatch per application, without bearing the burden of travel expenses and honorarium for the expert.

Website of the association
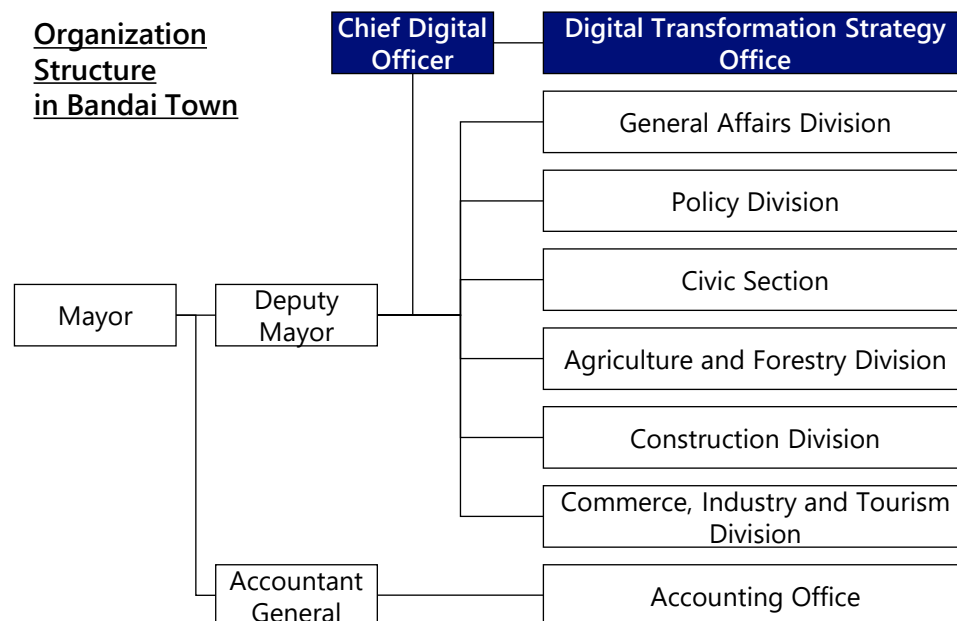

Features of the system
1. Covering 26 fields including open data, network infrastructure and human resources (HR) development
2. A total of 207 people were appointed in 2020

Bandai Town (Fukushima):
Digital Transformation (DX) Strategy Office

- In order to promote digital transformation (DX), the Digital Transformation Strategy Office was established as a cross-agency organization under the direct control of the Deputy Mayor, in accordance with the Town Comprehensive Plan and the Town Division Establishment Ordinance.

- This is a time-limited organization that assumes three years to promote DX. In three years, they aim to make the management structure of the office in principle for the whole organization.

Organization Structure in Bandai Town

Chief Digital Officer — Digital Transformation Strategy Office

- General Affairs Division
- Policy Division
- Civic Section
- Agriculture and Forestry Division
- Construction Division
- Commerce, Industry and Tourism Division
- Accounting Office

Mayor — Deputy Mayor — Accountant General

Source: Smart City Guidebook (Japan), Bandai Town website

In cities that did not have a master plan, the master plan is currently under development by leveraging international support.

- **Overview of the phase:** To decide on the overall direction, and share the vision with the citizens.
- **General actions:**
  1. Develop the partnership structure of core stakeholders.
  2. Share the structure and vision to the citizens of the city.

Lao PDR: Leveraging international support for master plan development

City	Overview

Vientiane	• Vientiane has not had a smart city master plan yet.
	• It is in the process of developing a master plan supported by MLIT and the consulting team, which will take 5-6 months to complete the draft plan and to propose to the governor.
	• Strategic targets and issues are below:
	  o Good public healthcare system.
	  o Easy access to public services with e-government applications.
	  o Affordable housing schemes.
	  o Clean environment.
	  o Urban resilience with fewer flooding incidents.

Luang Prabang	• Luang Prabang has not had a smart city master plan yet.
	• It is in the process of developing a master plan by cooperating with the Ministry of Public Work and Transportation and external consulting company (OCG Consulting). Expected to complete by March 2022.
	  o Master Plan Study for Smart City Development in Luang Prabang City was launched as the first project of the Smart JAMP project by MLIT.
	• Within the plan, the strategy follows the Lao PDR national policy.
	• Strategic targets and issues are below:
	  o Implement a replicable urban waste management and sewage solution on a public private partnership (PPP) mode.
	  o Develop proper solid waste treatment systems.
	  o Restore all wetlands in the city and preserve natural spaces along the Mekong River and Namkhan River.
	  o Accommodate the expected growth in tourism industry while preserving the values of the world heritage site.

Source: NRI based on interview and questionnaire, ASCN Smart City Action Plans 2018

Some municipalities have developed a smart city vision and shared it with local citizens through town meetings and smart city declaration by the mayor.

Aizuwakamatsu City (Fukushima): Sharing through town meetings

- In the 7th Comprehensive Plan of Aizuwakamatsu City, which is the city's top-level plan (FY2017~2026), "Smart City Aizuwakamatsu" is positioned as one of the 3 major perspectives in order to promote the creation of a strong community with sustainability and resilience and a safe and comfortable place to live in the future.

- In formulating the Comprehensive Plan, the city has conducted citizen questionnaires and town meetings to share its policies with citizens and reflect their opinions in the plan.

Basic concept in the comprehensive plan

Vision for Urban Development

Walking Together, Creating Together "Onko Soshin" in Aizuwakamatsu

Theme 1 ▸ Towards a town where people shine

Theme 2 ▸ Towards a town where we build together

Theme 3 ▸ Towards a town that continues to connect
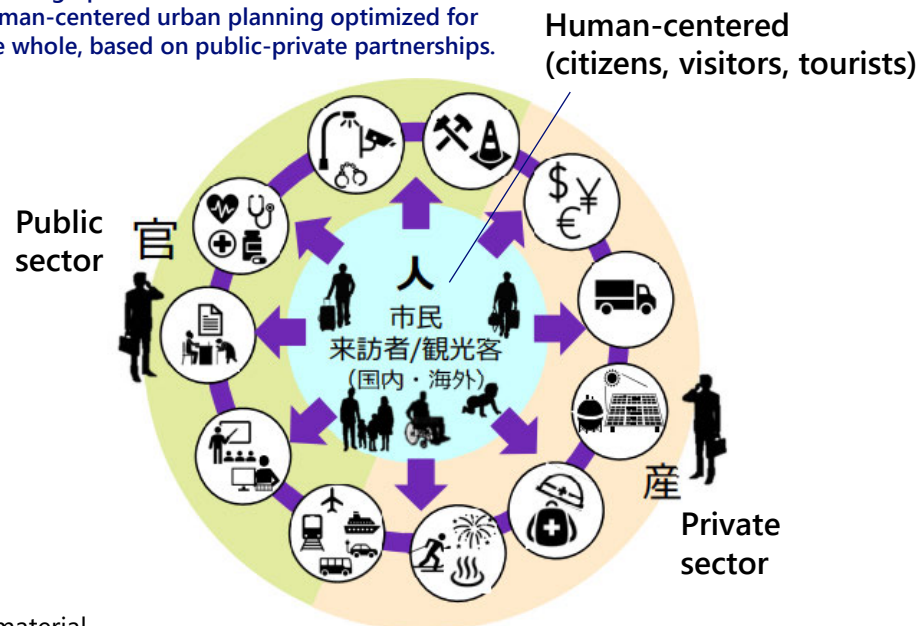
Perspective 1: Smart City Aizuwakamatsu
Perspective 2: Job Creation
Perspective 3: Optimization of public facilities and administrative services

Kaga City (Ishikawa): Smart City Declaration

- Kaga City announced the "Kaga City Smart City Declaration," which sets the basic philosophy of "realizing a human-centered future society" and the principles of operation on March 30, 2020.

- At the same time, the "Smart City Kaga Concept" and the "Kaga City Public-Private Data Utilization Promotion Plan" were formulated, setting forth the direction for realization and the basic policy for the utilization of various data.

Transformation from government-led urban planning optimized for individual fields to human-centered urban planning optimized for the whole, based on public-private partnerships.

Human-centered (citizens, visitors, tourists)

Public sector 官

人
市民
来訪者/観光客
(国内・海外)

産 **Private sector**

Source: Smart City Guidebook (Japan), Aizuwakamatsu city website, Kaga city presentation material

In Viet Nam, city-level master plans have developed based on national-level plan.

- **Overview of the phase:** To develop the organizational structure for smart city development, and share the vision with the citizens.
- **General actions:**
  1. Develop the primary promoter for the smart city project.
  2. Develop the detailed plan to achieve smart city development.

Viet Nam (Da Nang, Hanoi, Ho Chi Minh City): Master Plans at National and City Level

National level	• Viet Nam's Sustainable Smart City Development Plan for 2018-2025 and 2030 Vision:
	   o The plan and vision was announced by the Prime Minister in 2018.
	   o Goal: To develop at least 6 smart cities in Viet Nam by developing 4 pilot smart cities and linking networks.
	   o Phase: Planning (~2020), Implementation (~2025), and Networking (~2030).
	• 10 group of tasks, solutions: (1) Reviewing, researching, and improving policies, (2) Improving the system of standards and regulations, (3) Establishing a database system, (4) Applying smart technology in urban planning and management, (5) Developing smart urban infrastructure, (6) Developing smart utilities, (7) Developing capacity for smart city, (8) Increasing mobilization of resources, (9) Promoting international cooperation and technology transfer, (10) Raising awareness.

City level		Da Nang	Hanoi	Ho Chi Minh City
	Vision	• By 2030, aim to become a smart, liveable and sustainable city, while ensuring economic growth and competitiveness.	• By 2030, aim to be a green, culturally rich, civic and modern city with sustainable development to improve people's lives.	• By 2025, achieve rapid and sustainable economic development through optimal resource use and citizen-centred governance.
	Master Plan	• Da Nang's construction plan has a vision for the target year of 2050 and a comprehensive construction plan up to 2030.	• There is a comprehensive plan for the construction of the capital city of Hanoi with a target year of 2030 and a vision for 2050.	• In 2008, the Ho Chi Minh City Metropolitan Region Plan was approved, which covers eight central municipalities and provinces.
	Focus Area	• Smart Governance • Smart Life • Smart Mobility • Smart Environment • Smart Citizens • Smart Economy	• Smart Transport • Smart Travel • Intelligent Operation Centres (IOCs)	• Smart Governance • Smart Environment • Smart Transport

Source: Ministry of Information and Communications and MLIT report

Kuala Lumpur Smart City Master Plan (2021-2025) focuses on 7 components under 3 phases of development.

Kuala Lumpur: Smart City Master Plan (2021-2025)

Smart City Component

1. Smart Economy
2. Smart Living
3. Smart Environment
4. Smart People
5. Smart Government
6. Smart Mobility
7. Smart Digital Infrastructure

Implementation Roadmap

- **Sept 2020** Launch Kuala Lumpur Smart City Master Plan
- **Q1 2021** Short term (3-6 months)
  - Quick win deployment
- **Q4 2021** Medium term (6-12 months)
  - Performance review: quick win
  - Medium term projects deployment
- **Q2 2023** Long term (12-18 months)
  - Long term projects deployment
  - Performance review: Middle term projects
- **Q3 2025** Master plan revision

Smart City Vision and Strategy
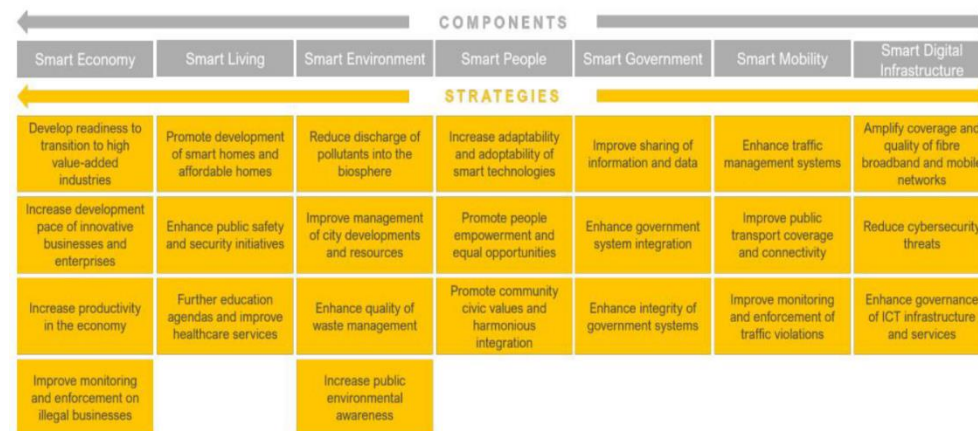
Source: NRI based on interview and questionnaire result

Brunei Darussalam set up a Smart City Steering Committee to monitor the smart city development.

Bandar Seri Begawan: Consideration in the Plan (Strategy) Development Phase

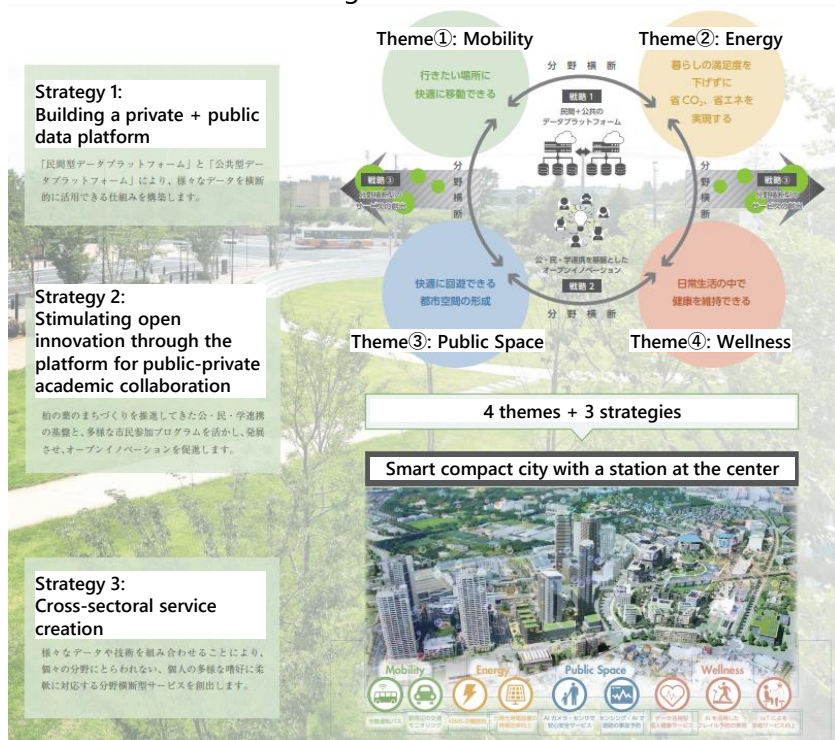| Consideration item	Digital Economy Council	Smart City Steering Committee
Committee	• Digital Economy Council is co-chaired by Minister of Finance and Economy II and Minister of Transport and Infocommunications, and provides the direction and steer on digital economy initiatives for Brunei Darussalam. • A Digital Economy Masterplan 2025 was launched in 2020.	• Smart city initiatives and development are currently under the purview of the Smart City Steering Committee co-chaired by Minister of Development and Minister of Transport and Infocommunications with members from related agencies. • The Committee also oversees alignment of initiatives to the Digital Economy Masterplan. • A Smart City Action Plan has been drawn up providing basis for smart city development implementation.

Focus Area	• The Council focuses on the implementation of projects under ten priority clusters:
	  1) Logistics and transportation;
	  2) Energy;
	  3) Business services;
	  4) Tourism;
	  5) Financial services;
	  6) Health;
	  7) Agri-food;
	  8) Education;
	  9) Halal;
	  10) Construction.
		• Five focus areas have been identified to further improve the efficiency of provision of services by technological utilization for built infrastructure:
		  1) Mobility;
		  2) Utilities (include water and electrical supply);
		  3) Buildings and Homes;
		  4) Safety and Security;
		  5) Environment and Waste Management.

It is important to consider and formulate clear visions and goals and specific action plans for the realization of smart cities.

Kashiwa-no-ha (Chiba): Smart City Action Plan

- In March 2020, an action plan to create "A Smart and Compact City Centered on Train Stations" using new technologies and data such as AI and IoT was announced.

- Under the concept of "TRY the Future: A City that Continues to Evolve," the plan states that the city will promote urban development based on four themes and three strategies.

Strategy 1:
Building a private + public data platform

「民間型データプラットフォーム」と「公共型データプラットフォーム」により、様々なデータを横断的に活用できる仕組みを構築します。

Strategy 2:
Stimulating open innovation through the platform for public-private academic collaboration

柏の葉のまちづくりを推進してきた公・民・学連携の基盤と、多様な市民参加プログラムを活かし、発展させ、オープンイノベーションを促進します。

Strategy 3:
Cross-sectoral service creation

様々なデータや技術を組み合わせることにより、個々の分野にとらわれない、個人の多様な嗜好に柔軟に対応する分野横断型サービスを創出します。

Theme①: Mobility
Theme②: Energy
Theme③: Public Space
Theme④: Wellness

4 themes + 3 strategies

Smart compact city with a station at the center

Otemachi, Marunouchi and Yurakucho District (Tokyo): Smart City Vision and Action Plan

- In March 2020, an action plan to promote the "update and redesign of existing city" through PPP and area management in cooperation with the public and private sectors was published.

- The plan sets out the direction for improving the value of the area by making it smarter and realizing data-driven area management in order to achieve the goals and vision.

2) District objective: Vision-Oriented Smart City

The district has established "urban development guidelines" as its urban development goals, and in order to better achieve these goals, the district is working to become a vision-oriented smart city. The smart city project is also unique as it is promoting the "updating and redesigning of existing city" for the mature society that Japan is facing, through "PPP and area management".

VISION District development goals
大丸有まちづくりガイドラインより ※2019年度懇談会議決定時点

1. An international business city leading the way
2. A city of people, bustle and culture
3. A city of information exchange and dissemination
4. A city where elegance and vitality are in harmony
5. A convenient and comfortable city to walk
6. A sustainable city that coexists with the environment
7. A safe and secure city
8. A city where the community, gov. and visitors work together to nurture
9. A smart city that makes use of new technologies and data

Area Management

官
・国
・東京都
・千代田区

民
・地権者
・入居企業
・就業者　等

公民協調
PPP

Otemachi, Marunouchi and Yurakucho Smart City

Direction of the city update

創造性 Creativity
快適性 Amenity
効率性 Efficiency

Direction of the city redesigning

Vision Oriented

Smart&Walkable
誰もが快適に安全・安心に
街の魅力を連続的に体験・楽しむ
交流・出会いの拡大

大手町・丸の内・有楽町地区　スマートシティ推進コンソーシアム

Source: Smart City Guidebook (Japan), Kashiwanoha Smart City Consortium, Otemachi, Marunouchi and Yurakucho District Smart City Promotion Consortium

Banyuwangi has implemented projects of public service and healthcare.

- **Overview of the phase:** To conduct pilot projects, and gradually implement the solutions within the smart city.
- **General actions:** 1. Conduct pilot programs, to enhance the plan, check the feasibility, and receptiveness by the community.
  2. Implement the plan, based on the plan and the pilot project results.
- **Issues to implement:** Proof of concept (PoC) phase - Providing the citizens' documents, proof of business (PoB) phase – Increasing the economic benefits to the people.

Banyuwangi: Implemented Projects Across the City

Public Service	Health & Economic
• The automated teller machine (ATM)-liked machine which will be able to provide some public service (by using identification (ID) card) at the citizen's nearest convenient location. • This is the initiative to address one issue of the Banyuwangi that is inconvenience in getting public service at the city center as it takes a long commuting time (3 hours for the farthest village).	• Delivery of medicine to poor people by Go-Jek. • So the people do not have to wait at the hospital and Go-Jek will deliver the prescribed medicine to their home.

Public Service Based On Information Technology

LAHIR PROCOT PULANG BAWA AKTA — Born Baby Directly Gets the Birth Certificate

SPM ONLINE (Surat Pernyataan Miskin) — to get poverty statement letter is enough in village office to it is issued in 6 hours

ADMINISTRATION LETTER — One Stop service administration letter at the village office

JALIN KASIH — Aplication to eradicate poverty based on geospasial

Health & Economic

JEMPUT BOLA RAWAT WARGA — Medical treatment for Poor sick people at home

GO-JEK NGANTAR OBAT WARGA MISKIN — Go-Jek Rider escort medicine to poor people

banyuwangi-mall.com — virtual mall of Banyuwangi to sell SME products

INTERNET MARKETING — Training for youth people in order to comprehend digital market society

Source: NRI based on interview and questionnaire, Banyuwangi Regency

Chula Smart City collaborates with various partners in piloting and implementing mobility solution including electronic vehicles (EV) and charging stations.

- **Issues to implement:** Monetization in each project.
  - o Business model really depends on the project (e.g. size, funding scheme, and project owner). For example, project by Bangkok Metropolitan Administration is run by themselves, whilst for Chulalongkorn University they have the budget themselves, and invite alumni and start-ups to join the project (e.g. EV tuk-tuk).

Service	Pilot and Implementation details	Partners	
EV Tuktuk Sharing	EV Tuktuk with MuvMi application pilot project for Urban Mobility Tech Co.,Ltd. within Chula smart city since 2018 to increase accessibility between mass transit and areas in the smart city.	**Urban Mobility Tech (MuvMi app)**	EV TUKTUK SHARING
E-Scooter	30 E-Scooter with Leaf application and scooter parking spot of total 20. The pilot project is a collaboration with MakeIO Co.,Ltd. before implemented in other areas.	**MakeIO (Leaf app)**	E-SCOOTER
EV Car Sharing	Ultra-compact EV cars, Toyota Ha:mo with application to check car availability and location real time. • Started pilot phase from 10 in 2017~2019. • Currently increased to 30 cars in total.	**TOYOTA**	EV CAR SHARING
EV Charging Station	EV Charging Stations with Evolt application to serve the increasing use of EV car in Chula smart city. • Started pilot phase with 3 charger in 2019. • Currently increased to 56 chargers in 24 stations.	**Evolt**	EV CHARGING STATION

It is important to confirm the response of users and installation/provision issues in PoC phase and to identify services and verify their sustainability in PoB phase.

Arao City (Kumamoto): Casual Sensing and Everyday Human Health Checking (Healthcare)

- Issue: The rate of people receiving specific health check-ups is low, and the cost of treating lifestyle-related diseases is higher for those who have not received check-ups.
- Solution: The city aims to extend healthy life expectancy by fostering health awareness and making it a habit to take actions that are good for physical and mental health through smart healthcare services such as daily health management recommendation services.
- In order to implement the system in society:
  - FY2020: PoC phase to verify its social acceptability.
  - FY2021: PoB phase to verify the business model.
  - FY2023: Enhancement phase to improve the service content and aim for social implementation.

FY2020: PoC phase

- Confirmation of the response of users (residents, etc.)
  ➡How much would they be willing to pay for the service?
- Confirmation of installation/provision issues.
  ➡Required resources, installation and management costs.

FY2021: PoB phase

- Identifying the services to be implemented.
- Verify the sustainability of the service by providing a prototype.
  ➡Verify the feasibility of the business, including cash flow.

FY2023: Enhancement phase

Source: Smart City Guidebook (Japan), Arao Smart City Promotion Council
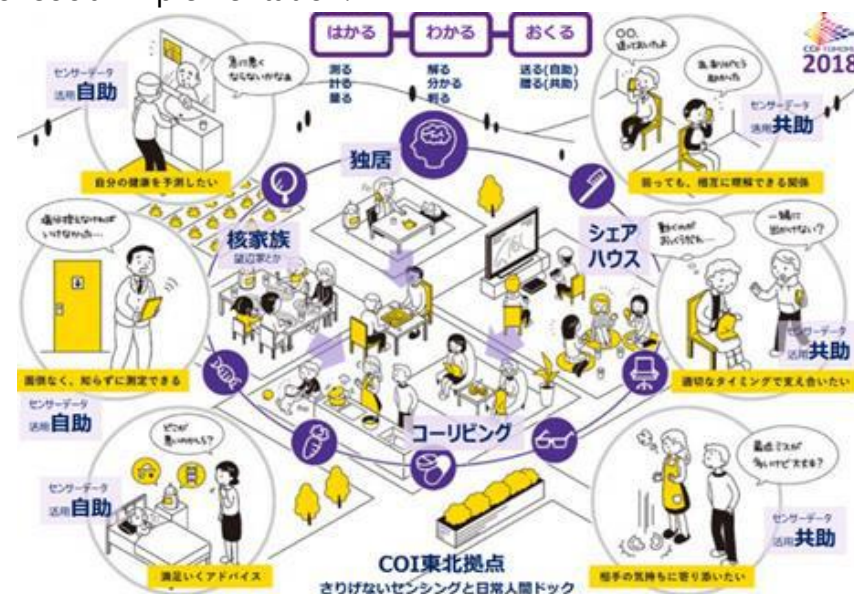
Singapore implements nation-wide digital transformation through the Smart Nation initiative.

- **Overview of the phase:** To monitor the implementation and enhance the services.

- **General actions:**　　 1. Monitor the implementation, to ensure that the services take root in the community.
　　　　　　　　　　　　 2. Continuously update and refine the services, based on the monitoring results.

Singapore: Singapore Smart Nation Initiative

- The Smart Nation initiative is about transforming Singapore using technology to improve the lives of our citizens and businesses, and to make Singapore an outstanding city where people can live, work and play in.
- To demonstrate digital transformation at the national level, one of the key digital infrastructure projects that Singapore has rolled out is the National Digital Identity ecosystem, which provides users with a single digital identity to transact with the Government and private sector organisations securely and more conveniently.
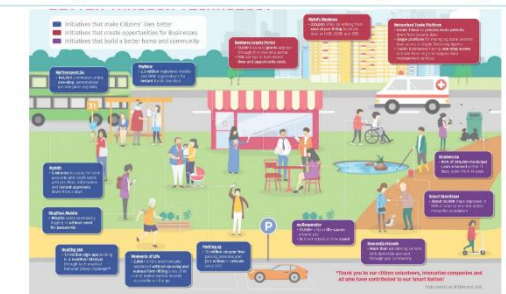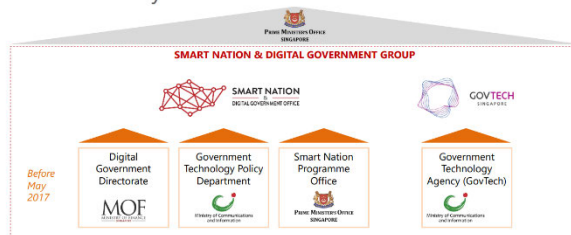
Sources: Smart Nation and Digital Government Office, Centre for Liveable Centres
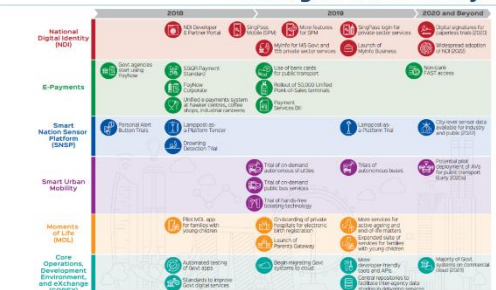
The smart city services have been expanding with the use of the City OS data which is used from the city's open data provision infrastructure.
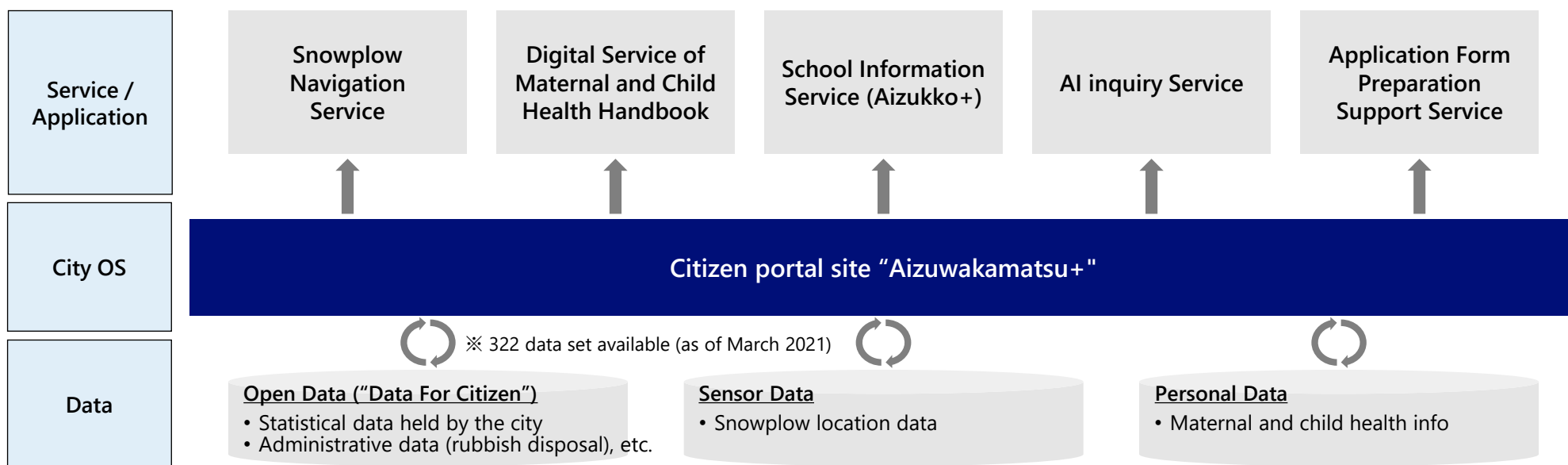
Aizuwakamatsu City (Fukushima): Providing services using City OS

- In December 2015, the citizens' portal site and City OS "Aizuwakamatsu + (Plus)" have started operation.
  - The City OS is a website that displays recommended information on a priority basis according to personal attributes (age, gender, family structure, hobbies, etc.).
  - By registering a single ID and password, users can access multiple services in a one-stop service.
- 5 main services have already been linked to the City OS. (➡Further demonstrations of the payment service and others are underway.)
- The City OS data is used from the city's open data provision infrastructure "Data For Citizen" and other sources.
- The platform was developed, taking into consideration the issues for data usage such as protection of personal information, fair and ethical usage of data, and consideration of intellectual property and competitiveness of companies involved (※).

Service / Application	Snowplow Navigation Service	Digital Service of Maternal and Child Health Handbook	School Information Service (Aizukko+)	AI inquiry Service	Application Form Preparation Support Service
City OS	Citizen portal site "Aizuwakamatsu+"				
Data	**Open Data ("Data For Citizen")** • Statistical data held by the city • Administrative data (rubbish disposal), etc.	**Sensor Data** • Snowplow location data		**Personal Data** • Maternal and child health info	

※ 322 data set available (as of March 2021)

Source: Smart City Guidebook (Japan), Aizuwakamatsu City

The service area was expanded in about two months after the launch of the service while securing volunteers and other necessities.

Ina City (Nagano): Gradual service area expansion of the drone shopping service

- Issue: It is difficult for elderly people who do not have their own cars to get around and go shopping in the mid-hill area. (The nearest supermarket is 11km away, and a bus takes 40 minutes one way, with only two services a day.)

- Solution: In 2020, a drone shopping service was implemented, which allows elderly people to use a familiar remote control to purchase items from a selection of about 300 items on a cable TV screen by 11 am, and have them delivered by drone or other means by evening.

Research phase:
Shopping Conditions Survey
(January 2017)

- Recognizing that the number of people in the community who are vulnerable to shopping, such as those who need nursing care and the elderly living alone, is increasing every year.

➡Selection of areas with high demand.

Pilot phase:
Development and Technical
Demonstration (2018~)

- Development of technology for drones that be used as a route over the river.
- Finalization of cooperation procedures/specifications.
- Conducting a trial campaign to allow people to "try it out" without registration or usage fees 1 month before implementation.

Implement phase:
Launch the Service
(August 2020)

- Started in 4 villages in Hase district.
- The service covers approx. 600 households (including 150 elderly-only households).

Enhancement phase:
Service Area Expansion
(October 2020)

- Expansion of the area to 9 villages in 2 months (securing volunteers and other staffs.)
- Service coverage expanded to approx. 900 households (including 300 elderly-only households.)
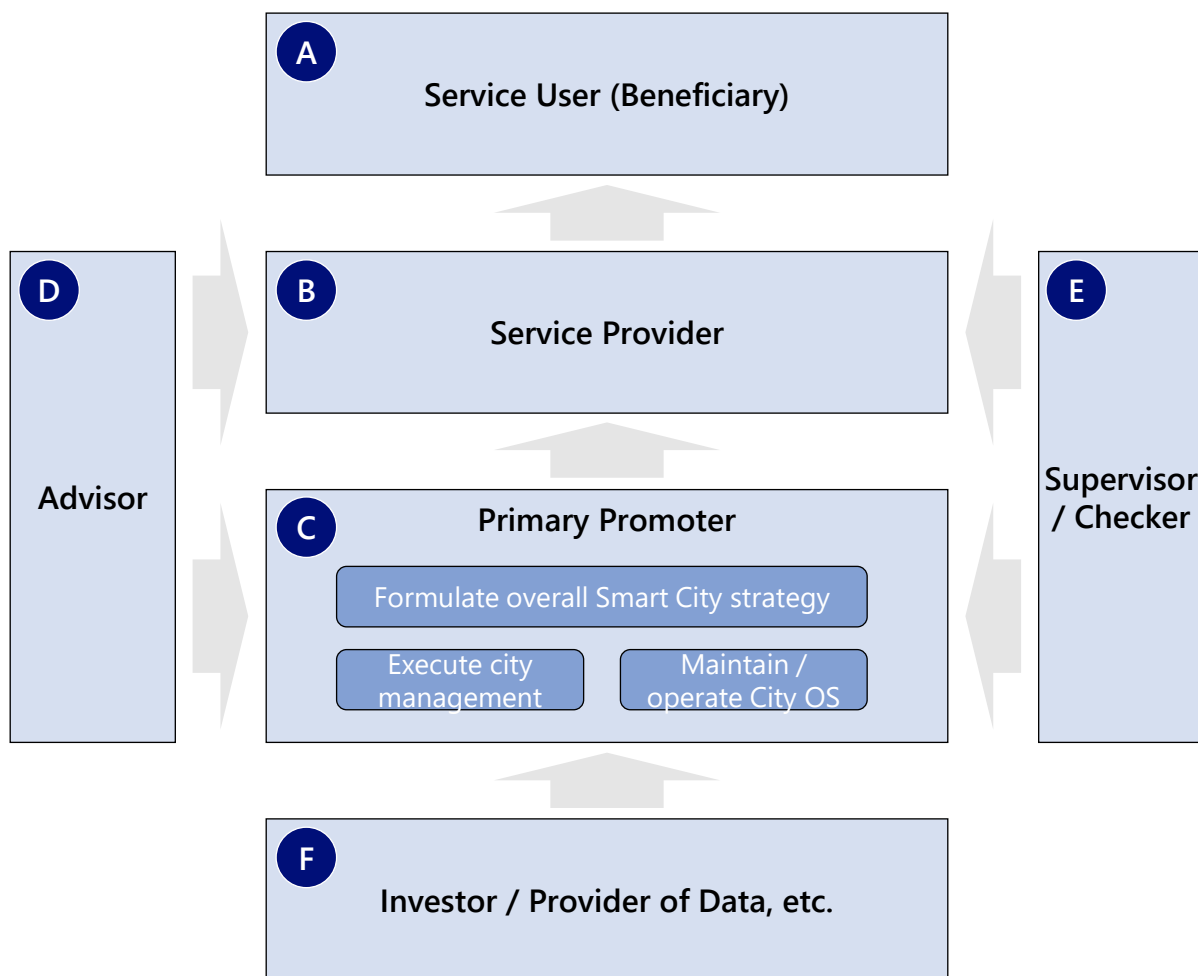
Source: Smart City Guidebook (Japan), Ina City

Agenda

Key stakeholders involved in the smart city can be broadly categorized into six types as below.

Types of Stakeholders in Smart City

Objectives and Roles

A
- Receive benefits through use of the services, and pay compensation for them as needed.

B
- Provide and manage each individual service.
- Objectives of generating profit by provision of services and R&D and other activities utilizing the region for trials and implementations.

C
- Comprehensive promotion and operation of Smart City.
- Objectives of uplifting and developing local economy.

D
- Advise as an expert regarding Smart City promotion as a whole and direction of each service.

E
- Constantly check services provided and overall promotion, regularly provide instructions and feedback.

F
- Provide funding and data sometimes for compensation.

Diagram labels:
- A: Service User (Beneficiary)
- B: Service Provider
- C: Primary Promoter
  - Formulate overall Smart City strategy
  - Execute city management
  - Maintain / operate City OS
- D: Advisor
- E: Supervisor / Checker
- F: Investor / Provider of Data, etc.

Source: Smart City Reference Architecture White Paper

Stakeholder Role by Player Type

Wide range of players support the smart city development, contributing as different type of stakeholders, depending on how the smart city is organized.

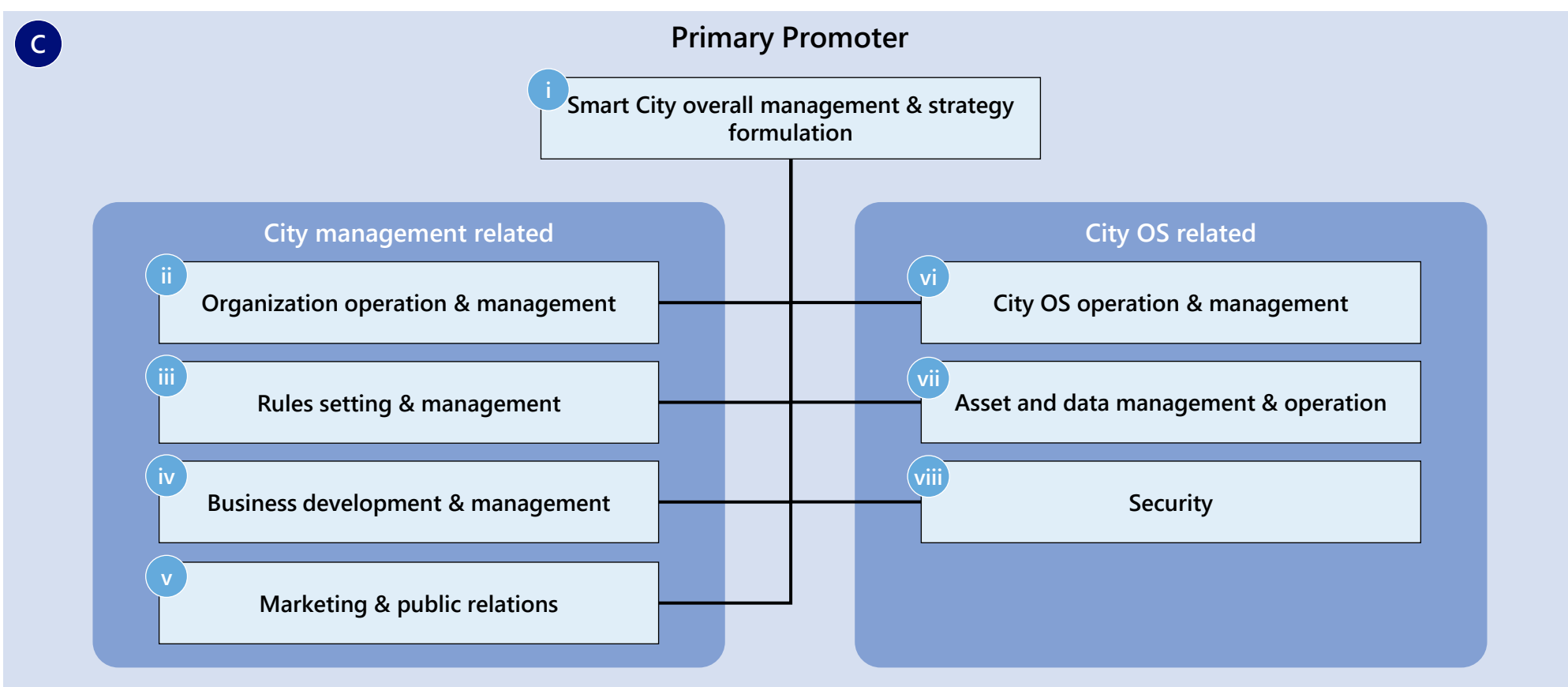### Stakeholder Role Each Player Type Typically Plays

Player Type		Description	Stakeholder Type within Smart City					
			A Service User	B. Service Provider	C. Primary Promoter	D. Advisor	E. Supervisor / Checker	F. Investor / Data Provider
Public	National Government (Policy Maker)	Presents the nation-wide strategy for smart city development, and conducts monitoring and supports funding where required.					●	●
Public	Local and Regional Administrations	Presents the region-wide strategy for smart city development, and conducts monitoring and supports funding where required.		●	●		●	●
Industry	Local Companies	Provides knowledge based on local trends. Depending on the business model, may function as the primary promoter.	●	●	●			●
Industry	Non-Local Companies	Provides knowledge based on nation-wide trends. Depending on the business model, may function as the primary promoter.	●	●	●			●
Industry	State Owned Enterprises	Provides knowledge based on nation-wide trends. Depending on the business model, may function as the primary promoter.	●	●	●			●
Industry	Property Developers	Provides service regarding the real estate and property development.		●				
Academia	Universities / Experts / Scientists	Provides advice based on academic and expert knowledge, and conducts advanced technology demonstration projects.				●		
Academia	(Private) Research Institutes	Provides advice based on expert knowledge, and conducts advanced technology demonstration projects.				●		
Users	Citizens	Uses the service, and provides feedback based on the experience as a resident.	●					
Users	Visitors (Tourists, etc.)	Uses the service, and provides feedback based on the experience as a visitor.	●					
Others	Civic Organizations NPOs / NGOs	Provides feedback based on the consensus of residents' opinions.				●		

Source: Smart City Reference Architecture White Paper

Functions of the Primary Promoter

Primary promoter is an essential stakeholder, which is responsible for determining the overall direction of the smart city in the region.

- They formulate the overall smart city strategy with the objectives of raising and developing the economy of the whole region, and functions as the player responsible for city management and operation / management of City OS to implement the strategy.

Examples of Main Functions Primary Promoter should Assume

C

Primary Promoter

i — Smart City overall management & strategy formulation

City management related

- ii — Organization operation & management
- iii — Rules setting & management
- iv — Business development & management
- v — Marketing & public relations

City OS related

- vi — City OS operation & management
- vii — Asset and data management & operation
- viii — Security

Source: Smart City Reference Architecture White Paper

Functions of the Primary Promoter

The details of each function is below. One of the important functions is marketing & public relations, to have the users acknowledge the availability of each service and how to use it properly in the region.

- In many cases, it is also necessary to get funding and participation from business entities and to attract tourist and incoming migrants.

Examples of Main Functions Primary Promoter should Assume (Details)

Main function	Description
i Smart City overall management & strategy formulation	• Formulate and manage overall strategy of Smart City, and perform overall management to realize Smart City according to the strategy.
ii Organization operation & management	• Supervise stakeholders, establish and manage primary promoter to make the whole Smart City function smoothly.
iii Rules setting & management	• Establish and manage rules and guidelines necessary for the promotion of Smart City.
iv Business development & management — Service development & management	• Develop services through experience design for each field of business conducted in Smart City in the region, and manage services provided and managed by each service provider. * Subcommittee, etc. for each business field may also be assumed.
Business development & management — Financial management	• Build and manage business model with the aim of sustainable management of the whole Smart City, and manage all the financial matters which may arise.
v Marketing & public relations	• Manage public relations for the country and other communities as well as residents, tourists, and business operators, and work as a point-of-contract for information collaboration.
vi City OS operation & management	• Develop and operate digital systems including City OS, and determine and manage the application programming interface (API) of services, federations to other communities, etc.
vii Asset and data management & operation	• Manage assets in the region, acquire and store data from residents, public administration, service providers, etc., analyze them, and promote their utilization by the whole Smart City.
viii Security	• Ensure security of the whole digital systems including from City OS to services and assets.

Source: Smart City Reference Architecture White Paper

Clarifying the roles & responsibilities within the primary promoter for each function supports an efficient strategy development and implementation.

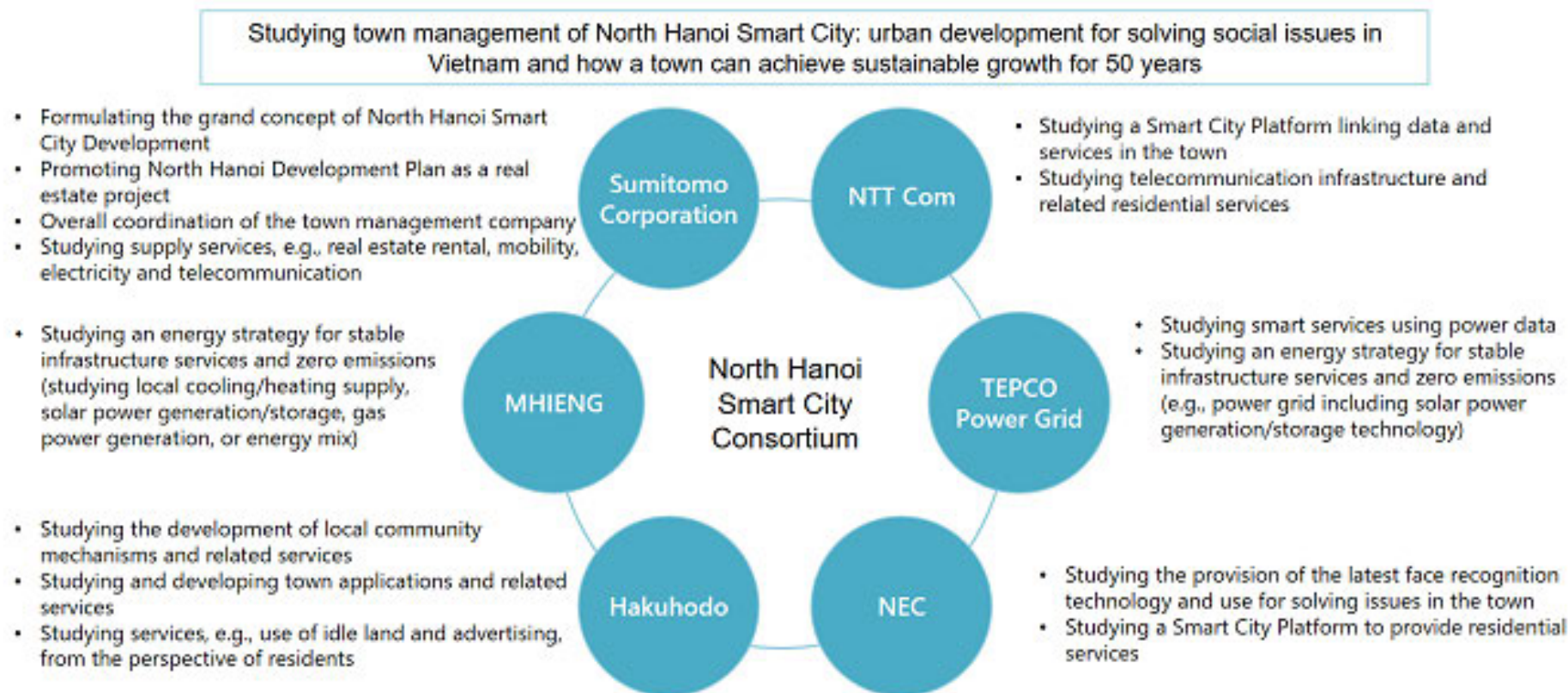## DKI Jakarta – Responsible Departments for the Primary Promoter Functions

Main function

i Smart City overall management & strategy formulation

ii Organization operation & management

iii Rules setting & management

iv Business development & management

v Marketing & public relations

vi City OS operation & management

vii Asset and data management & operation

viii Security

Responsible Departments within DKI Jakarta

- DKI Jakarta and Jakarta Smart City leaders

- Jakarta Smart City leaders i.e. the director, head of subdivision of administration, and all head and executive units

- Legal Compliance Team together with the leaders

- Product Development and Analytics Division

- Communications Division, Marketing Division

- Product and Service Development Division

- Data Analysis Division

- Network and Infrastructure Division

Forming a primary promoter, via companies with diverse solutions, helps address the various challenges in the smart city efficiently.

North Hanoi Smart City – Consortium for Smart City Development

- In North Hanoi Smart City, a consortium which included major companies in the energy, telecommunication, technology, and marketing sector joined, to address diverse urban challenges within the city.
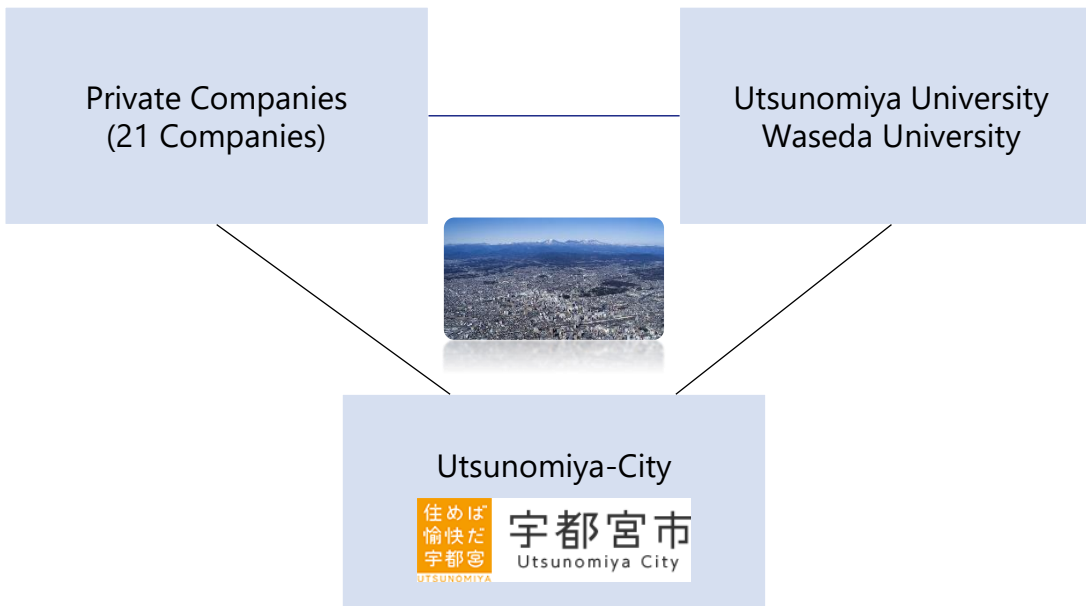
Studying town management of North Hanoi Smart City: urban development for solving social issues in Vietnam and how a town can achieve sustainable growth for 50 years

- Formulating the grand concept of North Hanoi Smart City Development
- Promoting North Hanoi Development Plan as a real estate project
- Overall coordination of the town management company
- Studying supply services, e.g., real estate rental, mobility, electricity and telecommunication

Sumitomo Corporation

NTT Com

- Studying a Smart City Platform linking data and services in the town
- Studying telecommunication infrastructure and related residential services

- Studying an energy strategy for stable infrastructure services and zero emissions (studying local cooling/heating supply, solar power generation/storage, gas power generation, or energy mix)

MHIENG

North Hanoi Smart City Consortium

TEPCO Power Grid

- Studying smart services using power data
- Studying an energy strategy for stable infrastructure services and zero emissions (e.g., power grid including solar power generation/storage technology)

- Studying the development of local community mechanisms and related services
- Studying and developing town applications and related services
- Studying services, e.g., use of idle land and advertising, from the perspective of residents

Hakuhodo

NEC

- Studying the provision of the latest face recognition technology and use for solving issues in the town
- Studying a Smart City Platform to provide residential services

Source: Sumitomo Corporation

Partnership with the academic and private sectors, and working closely with the key stakeholders in the city, will enhance the smart city development.

Utsunomiya City (Tochigi) – U Smart Development Consortium

- In Utsunomiya City, a consortium was developed to enhance partnership between the public and private sector, and to leverage advanced digital technologies.

- In the operation of the consortium, rules (e.g. non-disclosure agreements, clarification on the intellectual properties, etc.,) are developed so the stakeholders can collaborate efficiently under a common vision.

U Smart Development Consortium

Stakeholders in the City

Private Companies
(21 Companies)

Utsunomiya University
Waseda University

Utsunomiya-City

住めば愉快だ宇都宮 UTSUNOMIYA | 宇都宮市 Utsunomiya City

Shares the issues
and challenges

Collaboration

Cooperates for
pilot projects

- Transportation business
- Shopping street
- Tourism business
- Residents

Source: Smart City Guidebook (Japan), Utsunomiya City

Agenda

Overview of Smart City by Business Model (Revenue Stream)

There are three basic business models which can be adopted by each one of the following primary promoter patterns.

Smart City Basic Business Model Patterns

| | Model Overview | Business Model Illustration | Primary Promoter |

A — Consortium-led model

- Model in which local consortium consisting of local companies and local government, etc. leads smart city in the region.
- Primary promoter (consortium) receives contribution from Local government and company and collects user fees from various service providers.
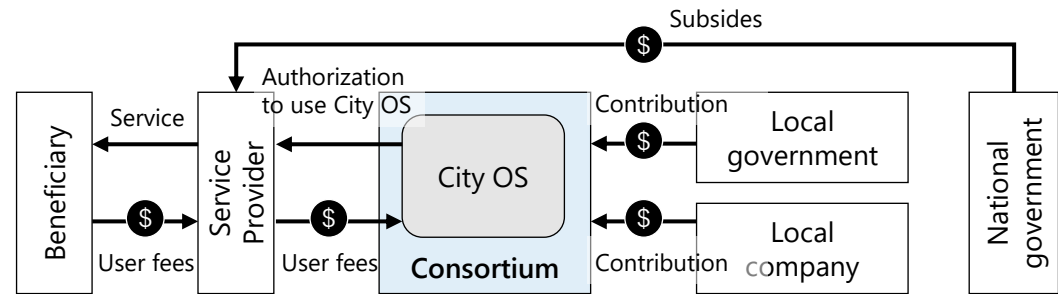
B — Local government (Public)-led model

- Model in which mainly local government (public) leads smart city. Model with the collaboration of multiple municipalities can also be assumed.
- Primary promoter (Local government) receives subsides from national government and collects user fees from various service providers.
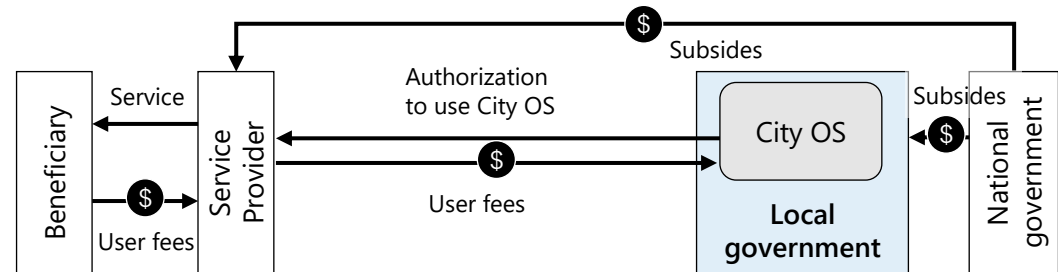
C — Private-sector-led model

- Model in which mainly private companies lead smart city in the region. Rather than local government-by-local government, model promoting smart city transformation of the specific area / green-field type can be assumed.
- Primary promoter (Private sector) collect user fees from service providers.

Source: Smart City Reference Architecture White Paper

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In ASEAN cities, local governments are driving smart city development, and there are few private sector-led patterns. Some cities have formed consortium with local and foreign private companies to lead the development on a project basis.

Smart City Business Model in Each City

■: Business model applied for the city

Model	BRN	KHM			IDN			LAO		MYS				MMR			PHL			SGP	THA			VNM		
	BSB	BA	PP	SR	MA	BA	DJ	LP	VI	JB	KL	KK	KU	NPT	MA	YA	CC	DC	MA	SGP	BA	CH	PH	DN	HA	HCM
A Consortium-led model			■						■									■			■					
B Local government (Public)-led model	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			■	■	■
C Private-sector-led model																						■	■			

Source: NRI based on interview and questionnaire

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Main monetization points for the key players are providing the service / application, hardware & maintenance, digital platform (City OS), and general construction & real estate development businesses.

Monetization Points for the Key Players

Examples of service and business

	Layer					
Service	**Service / Application**	Mobility service	Energy management service	Healthcare service	Incubation service	Community service
Hardware/ Infrastructure	**Hardware & Maintenance**	Sensor	Monitoring camera	Electric equipment	Ventilation & Lighting	Consumer electronics
	Infrastructure	Energy	Transport & Mobility	Security	Water	Waste & Sanitation
Platform	**Digital Platform (City OS)**	Data infrastructure / Networks / API management / Data management & analytics				
Construction/ Real estate	**Construction**	Housing	Office	Retail	Hospital	Station
	Real Estate	Real estate sales & leasing				
		Asset management & Property management				

Monetization through service fees and membership fees will help enhance financial sustainability for services within the smart city.

Ina City (Nagano): Service Fee for Drone Delivery Service

Overview	• If resident orders from 300 items available by 11am, will be able to receive the products by evening time, from drone.
Timeline	• Implemented in FY 2020.
Service Fee	• Users pay JPY1,000 per month. • The seller also pays 10% of the total sales.
Result	• Users: 47 households (Pays JPY1,000 per household; October 2020) • Sellers: Pays 10% of the total sales of JPY129,759 (November 2020)

Kyoto Prefecture: Membership Fee for Data Platform

Overview	• Through collaboration between academic, industry, and public sector enhance efficient data usage, and develop new business through business matching.
Establishment	• Established in November 2018.
Annual Membership Fee	• Large companies: JPY200,000. • Mid to small sized companies: JPY100,000. • Smaller companies: JPY30,000. • Start-ups: JPY10,000.
Members	• 100 organizations (Private companies, universities, research institutions, administration, etc.)

Source: Smart City Guidebook (Japan)

The cost for services provided in the smart city are paid by the residents, private sector, or from the public sector, depending on the costing type.

Costing Allocation by Stakeholder Type

	Overview	Benefits for the Stakeholder	Issues & Challenges	Example of Sources of Finance
Residents (User of the service)	• Users of the services provided in the smart city pay the fee for the services which was used.	• More convenient lifestyle • Higher safety and security	• Providing benefits to the users, for the cost they are paying.	• Service fees • Data usage fee
Private Sector	• Private sector makes investments towards the smart city, to receive long-term return.	• Revenue increase • Increase in convenience due to improvement in the services provided by the local government	• Understanding what the future income stream would be, for decision making regarding investment plans.	• Investment from company • Business improvement district (BID)
Local Government	• Local government funds for the services using tax, to solve issues arising in the society.	• Can provide higher quality government services	• Difficult to account for the ordinary expenses, given that the budget is set on a single-year basis.	• Tax • Social impact bond (SIB) • Pay for success (PFS)

Source: Smart City Guidebook (Japan)

Agenda

Continuing to engage with the citizens on a long-term basis, to raise interest and enhance active communication, will be the key to promote citizen participation.

Key Focus Points for Enhancing Citizen Participation

	Common issues & challenges for citizen participation	Solutions to overcome the issues & challenges
Raise interest from the citizens	• Citizens are typically not familiar with the concept of smart cities, and may not be interested in participation.	• Communicate efficiently on what a 'smart city' refers to, and the benefits for the citizens, to raise interest to participate in the initiatives.
Enhance active communication from the citizens	• Initiatives provided by the local government may be a one-sided communication, which citizens do not actively communicate.	• Ensure that the information is provided to the citizens transparently, and enable all citizens to be able to participate, by leveraging communication tools such as online surveys.
Continuously engage on a long-term basis	• Due to the low awareness of smart city initiatives, in order for the citizens to actively participate in the smart city development, it can take a long period of time.	• Work step-by-step on a long-term basis, and provide successful experiences which residents will be able to feel that they had contributed to.

Source: Smart City Guidebook (Japan)

Many cities are using a variety of methods to engage citizen participation.

	City	Initiatives in detail
Raise interest from the citizens	Jakarta	• Using social media through packaging interesting information, such as Instagram @jsclab, YouTube channel Jakarta Smart City.
	Siem Reap	• Social media platforms and national media are now the leading platforms to communicate with the locals. • Some SMEs and Social Enterprises are doing workshops as well.
	Battambang	• Seminars, conferences, workshops and social media.
	Mandalay	• To enhance citizen participation for mobile apps for this area, leverage media such as newspaper and social media websites.
	Phuket	• Aims to raises awareness and create opportunities for stakeholders to meet each other, by organizing events and campaigns. • Leverages pilot projects to illustrate to the citizens how smart city can make a difference, and generate interest towards in investing in money.
	Davao City	• Broadcast media and social media platform. • Video conferencing, webinars and other online platforms.

Enhance active communication from the citizens	Bandar Seri Begawan	• Project that have been/planned to incorporated citizen participation are;
		  o The flood warning system which will be opened for the public to provide information/complaint on its operation in the future.
		  o Channel for the public to give opinion/feedback/complaints on government public services through mobile application (e.g. WhatsApp, Smart Kampung) and call center.

	Nay Pyi Taw	• There is survey and interviewing local inhabitants on public services such as water supply, apply business license, waste collection, public transportation in some selected areas in the city.
	Yangon	• Through workshops and the Yangon City Development Committee (YCDC) website.
	Phnom Penh	• Strengthen the capacity of professional officers through the establishment of workshops, public input, as well as listening and discussing with counterparts in order to promote and improve the city's challenges.
	Vientiane	• To get citizen opinion, all public service departments are providing contact number to be easily reached by the citizen and to provide suggestion on public service as quickly as possible.
	Kota Kinabalu	• There are initiatives to enhance citizen participation in waste management by gathering opinions/issues from the citizen in the targeted areas.
	Banyuwangi	• Seminar with support from industry expert, academy. • Periodical workshops, and application to gain public opinion/Q&A.
Continuously engage on a long-term basis	Cebu City	• To get citizen participation, the city initially did public hearing/council to gain opinion from the citizen.
	Kuching	• The city provides the open platform/API where the start-ups can participate in the smart city development as well as other multi-channels where the city can provide timely information (Covid-19 cases update) to the citizen and the citizen can also report on crime, disaster as well as provide feedback and complaint on public service to the local government as well.
	Luang Prabang	• Currently, participation takes place farthest at the village leader level not the citizen i.e. through mobile application (e.g. WhatsApp, WeChat or others approved by the Ministry of Technology and Communication) which the representative thinks it is not sufficient and aims for development of ICT through international collaboration in the future.
	Manila	• The Go Manila App was initially developed to provide the real time traffic information. • Now it is expanding to facilitate transactions between both individual (i.e. public service) and business (i.e. business approval) and the government. Intentionally, the app aims to touch on individual people in informal sector to access the system and in turn, the local government will have the information of the citizen. • For the Go Manila app, the target is to have 80% of all Manila citizens registering in the app by the next 3 years (currently, around 20-30K business owners are using the go Manila app).

Jakarta has developed the systems called CRM and Musrenbang to collect citizen's complaints and opinations for improving the smart city development.

DKI Jakarta: Citizen Relations Management

- To answer challenges such as resolving citizens' complaints and improve services to the citizens, the Jakarta Provincial Government continues to innovate, one of which is by developing Cepat Respon Masyarakat (Citizen Relations Management) or CRM.

- The CRM system consists of a platform of 14 channels of official community complaints.

- Before there was CRM, so that community reports could be completed, there was a long process that had to be followed by the Regional Apparatus (OPD). As a result, the public waited a long time to know the updates from their reports.

DKI Jakarta Provincial Official Complaints Channel

Geo-tagging based channels	1. Qlue
Social media-based channels	2. JAKI (Jakarta Now) 3. Twitter @DKIJakarta 4. Facebook for DKI Jakarta Provincial Government 5. Governor's Social Media 6. Jakarta.go.id 7. E-mail to dki@jakarta.go.id 8. SMS to 08111272206 9. Text to LAPOR 1708
Face-to-face channels	10. Sub-District Office, 11. District office, 12. Mayor's office, 13. City Hall, 14. Inspectorate Office

Source: Jakarta Smart City, JMC IT Consultant

Musrenbang (Citizen Participation for City Development Plan)

- A program called "e-Musrenbang" has been implemented by Jakarta Provincial Government since 2015 to formulate the Annual Regional Development Plan called RKPD.

- It allows citizens to propose a public program to involve to the governance. The proposals can be accessed via the website or the application (planJKT). Both platforms can also be used to submit a direct proposal.
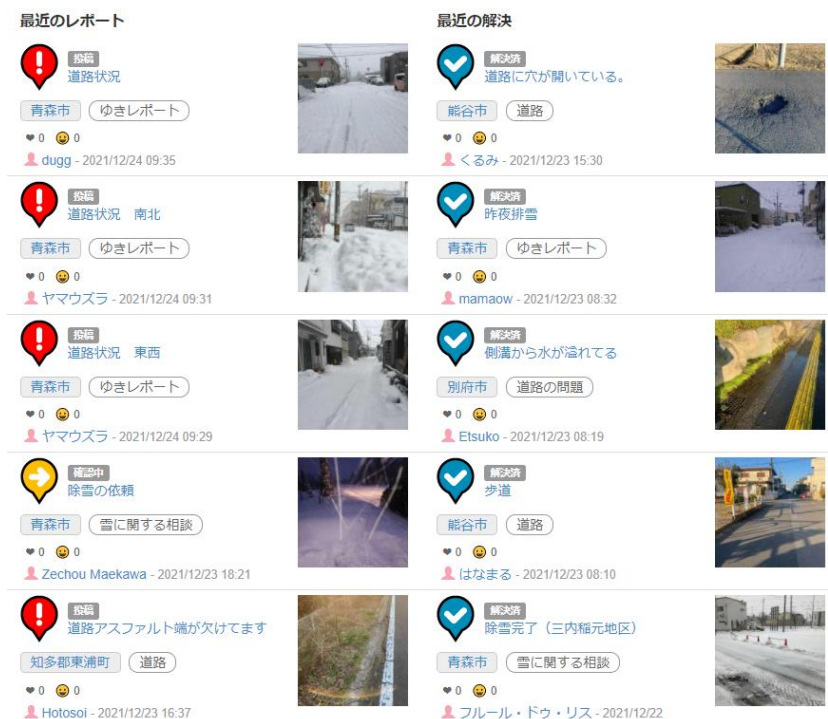

Diagram Aplikasi
e-Musrenbang

Aplikasi
e-Musrenbang
Mengawal partisipasi masyarakat dari tingkat desa/kelurahan dalam proses perencanaan pembangunan daerah
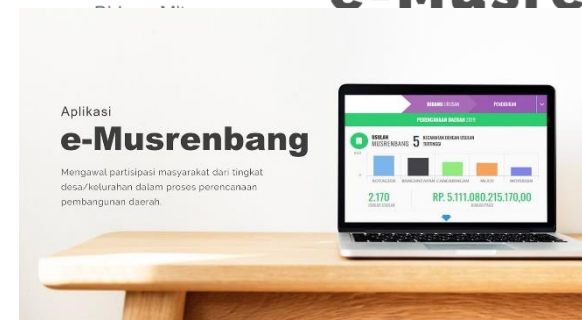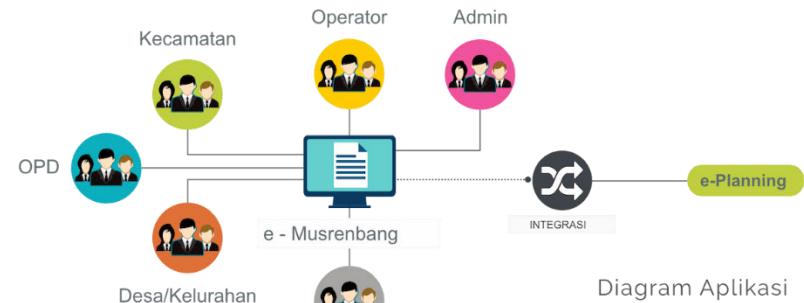
Leveraging mobile apps and websites which the resident can easily voice out opinions, will help enhance active communication from the citizens.

Mobile App (Used in Multiple Cities in Japan) - FixMyStreet Japan

- Mobile app which is used by over 20 cities within Japan, in which the residents can upload pictures regarding issues observed within the city (e.g. road damages, lighting failures, etc.,) for the city government to address.

Picture: Residents providing information about the issues caused to the road (e.g. road filled up with snow, water flooding from the road, etc.)

Kakogawa City (Hyogo)
Decidim (Platform for Communication on Policies)

- Platform, which the city can seek for opinions from the residents and discuss regarding policies.

- When developing the smart city plan, the city asked for ideas on the platform.

Picture: Asking for opinions regarding the name of the mixed use facilities which will be built within the city

Source: FixMyStreet Japan, Kakogawa City, Smart City Guidebook (Japan)
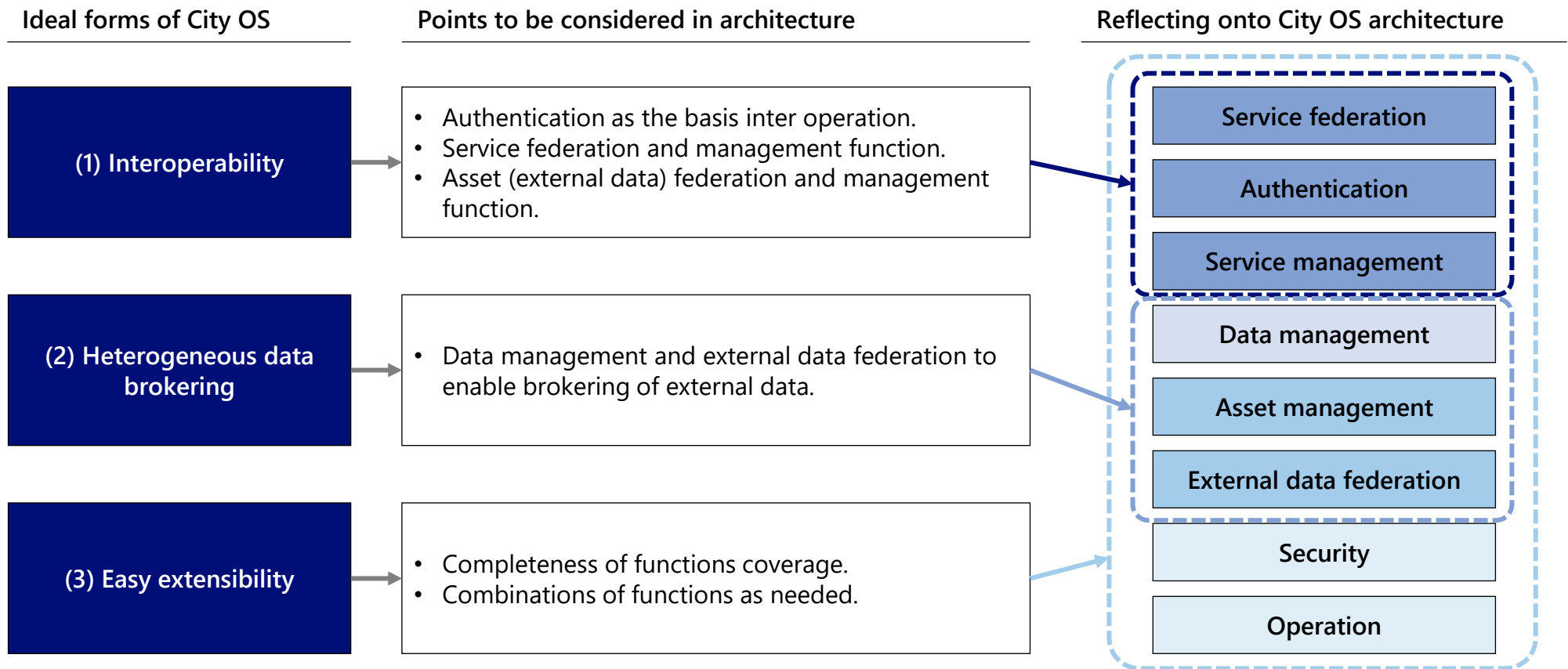
Agenda

City OS is the core for digital infrastructure in smart city, in which data linkage and providing clear rules for data usage will be key to successful implementation.

Development of Smart City	Development of City OS	Key Consideration Points for City OS Development	
		Data Linkage and Utilization	**Rules for Data Management**
Conceptual Phase → **Preparation Phase** → **Plan (Strategy) Development Phase** → **Pilot and Implementation Phase** → **Enhancement Phase** (Five Steps for Smart City Development)	**Understand the necessity of City OS**	• Develop a City OS, in which the data can be used across business fields, services, and applications. • Aim to develop a City OS, in which can be interoperable with other cities, to provide services which can be used across a wider area.	• Develop the rules for data utilization for each step of the data management such as data collection, data utilization, data storage, and data deletion.
	Design the basic structure for City OS		
	Develop and implement the City OS	• Continue to work towards ensuring the robustness of the data, and develop services which will be beneficial for the residents.	• Monitor the process of data management, and continue to enhance the rules as the data usage and service develops.

Source: Smart City Guidebook (Japan)

Characteristics of City OS

City OS is designed with characteristics such as (1) interoperability (connectable), (2) heterogeneous data brokering (exchangeable), and (3) easy extensibility (sustainable) in order to solve the traditional issues of Smart City.
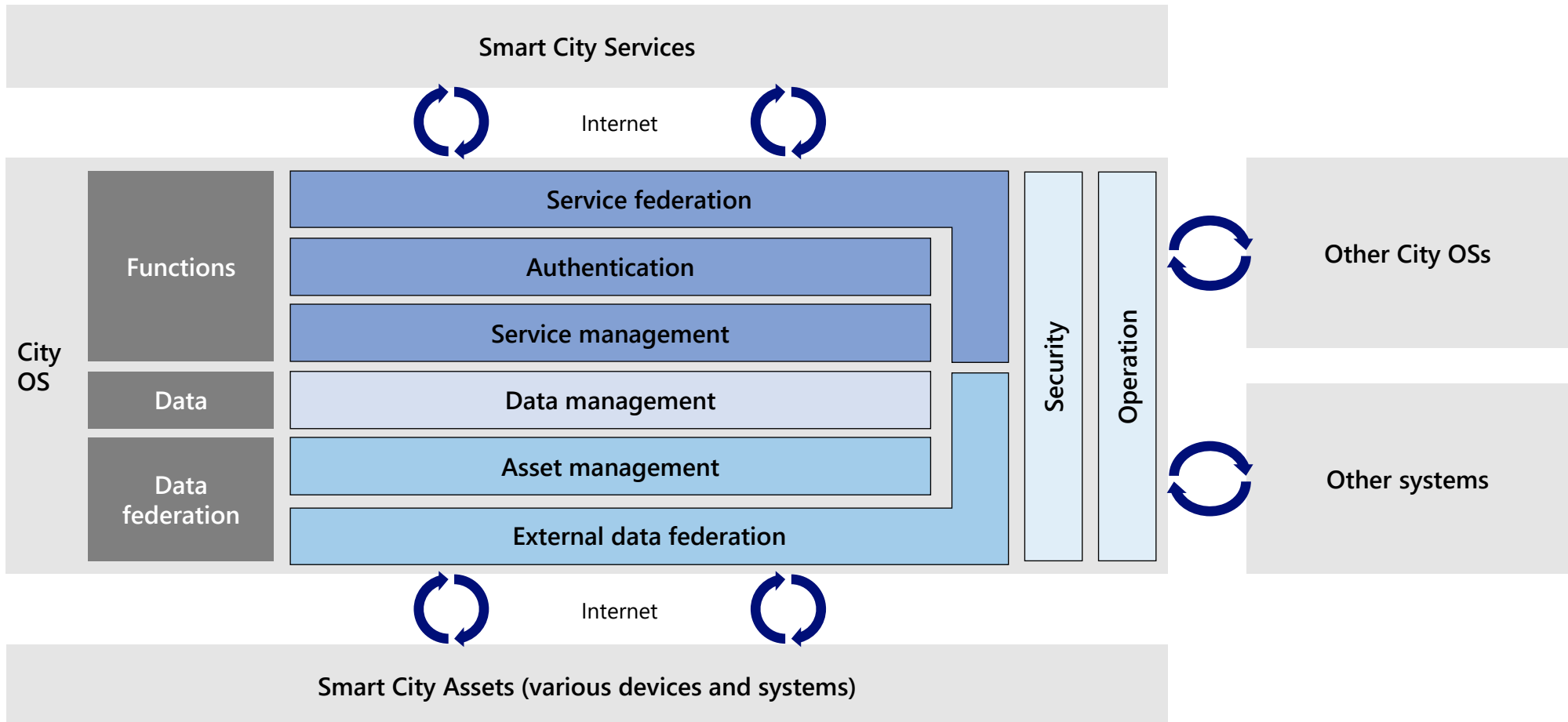
Characteristics of City OS and Smart City Reference Architecture

Ideal forms of City OS	Points to be considered in architecture	Reflecting onto City OS architecture
(1) Interoperability	• Authentication as the basis inter operation. • Service federation and management function. • Asset (external data) federation and management function.	Service federation Authentication Service management
(2) Heterogeneous data brokering	• Data management and external data federation to enable brokering of external data.	Data management Asset management External data federation
(3) Easy extensibility	• Completeness of functions coverage. • Combinations of functions as needed.	Security Operation

Source: Smart City Reference Architecture White Paper

Basic Functions of City OS

City OS consists of 8 components which manage the storage of data collected from various devices and systems utilized in the region, other systems, other City OSs, and federations to services within and outside the City OS.

Entity Relationship Diagram of City OS

Bangkok City Data Platform has implemented data catalog; data collection from government agencies and directories, which is currently providing 177 data sets.

Bangkok: City Data Platform

Concept of City Data Platform

1 Data Catalog

- Data collection from government agencies and integration into metadata
- Directory service

2 Data governance

- Data accuracy, consistency, completeness, freshness
- Data Security
- Data availability

3 Data exchange

- ID verification
- Access control
- Data Linkage
- Transaction logging
- Digital Signature
- Service status tracking
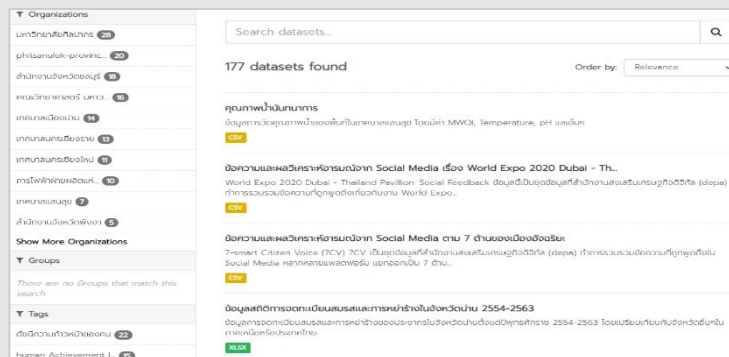
177 Data sets is available for download (i.e. Tourism data, drone registration, no. of population)
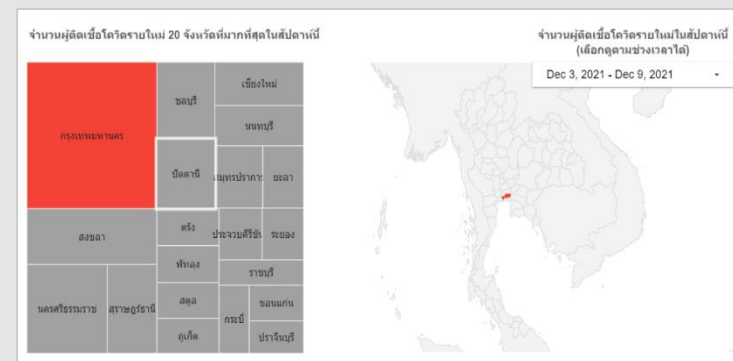
Sample Usage of Data from our City Data Platform : The number of infected people

Source: Thailand Digital Economy Promotion Agency (DEPA)

Setting clear rules and governance structure for data collection and utilization will help assure the citizens on data safety and enhance the data utilization.

Aizuwakamatsu City (Fukushima): Data Management Rules – Ensuring Opt-in by the Citizens

- The opt-in from the citizens regarding data collection and usage by the development organization is required, based on understanding that the citizens should provide consensus on the data being collected and utilized, based on understanding that they will receive personalized service through the data.

Governance Structure for Data Management

Super City Advisor
Aizu University

Voter

Citizens

Advice →

Election, resident votes

Exchange opinions

Policy Making

Advice
Monitor →

Aizuwakamatsu City

Provide data based on opt-in
(=Agree on collection and usage of data)

Request city OS operation based on overall policy and make revisions where needed

Exchange opinions

Operation of City OS and Core Services

Monitor →

← Collaborate →

Smart City Development Organization (AiCT and Local Companies)

Each Stakeholder's Responsibility for Data Management

- Provide data to the development organization which operates the city-OS, based on **opt-in** (i.e. agree on collection and usage of data.)
- Provide opinions to the city, and monitor the city through the elections.

- Decide on the overall policy regarding data distribution, management, and usage, by listening to the opinions of the key stakeholders.
- Request for the smart city development organization to operate the city OS based on the overall policy, and make revisions accordingly where needed.

- Formed by the key companies which are responsible for the smart city development.
- Operates the city-OS and core services based on the overall policy developed by the city.

Source: Aizuwakamatsu City

Digital Model Technology

Digital models can enhance the services provided in the cities, by conducting simulations from the data collected in the actual cities.

Overview of Digital Model / Digital Twins

- In a digital model / digital twin, a virtual cyber space is developed through the data collected from cameras and sensors in the cities.

- Simulations are conducted within the cyber space, in which the findings are used to develop new services and enhance the quality of life in the actual cities.

Reality: Physical Space
- Cameras
- Sensors

Data collection and provision →

Virtual: Cyber Space
- 3D digital data
  - Urban infrastructure
  - Buildings
  - Geology
- Monitoring data
  - Flow of people's movement
  - Logistics
  - Energy
  - Environment

↑ **Pilot projects and experiments**

Usage of data as information ↓

Develop new services and enhance convenience

Simulation
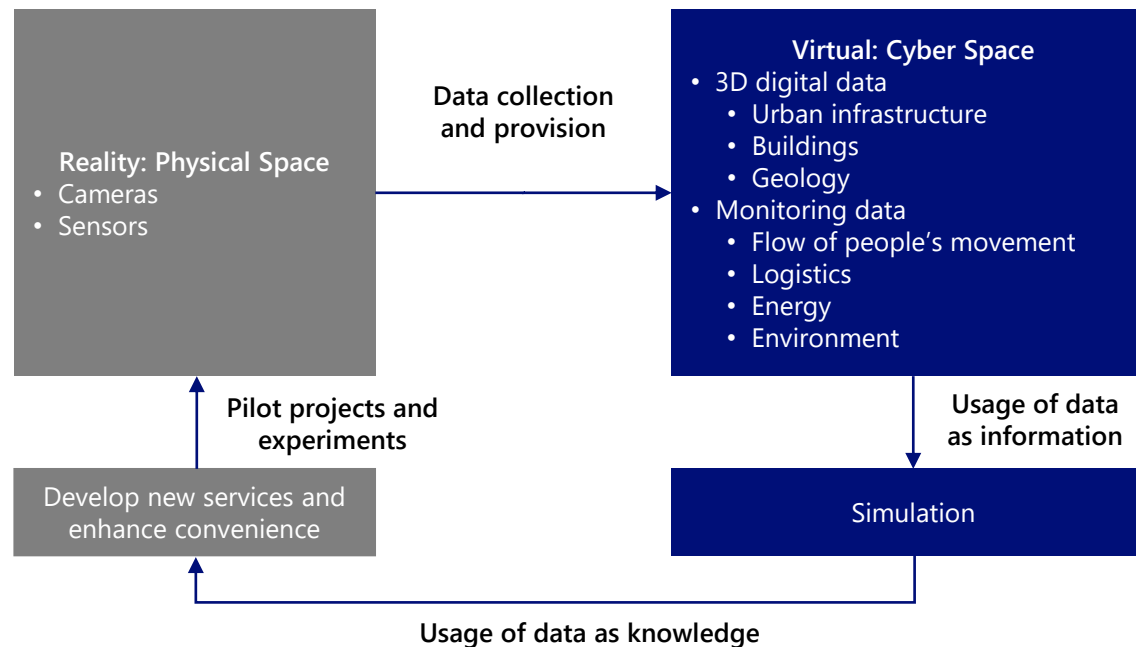
Usage of data as knowledge

Leveraging 3D city modelling technology and GIS data can help enhance the analysis on optimal usage of areas within the physical space.

Singapore: Virtual Singapore – 3D City Model

- Singapore developed a dynamic 3D city model and collaborative data platform, intended for use by the public, private, people and research sectors.

- Use case includes leveraging the data on heights of buildings and amount of sunlight available, to analyze which buildings have higher potential for solar energy production.

Usage of GIS Data

City / Country	Description
Johor Bahru	• Currently focused on developing an integrated Big Data Analytics platform called Iskandar Malaysia Urban Observatory (IMUO) that will leverage on GIS and Data Analytics Technologies. • IMUO shall also leverage on on-going Local Authorities' Digital Transformation initiatives to achieve better city planning and management within each city and seamlessly between cities in the region. • Nationally, the Ministry of Housing and Local Government (KPKT) is also in the progress of developing Malaysia Urban Observatory (MUO) concurrently with IMUO to integrate and analyze data at a macro and national level to assist in strategic decision-making and policies.
Nay Pi Taw	• GIS database for urban area of Nay Pyi Taw was established and partially implemented (e.g. city road database) specifically within urban areas. • GIS portal is under implementing stage.
Yangon	• Uses GIS to document every sector of Yangon city. • Current progress is at 80% building data and 50% zoning regulation data, in which target year for completion is 2025.
Viet Nam	• The Ministry of Construction is conducting research on GIS upgrade to develop greener cities, aiming to implement and share to multiple cities within 2022.

Source: National Research Foundation Singapore, NRI based on interview and questionnaire
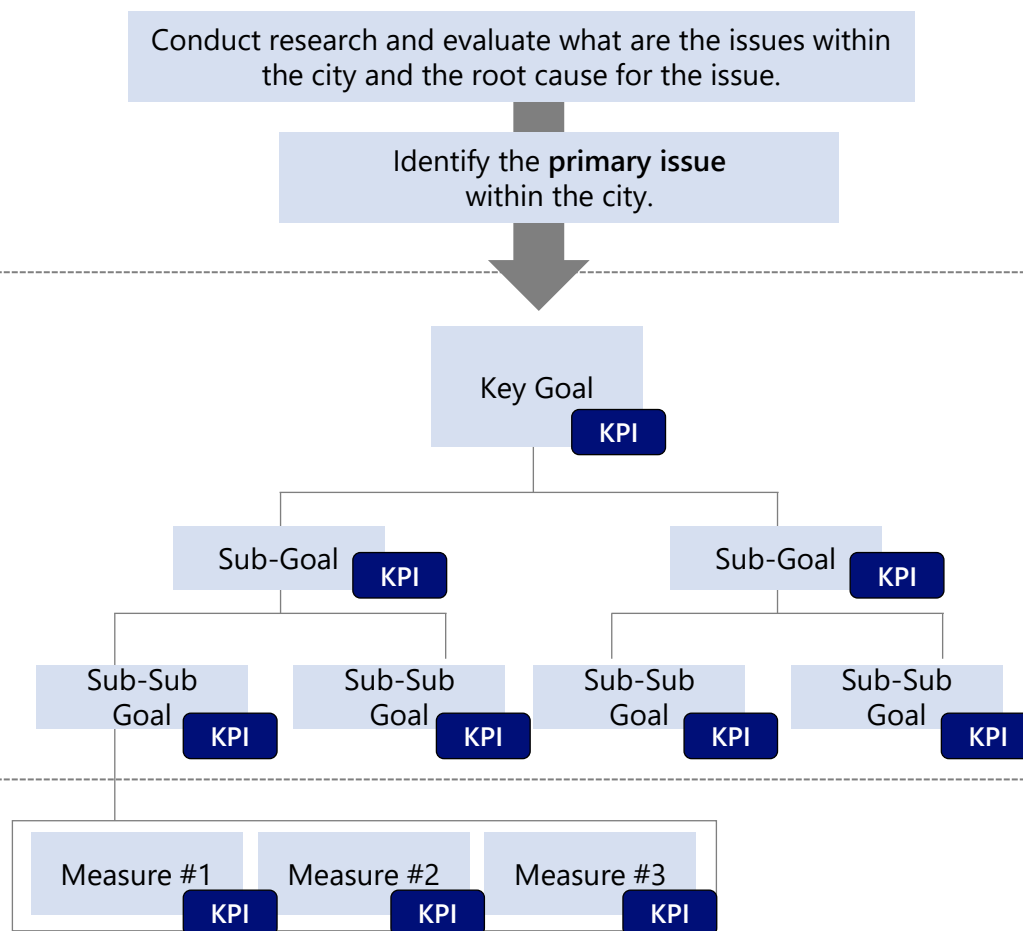
Agenda

Ensuring that the goal is set based on the primary issue, and that the KPI for the goal is specific, measurable, and realistic is the key for strategy development.

Structure of Strategy Development
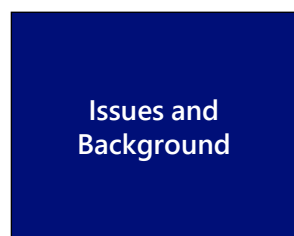
Structure of Strategy Development

Consideration Points

Issues and Background

Conduct research and evaluate what are the issues within the city and the root cause for the issue.

Identify the **primary issue** within the city.

- **Selection and concentration**, to identify the **primary issue** is the key for effective strategy development.

Goals

Key Goal
KPI

Sub-Goal
KPI

Sub-Goal
KPI

Sub-Sub Goal
KPI

Sub-Sub Goal
KPI

Sub-Sub Goal
KPI

Sub-Sub Goal
KPI

- To set the KPI for the key goal and each of the sub goals and sub-sub goals.

- For the KPI, to ensure that it is the following:
  - **Specific**, and easy to understand for all stakeholders.
  - A **quantitative** goal which is **measurable**.
  - The goal is **realistic** and **achievable**.

Measures

Measure #1
KPI

Measure #2
KPI

Measure #3
KPI

- **Monitor and evaluate** the results based on the KPI regularly, and make refinements to the targets where needed.

Source: Smart City Reference Architecture White Paper

The KPI for the smart city is arranged by the Jakarta and Jakarta Smart City leaders which is included into Medium-Term Regional Development Plan.

DKI Jakarta: Smart City KPI

- The items to be evaluated in the KPI include total 7 topics with clear quantitative targets

Item	Output indicator	Operational definition	2020		2021	
			Target	Achieved	Target	Achieved
Service Development	Number of public service applications integrated into the Jakarta Smart City application.	Number of public service applications integrated into the Jakarta Smart City application in 1 year.	4	38	10	30
Public Opinion Response Management	Number of response in Cepat Respon Masyarakat Platform.	Percentage of reports responded in 1 year.	81.00%	99.85%	85.00%	94.11%
Information Dissemination of Service Development	Number of people who consume Jakarta Smart City service information.	Number of people who access information in 1 year.	200,000	9,960,971	500,000	25,961,502
Research and Development Program	Number of studies/research produced.	Studies/research produced in 1 year.	16	234	20	234
Application Development	Number of features developed.	Number of features developed in 1 year.	20	46	30	38
Infrastructure Development	Number of servers in operation.	Number of servicers in operation in 1 year.	2	3	3	3
Office Operations	Number of available office operational needs.	Number of months available for office operational needs.	12	12	12	12

Source: NRI based on interview and questionnaire result

Chonburi provides KPIs for 6 key areas, in which a quantitative target is provided for 2-4 indicators in each key area.

Chonburi: Smart City KPI

- The items to be evaluated in the KPI include 6 key areas, in which the target is provided by indicator for 2040.

Item (Key Areas)	Indicator	2040 Target
1. Achieving sustainability through "Net Zero" emission	Waste to Energy Generation	20 MW
	Energy self reliance with smart grid management	100%
	Renewable energy utilization rate	20%
	Waste-water utilization rate	100%
2. Providing easy access and effective mobility	Public transportation utilization rate for commuters	50%
	Green vehicle (hybrid, electric) utilization rate	20%
3. Enhancing quality of life and sustainable environment	Tenant occupancy rate	100%
	Create walkable city, increase recreational walkway length	30%
	Increase per capita public green space	20%
4. Linking top level education and innovation	No. of education facility	15
	No. of R&D facility	10
	% of skilled labor	30%
5. Fostering innovative technology based industry	Companies on targeted industries	50%
	Services network coverage (4G, 5G, FTTX)	100%
	Use of smart factory application	50%
6. Exhibiting healthy living style for all ages	Employees having a periodical medical-check up	100%
	People working after 60 years old (% of senior executive levels)	10%

Source: NRI based on interview and questionnaire result

Splitting steps to reach the key goal, and developing a specific, measurable, and realistic goal by step will help ensure that the progress can be evaluated clearly.

Haneda Innovation City (Tokyo, Ota Ward): Smart City KPI

- Ward-wide goal (e.g. increase in productivity) is set as a key goal (outside the smart city,) in which the process is divided into steps, which includes KPI for each step.

Smart Robotics

Steps	Target	KPI	
Step 1 (FY20-21)	• Leverage diverse types of robots to replace tasks.	Type of robots	10
		Number of robots	50
	• Able to automatically control multiple number and types of robots simultaneously.	Number of tasks replaced	10
Step 2 (FY22-23)	• Leverage robots to enhance convenience and replace / support jobs.	Efficiency Rate	+20%
		Satisfaction Rate	80%
Key Goal (FY24-)	• Improve productivity.	Increase the value added within district	+JPY 2.2 trillion
		Number of employees in district	361,000 people

Smart Tourism

Steps	Target	KPI	
Step 1 (FY20-23)	• Make the tourism resources apparent.	Tourism service user	350,000 people per year
	• Leverage human movement data to create more bustle.	Visitors for HI City	7,000 people Per day
Step 2 (FY24-)	• Make the tourism resources apparent. • Create more bustle.	Visitors going out from HI City to the Ota ward	200,000 people / Year
Key Goal	• Enhance tourism and the local community.	Tourism expenditure	JPY 202.5 bn / Year
		Tourism Visitors	45 mn people / Year

Source: Smart City Guidebook (Japan)

Agenda

Concluding Notes for Readers of ASEAN Smart City Planning Guidebook

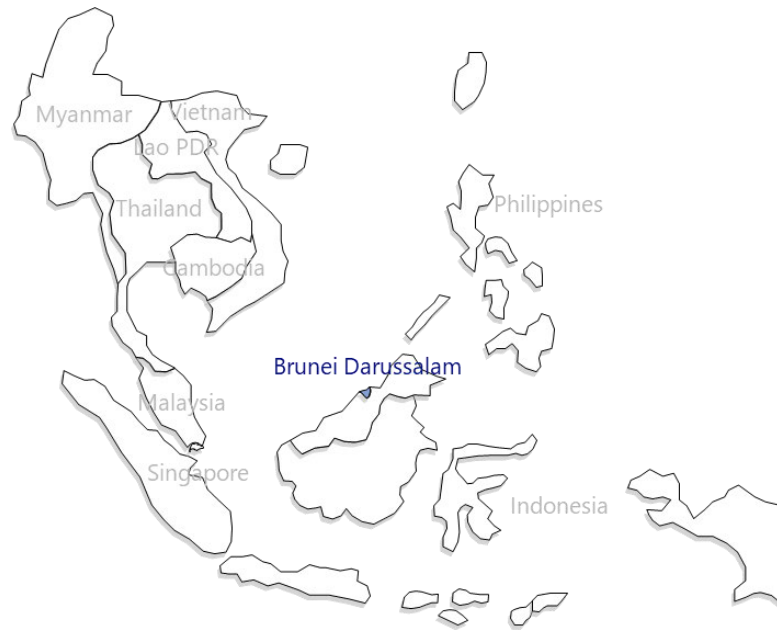|	
Key takeaway 1: Providing an optimal solution for each city's specific challenges leveraging advanced case studies will be effective	• In this guidebook, the ASEAN Smart Cities Framework and ASUS were leveraged to provide case studies of 26 pilot cities in ASCN. Each city has its own unique challenges and is considering and providing a wide range of solutions to address them, in which the range of areas covered by the solutions is expanding as well. • It is therefore important that the city's specific challenges are considered and identified by the local government, whom are the key players in smart city development, and other local stakeholders, and that the most appropriate solutions are considered and provided in order of priority. • When considering the most appropriate solutions, it will be effective to seek, consider and collaborate on solutions which suit the target city, leveraging the advanced examples in each area introduced in this guidebook, as well as the examples from Japan as reference to gain further inspiration.
Key takeaway 2: Identifying the appropriate timing for collaboration based on development stage will enhance development and investment	• In this guidebook, the Smart City Development Framework outlines the stages of smart city development in the 26 ASCN pilot cities and the key enablers at each stage, in which smart city development in ASEAN cities has been progressing steadily since 2018, with all cities having considered and developed master plans and started to implement pilot solutions and full-scale solutions (many cities are working on both in parallel as well). • Therefore, in the ASCN 26 cities, focus areas have been confirmed based on city-specific challenges, and now at the stage of exploring and diversifying the necessary digital technologies and solutions to address these challenges, in which many opportunities for collaboration among ASEAN Member States and with countries outside the region have become identified in each city. • It is important to understand the potential and timing for expansion and collaboration in each city by referring to the development stage of each city and the current challenges and solutions introduced in this guidebook.
Key takeaway 3: Collaboration between local stakeholders leveraging best practices will further drive efficient partnership	• In preparing this guidebook, the ASCN and ASEAN Secretariat have supported with providing insights to develop the guidebook, reaffirming that local governments, companies and the peoples are the key players in the development of smart cities in ASEAN cities. • Therefore, it is most important to successfully involve local governments, businesses and residents when considering smart city development plans and the provision of technologies and solutions in new cities. • Best practices regarding the collaboration between local governments and companies, as well as the engagement with local residents described in this guidebook will be beneficial when considering the development of smart cities and the provision of solutions.

Agenda

Brunei Darussalam

Key Market Index

GDP (Millions of US$) [1]	12,003
GDP per capita (US$) [1]	26,462
Median Age [2]	31
% Improved Sanitation Facilities [3]	94
% Improved Drinking Water Source [3]	100
Internet Subscribers per 100 persons [4]	79
Cellular Phone Users per 100 persons [5]	139

1 Brunei Department of Economic Planning and Statistics, Gross Domestic Product, Third Quarter 2021
2 Brunei Department of Economic Planning and Statistics, Report of the Mid-Year Population Estimates 2020
3 Brunei Ministry of Development, 2021
4 Brunei Authority for Info-Communications Technology Industry, ICT Household Report 2019
5 Brunei Authority for Info-Communications Technology Industry, 2021

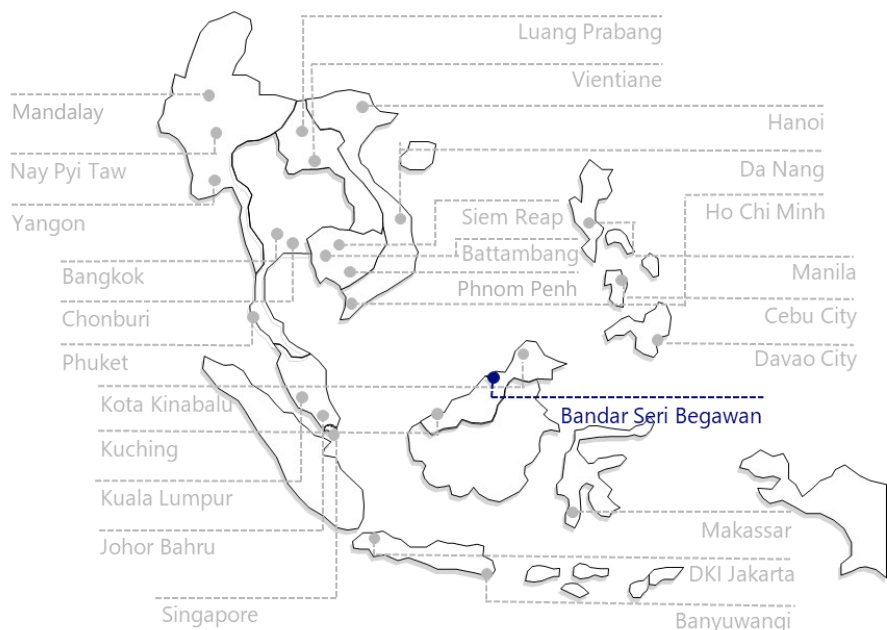## Smart City Plan & Activity (National level)

Governmental Direction

- In 2020, a national Smart City Steering Committee was set up and co-chaired by the Minister of Development and Minister of Transport and Infocommunications. A Smart City Action Plan is subsequently crafted to support the implementation of smart city development.
- A Digital Economy Masterplan 2025 is considered as a higher level master plan. As such, where the Digital Economy Masterplan defines certain key technologies (e.g. AI, big data, blockchain, IoT and automation,) the Smart City Action Plan will incorporate the deployment of these technologies in the smart city projects.

Partnerships with other countries

- South Korea and Brunei Darussalam have agreed in Seoul to strengthen their partnership on smart cities and other ICT-related programs. (November 24, 2019.)

Country Basic Information

Land Area (km^2)	5,765
Population (thousand)	454 (in 2020)
Urban Population (thousand)	312 (75%) (in 2016) 458 (84%) (in 2050)
Capital	Bandar Seri Begawan
Ethnicity	Malay 66%
Language	Malay (official language)
Religion	Islam 79% (national religion)
Political System	Constitutional monarchy

Source: ASEAN Smart Cities Network, MLIT reports, World Bank, Brunei Department of Economic Planning and Statistics, Report of the Mid-Year Population Estimates 2020, Brunei Department of Economic Planning and Statistics, Population and Housing Census Update Final Report 2016

Bandar Seri Begawan in Brunei Darussalam

Bandar Seri Begawan

City Basic Information

Land Area (km²)	100
Population (thousand)	100
Density (person/km²)	1,007
City Features	• The capital city of Brunei Darussalam. • It is located in the lower Brunei River. • The economy is backed by oil and natural gas development. • Kampong Ayer is a prominent traditional settlement, comprising of neighborhoods of traditional houses, schools and mosques built on stilts above the Brunei River in Bandar Seri Begawan.

Smart City Action Plan

Vision

To develop Kampong Ayer as the Jewel of Bruneian Heritage and facilitate its growth as part of Bandar Seri Begawan's smart city development plan.

Focus Areas

Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
★	★		★		★

Focus Area	Detail & Project Sample
Civil and Social	• Kampong Ayer as part of Bandar Seri Begawan as the main tourist destination with its own unique characteristics such as its culture, treasures and historical heritage which create community identity and cohesion.
Health and Well-being	• Kampong Ayer will provide utilities and services, community facilities and recreational areas which are necessary for the promotion of vibrant social and cultural life.
Industry and Innovation	• Kampong Ayer as a center for opportunities for commercial development to create employment and spin offs for other SMEs businesses and livable social activities.
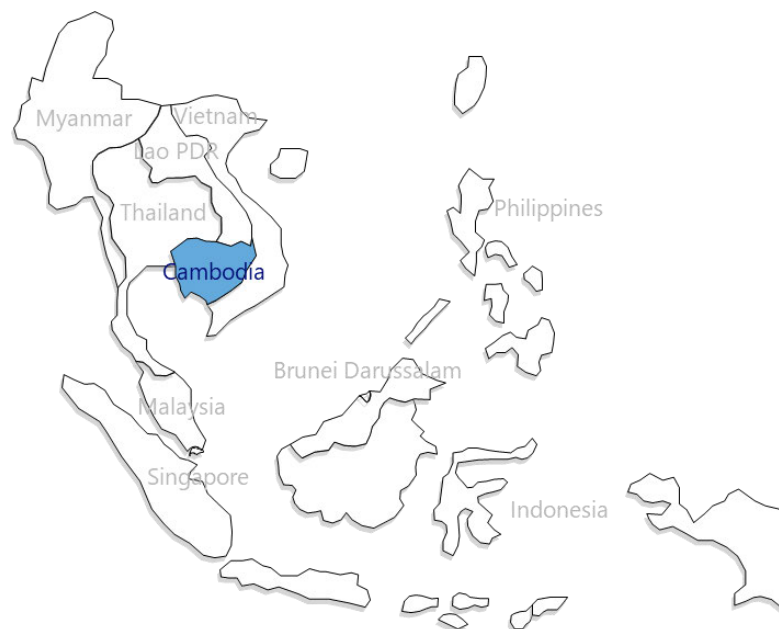
Cambodia

Country Basic Information

Land Area (km^2)	181,000
Population (thousand)	16,720 (in 2020)
Urban Population (thousand)	3,161 (21%) (in 2014) 8,167 (36%) (in 2050)
Capital	Phnom Penh
Ethnicity	Cambodian 90%
Language	Cambodian (Khmer)
Religion	Buddhism (Majority)
Political System	Constitutional monarchy

Key Market Index

GDP (Millions of US$) [1]	25,809
GDP per capita (US$) [1]	1,544
Median Age [2]	26
% Improved Sanitation Facilities [3*]	62
% Improved Drinking Water Source [3*]	59
Internet Subscribers per 100 persons [3]	19
Cellular Phone Users per 100 persons [3]	133

1 World Bank, GDP (current US$); World Bank, GDP per capita (current US$) *Data for 2020
2 United Nations, Department of Economic and Social Affairs, Population Division (2019) *Data for 2020
3 ASEAN Secretariat, "ASEAN Statistical Report on Millennium Development Goals", 2017. * Data as of 2015
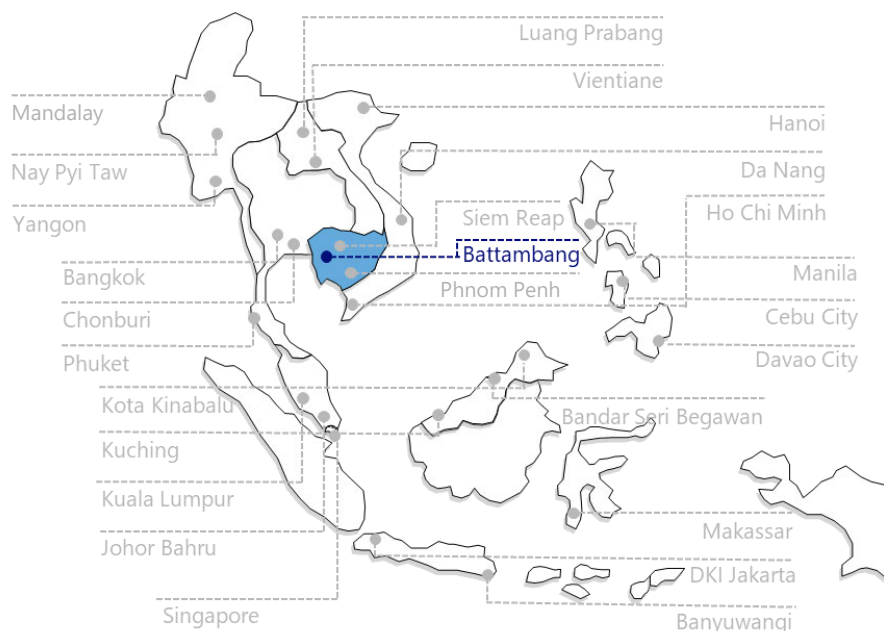
Smart City Plan & Activity (National level)

Governmental Direction

- Smart City plan is administered by the Ministry of Land Management, Urban Planning and Construction.
- Battambang, Phnom Penh and Siem Reap are set to be incorporated into the ASEAN Smart City Network.
- No integrated national master plan.

Partnerships with other countries

- Cooperation with the Korean government (2016) to build a smart city at Sihanoukville with water management, transportation and energy infrastructure based on Korean technology.
- Cambodia-Japan Urbanization Development (2019) is a coordination with the Japanese government to provide of all services within its capacity and promote business and investment opportunities in Cambodia to Japanese investors.

Source: ASEAN Smart Cities Network, MLIT reports, World Bank

Battambang in Cambodia

City Basic Information

Land Area (km^2)	115
Population (thousand)	161
Density (person/km^2)	1,395
City Features	• Battambang City is the second largest city in Cambodia. • It is located in the northwest of Cambodia about 300 kilometres away from the capital city Phnom Penh. • The city is known for its activities associated with rice production and heritage buildings as well as its good quality living environment.

Smart City Action Plan

Vision

To achieve a socially responsible, environmentally friendly and economically successful city whilst retaining Battambang's unique character.
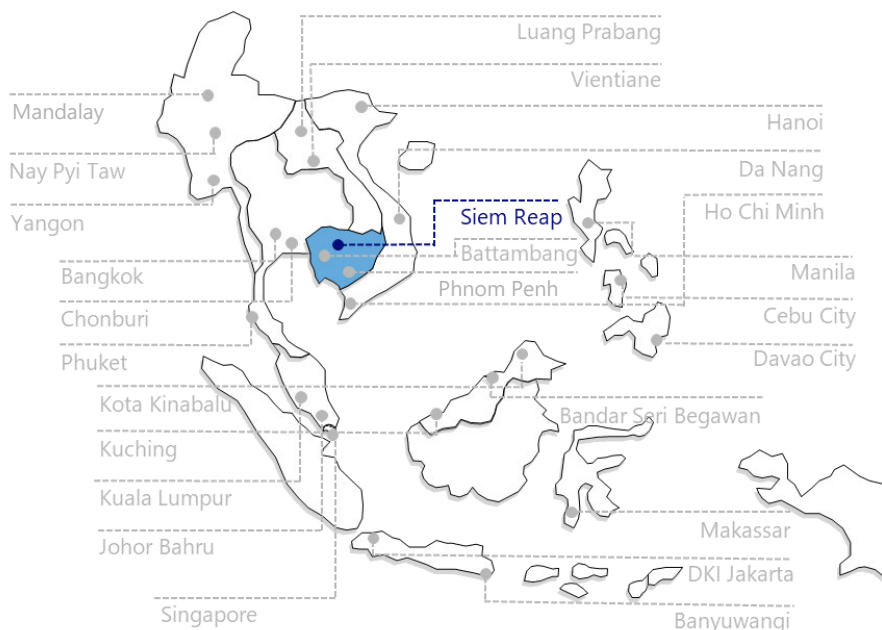
Focus Areas

Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
★			★	★	

Focus Area	Detail & Project Sample
Civil and Social	• Low cost housing and skill development for youth program is planned.
Quality Environment	• Additional drain and sewage infrastructure to move away from river-based natural waste management to sewage and wastewater management systems has been developed.
Build infrastructure	• Public infrastructure upgrade e.g. road improvement and organized market for street vendors has been planned.

88

Phnom Penh in Cambodia

City Basic Information

Land Area (km^2)	693
Population (thousand)	2,800
Density (person/km^2)	4,040
City Features	• Phnom Penh is the capital and administrative and cultural and economic center of Cambodia. • It is located in southern Cambodia, where the Tonle Sap River and Mekong River join. • Due to the recent economic growth, the construction of high-rise building and others is progressing.

Smart City Action Plan

Vision
To improve the urban environment to enhance citizen's quality of life.

Focus Areas					
Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
				★	

Focus Area	Detail & Project Sample
Built Infrastructure	• Sidewalks Rejuvenation Project which aims to increase pedestrian through the rejuvenation, restoration and repurposing of the sidewalks for 11 boulevards by managing unlicensed street vendors and illegal parking has been planned. • To improve efficiency of Phnom Penh's Public Transport Services that is user-friendly, environment friendly, innovative, the technology e.g. cash-less payment system and GPS tracking system has been introduced.

City Profile Overview (City level)
Siem Reap in Cambodia

City Basic Information

Land Area (km^2)	425
Population (thousand)	268
Density (person/km^2)	632
City Features	• Siem Reap is a resort town in northwestern Cambodia. • It is a tourist spot with museums, traditional dance performances, a Cambodian cultural village, silk farms, rice paddies in the countryside and the home of Angkor Angkor temple.

Smart City Action Plan

Vision

To enhance Siem Reap's position as a beautiful, unique and ideal tourist destination, characterized by the harmony of Khmer history, arts and nature.

Focus Areas

Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
★		★	★		

Focus Area	Detail & Project Sample
Civil and Social	• Smart Tourist Management System with security systems such as CCTV and traffic sensors has been developed in some areas.
Safety and Security	• Infrastructure for personal safety and security has been in progress e.g. CCTV installation. Other targets include installation of road traffic sensors, pedestrian traffic sensors.
Quality Environment	• Environmental management infrastructure e.g. drainage sensor to measure water level and solid waste and wastewater management infrastructure has been planned.

City Profile Overview (National level)

Republic of Indonesia
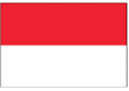
Country Basic Information

Land Area (km^2)	1,905,000
Population (thousand)	273,500 (in 2020)
Urban Population (thousand)	133,999 (53%) (in 2014) 227,770 (71%) (in 2050)
Capital	Jakarta
Ethnicity	Malay (Majority)
Language	Indonesia
Religion	Islam (87%), Christianity (10%)
Political System	Presidential

Key Market Index

GDP (Millions of US$) [1]	1,058,424
GDP per capita (US$) [1]	3,870
Median Age [2]	30
% Improved Sanitation Facilities [3]*	62
% Improved Drinking Water Source [3]*	71
Internet Subscribers per 100 persons [3]	22
Cellular Phone Users per 100 persons [3]	132

1 Euromonitor (Data for 2020)
2 Euromonitor (Data for 2020)
3 ASEAN Secretariat, "ASEAN Statistical Report on Millennium Development Goals", 2017. * Data as of 2015

Smart City Plan & Activity (National level)

Governmental Direction

- The implementation is decentralized to each city and administered by the Ministry of Home Affairs under Directorate General of Regional Administration.
- Smart City plan is carried out by ministries and agencies including the Ministry of Public Works and Public Housing.
- The master plan launched in 2013 aimed to develop 100 smart cities by 2019.

Partnerships with other countries

- Indonesia-Japan Smart City Virtual Forum (2020) through Japan Association for Smart Cities in ASEAN (JASCA)for sharing best practices and challenges in developing smart cities.
- Many projects are conducted through partnership with private sector for example, Huawei, China and PT. PINS Indonesia which Huawei provided end-to-end public safety Smart City solution with key focus on omni-protection, rapid response and efficient case-solving.

Makassar in Republic of Indonesia

City Basic Information

Land Area (km^2)	199
Population (thousand)	1,770
Density (person/km^2)	7,400
City Features	• Makassar is the capital of South Sulawesi province. • It is a central city in eastern Indonesia. • It is at the center of rapid socio-economic growth, supported by excellent geotechnical conditions and a thriving service industry.

Smart City Action Plan

Vision
To create Makassar as livable world class city for all.

Focus Areas					
Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
	★				

Focus Area	Detail & Project Sample

Health and Well-being	• To ensure that all citizens have easy and direct access to health care services, the city has planned to establish the inventory of health care data and integrate with all health system in a single platform.
	  o Current project is the District Health Information System (HIS).
	  o Methods for linking citizen data with financial data and utilizing it for preventive medicine are being explored.
	• To increase the city's revenues through improved tax collection via an integrated e-tax system. Citizen and business will file tax through personal mobile applications and one-time submission electronic platforms.
	  o Currently, the e-Tax system has been introduced to automate hotel and restaurant payments and value added tax (VAT) / hotel tax collection.

Banyuwangi in Republic of Indonesia

City Basic Information

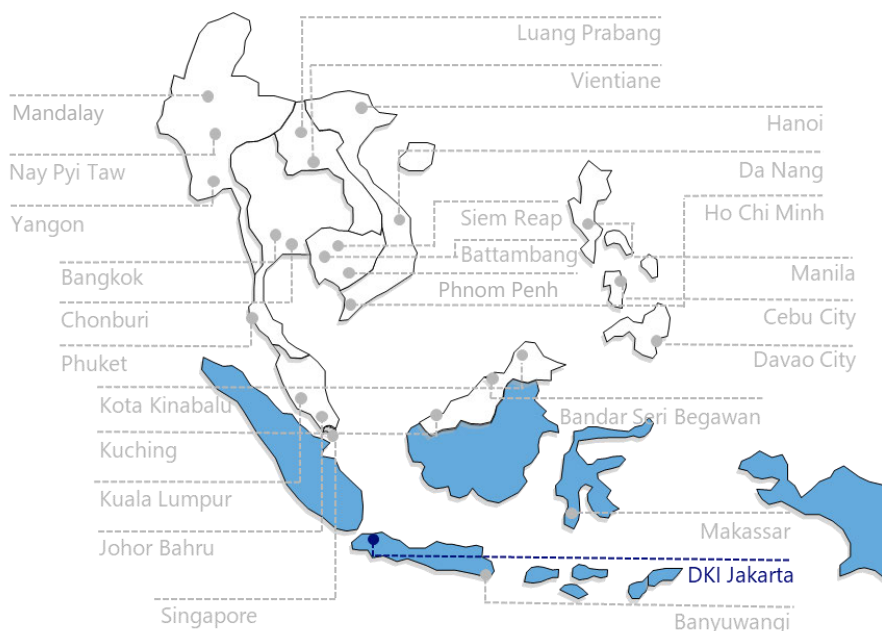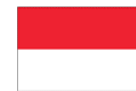|	
Land Area (km^2)	5,783
Population (thousand)	1,600
Density (person/km^2)	277
City Features	• Banyuwangi is the administrative capital of Banyuwangi Regency. • It is located in the easternmost part of Java, overlooking the lush green Bali Strait. • It is the tourist city, known as the city of festivities as nearly 100 festivals are held throughout the year.

Smart City Action Plan

Vision

- To develop an integrated system of government through institutionalization of innovation and bureaucratic reform at all levels of government.
- To accelerate development through information technology and early warning result oriented control system.
- To build a reliable generation through guaranteed access to basic services
- and the development of vocational education oriented from regional potential.
- To support the economy through development of financing partnerships and tourism-based development.

Focus Areas

Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
★	★				★

Focus Area	Detail & Project Sample
Civil and Social	• Eco-tourism in locality is planned through cooperation with strategic partners.
Health and Well-being	• Various ICT-based innovations has been implemented for public services e.g. birth certificate issuance.
Industry and Innovation	• Integration of customized IT modules into education curriculum to bring e-commers and online trading knowledge to young people has been planned.

Source: ASEAN Smart Cities Network, MLIT reports

City Profile Overview (City level)

DKI Jakarta in Republic of Indonesia

City Basic Information

|	
Land Area (km^2)	662
Population (thousand)	10,650
Density (person/km^2)	15,367
City Features	• DKI Jakarta is the capital city of Indonesia and a special city that constitutes the Capital Territory (DKI). • It is located on the northwest coast of the island of Java. • The city has been a major trade and financial centre and an important industrial city and a centre for education.

Smart City Action Plan

Vision

To be a city leading forward towards happy citizens.

Focus Areas

Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
	★			★	★

Focus Area	Detail & Project Sample
Health and Well-being	• Data collection apps and connection to big data system to design and deliver social and health programs has been developed.
Build infrastructure	• Integration of all Jakarta transit payment systems into one cashless system has been in progress. • Transjakarta bus (BRT) has a GPS sensor to track its location and route which provides real-time location for passenger to manage their travel time has been developed.
Industry and Innovation	• Job creation project which provides platforms for innovation sharing among research institutions and entrepreneurs has been planned. • Smart card for students to access books, clothes, public transport, food (meat and milk) has been planned.

Lao People's Democratic Republic
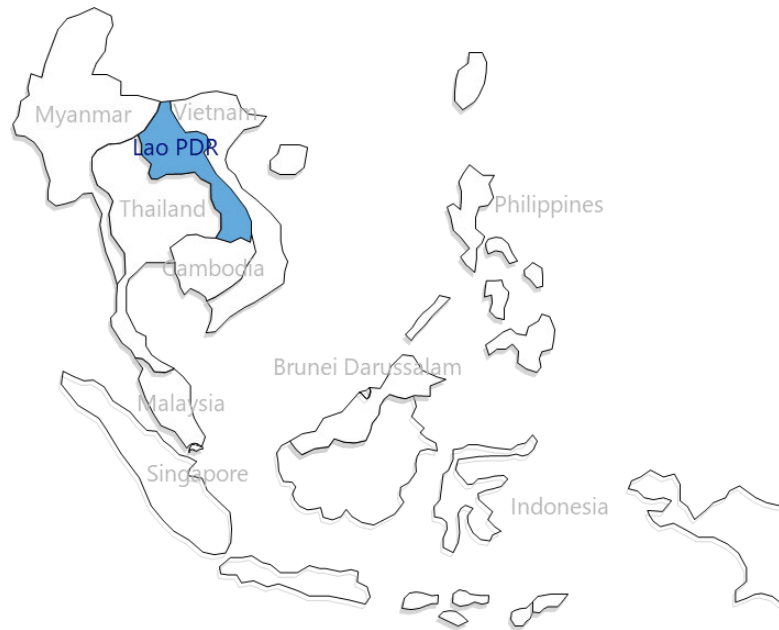
Country Basic Information

Land Area (km^2)	237,955
Population (thousand)	7,276 (in 2020)
Urban Population (thousand)	2,589 (38%) (in 2014) 6,435 (61%) (in 2050)
Capital	Vientiane
Ethnicity	Lao (Majority)
Language	Laotian
Religion	Buddhism
Political System	People democratic republic

Source: ASEAN Smart Cities Network, MLIT reports, World Bank, Local news

Key Market Index

GDP (Millions of US$) [1]	19,133
GDP per capita (US$) [1]	2,630
Median Age [2]	24
% Improved Sanitation Facilities [3*]	71
% Improved Drinking Water Source [3*]	76
Internet Subscribers per 100 persons [3]	18
Cellular Phone Users per 100 persons [3]	53

1 World Bank, GDP (current US$); World Bank, GDP per capita (current US$) *Data for 2020
2 United Nations, Department of Economic and Social Affairs, Population Division (2019) *Data for 2020
3 ASEAN Secretariat, "ASEAN Statistical Report on Millennium Development Goals", 2017. * Data as of 2015
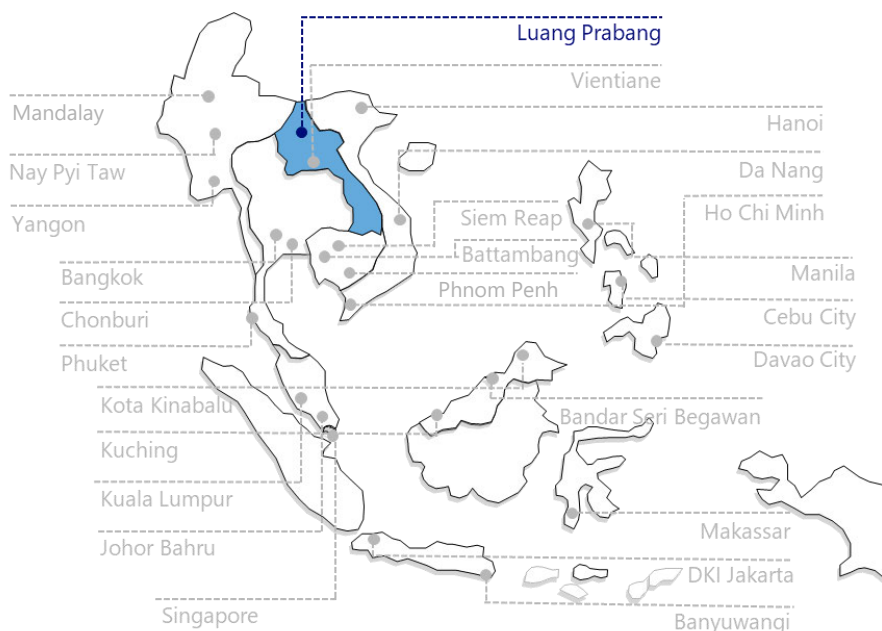
Smart City Plan & Activity (National level)

Governmental Direction

- The national strategy for smart cities is on process to be concretely incorporated in the 9th National Socio-Economic Development 5-year Plan (2021 to 2025).
- The smart city will be promoted by the Bureau of Economic Affairs of the Ministry of Foreign Affairs and the Bureau of Housing and Urban Planning of the Ministry of Public Works and Transportation with local governments.

Partnerships with other countries

- Japan, Ministry of Land, Infrastructure, Transport and Tourism has launched the project in Luang Prabang (2021). The study of local issues in each infrastructure field to identify necessary technologies which Japanese companies can offer to smart city development has been conducted.
- China, Yunnan Construction, Huawei and the Laos government has co developed smart expressway (2021) connecting capital Vientiane with Vangvieng with IoT equipment capable of analyzing big data along with other real-time services such as emergency services, and decision analysis.

Luang Prabang in Lao People's Democratic Republic

Luang Prabang
Vientiane
Mandalay
Hanoi
Nay Pyi Taw
Da Nang
Yangon
Ho Chi Minh
Siem Reap
Battambang
Bangkok
Manila
Phnom Penh
Chonburi
Cebu City
Phuket
Davao City
Kota Kinabalu
Bandar Seri Begawan
Kuching
Kuala Lumpur
Makassar
Johor Bahru
DKI Jakarta
Singapore
Banyuwangi

City Basic Information

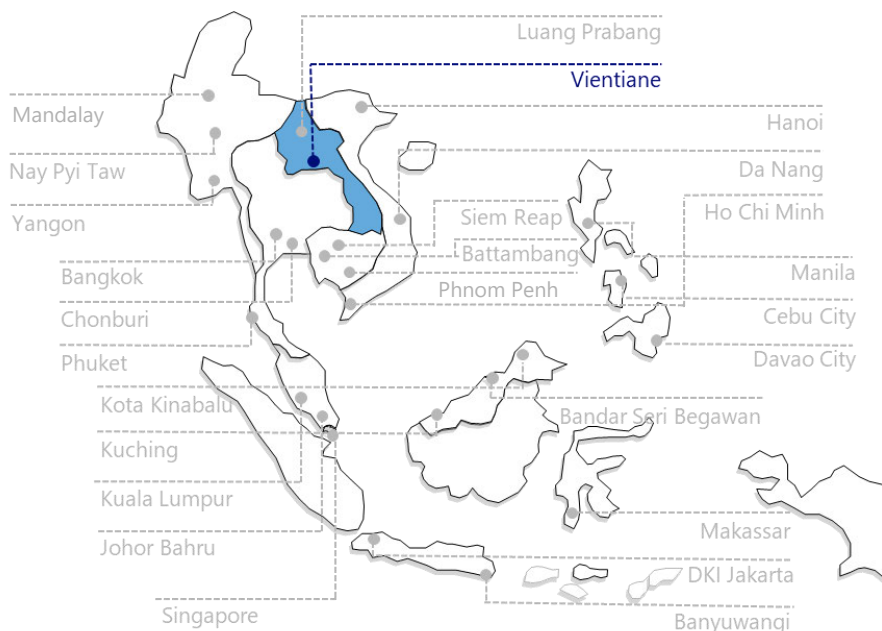| Land Area (km²)	857
Population (thousand)	98
Density (person/km²)	114
City Features	• Luang Prabang is the economic center of the northern part of Laos. • It is located in north of Vientiane. • The city is an ancient city that dates back to 1300s, and its entire urban area has been registered as World Heritage Site. (15 April 2021).

Smart City Action Plan

Vision

To be the city of tourism centre and regional connection, Luang Prabang envisions to be a clean, green, livable environment and smart city with the world heritage in the core by 2025.

Focus Areas

Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
★			★	★	

Focus Area	Detail & Project Sample
Civil and Social	• To preserve the United Nations Educational, Scientific and Cultural Organization (UNESCO) world heritage site by enhancing eco-tourism and through the other two focused areas.
Quality Environment	• Heritage Wetland Restoration for City Green Spaces and Habitats project which will develop green spaces, waste management system including wastewater treatment, storm water retention to prevent floods has been piloted in some areas and further study is implemented.
Built Infrastructure	• Upgrade of infrastructure to encourage tourism including footpaths, streetlight and amenities has been in progress in some areas.

Vientiane in Lao People's Democratic Republic

Luang Prabang
Vientiane
Mandalay
Hanoi
Nay Pyi Taw
Da Nang
Yangon
Ho Chi Minh
Siem Reap
Battambang
Bangkok
Manila
Phnom Penh
Chonburi
Cebu City
Phuket
Davao City
Kota Kinabalu
Kuching
Bandar Seri Begawan
Kuala Lumpur
Makassar
Johor Bahru
DKI Jakarta
Singapore
Banyuwangi

City Basic Information

Land Area (km²)	3,920
Population (thousand)	948
Density (person/km²)	209
City Features	• Vientiane is the capital city of Lao PDR. • It is located on the banks of the Mekong near the border with Thailand. • Population and employment opportunities have been concentrated at the center of politics, culture and economy.

Smart City Action Plan

Vision

Vientiane envisages the importance of environmental friendly urban development by declaring the development vision based on six indicators: peace, clean, green, light, charm and prosperity.

Focus Areas

Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
	★	★	★	★	

Focus Area	Detail & Project Sample
Health and Well-being	• Focus fields are such as education, public health, good transport, housing, public security and happiness.
Quality Environment	• The function of disaster prevention including fire and flood e.g. drainage management systems has been incorporated into the city Master Plans and socio-economic development plans. • Waste management system to ensure a clean city with fresh air and clean water has been planned.
Build infrastructure	• Infrastructure principle is to achieve a good balance between urban planning and good environment • The city is seeking to collaborate with stakeholders to identify underlying transport issues and develop a strategic roadmap specifying action plans for sustainable transport plan.

Malaysia

Country Basic Information

Land Area (km^2)	330,411
Population (thousand)	32,447 (in 2020)
Urban Population (thousand)	24,368 (75.1%) (in 2020) 36,163 (86%) (in 2050)
Capital	Kuala Lumpur
Ethnicity	Malay (69%)
Language	Malay (national), Chinese, Tamil, English
Religion	Islam (63.5%), Buddhism (18.7%), others
Political System	Constitutional monarchy

Key Market Index

GDP (Millions of US$) [1]	336,911
GDP per capita (US$) [1]	10,317
Median Age [2]	30
% Improved Sanitation Facilities [3]*	71
% Improved Drinking Water Source [3]*	76
Internet Subscribers per 100 persons [3]	18
Cellular Phone Users per 100 persons [3]	53

1 Euromonitor (Data for 2020)
2 Euromonitor (Data for 2020)
3 ASEAN Secretariat, "ASEAN Statistical Report on Millennium Development Goals", 2017. * Data as of 2015
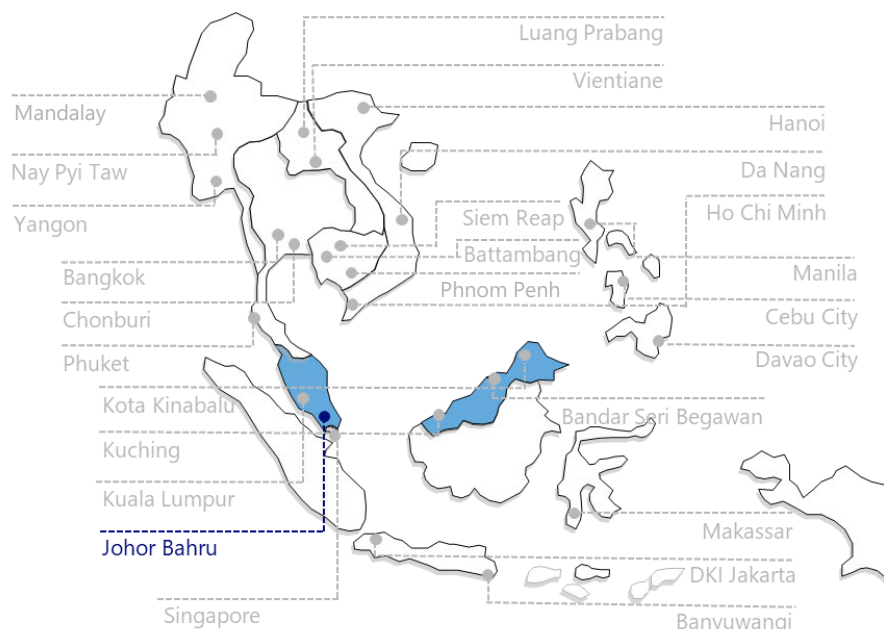
Smart City Plan & Activity (National level)

Governmental Direction

- The Ministry of Housing and Local Government has developed the national smart city framework as a national reference for smart city development in Malaysia.
- The Smart Cities Initiatives is a part of the National Physical Plan 3 and also the National Urbanization Policy which recognize the expansion of digital infrastructure and broadband coverage and strengthening the provision of infrastructure facilities and services for smart cities initiatives. Smart city agenda is also emphasised in the National Physical Plan 4 and the Twelfth Malaysia Plan (2021-2025).
- At least 5 smart cities are to be established by 2025.

Partnerships with other countries

- Japan, Ministry of Internal Affairs and Communications launched the 'Research on Smart City Model for Solving Social Problems in Malaysia' project (2019) which Japanese companies are expected to share technologies and best practices to help tackle challenges and boost economic development.
- Partnerships under ASCN such as Johor Bahru-United States of America, Kota Kinabalu-Republic of Korea, Kuching-Japan.
- Memorandum of Understanding on Cooperation in the field of Smart City Development between Malaysia and MOLIT, ROK.
- Cooperation with United Kingdom under the Global Future Cities Program to tackle transport and urban challenges through a smart, sustainable and integrated approach.
- China, Alibaba and Malaysian government agencies, Malaysia Digital Economy Corporation and Dewan Bandaraya Kuala Lumpur (2018) implemented cloud solution for traffic management in Kuala Lumpur.

Source: ASEAN Smart Cities Network, MLIT reports, World Bank, Japan Ministry of Internal Affairs and Communications, Malaysia Digital Economy Blueprint, MyCensus 2020

Greater Johor Bahru in Malaysia

City Basic Information

Land Area (km^2)	1,064
Population (thousand)	1,495
Density (person/km^2)	1,045
City Features	• Greater Johor Bahru is located at the southern tip of the peninsula. • It comprises of 3 local councils namely Johor Bahru City Council, Iskandar Puteri City Council and Pasir Gudang City Council.

Smart City Action Plan

Vision
To develop Johor Bahru smart city into a strong and sustainable metropolis of international standing.

Focus Areas

Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
★			★		

Focus Area	Detail & Project Sample
Civil and Social	• To improve government transparencies in tracking development target, and planning approval process, the Central Data Centre, Iskandar Malaysia Urban Observatory (IMUO) has been planned to be implemented in 2022. • IMUO which will collate, update, analyse, manage and disseminate data will function as a Knowledge Hub and as a Monitoring and Assessment Centre to monitor development progress.
Health and Well-being	• To improve water sustainability i.e. increasing water reserves and new water sources, there is plan to upgrade existing water plants with smart water management systems. • Also, regulations for treating wastewater for sale and use as non-drinking-water in order to compensate for increasing water demand is on development process.

Source: ASEAN Smart Cities Network, MLIT reports, World Bank

Kuala Lumpur in Malaysia

City Basic Information

Land Area (km^2)	243
Population (thousand)	1,800
Density (person/km^2)	7,377
City Features	• Kuala Lumpur is the capital city of Malaysia. • It is located in a valley surrounded by hilly terrain in the southwestern part of Peninsular Malaysia. • It has the highest population density in the country. • It remains the economic center of the country, although federal government functions have been transferred to Putrajaya.

Smart City Action Plan

Vision

Kuala Lumpur a City for All.

Focus Areas

Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
			★	★	★

Focus Area	Detail & Project Sample
Quality Environment	• Various environmental sustainability targets have been set e.g. target share of green employment, green building, green school, green area etc.

Built Infrastructure	• Priority is on the comfort and safety in major physical improvements.
	  o In line with the Pedestrian and Bicycle Master Plan 2019-2028, Kuala Lumpur has started to build the 11 km bicycle in the city centre area.
	  o The cloud-based intelligent transport system that allows commuters and operator to track the service status of the GOKL bus in near real time.

Industry and Innovation	• To modernise the industrial sector for economic growth and wealth creation that creates opportunities for innovation and knowledge economy.

Kota Kinabalu in Malaysia

City Basic Information

Land Area (km^2)	366
Population (thousand)	452
Density (person/km^2)	1,290
City Features	• Kota Kinabalu is the capital of the state of Sabah. • It is located at the northeastern end of Borneo. • It is a major tourist destination and a gateway for travelers visiting Sabah and Borneo while also one of the major industrial and commercial centres of East Malaysia.

Smart City Action Plan

Vision

Transforming Kota Kinabalu into a clean, green and livable city.

Focus Areas

Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
			★	★	

Focus Area	Detail & Project Sample
Quality Environment	• Integrated waste management from collection to processing that will reduce littering, toxic emissions from the landfill, and generate income for citizens and the government.
Built infrastructure	• Integrated Bus Rapid Transit (BRT), Light Rail Transit (LRT) and Bus Lanes to improve and enhance accessibility and networking for a better and systematic public transportation.

Kuching in Malaysia
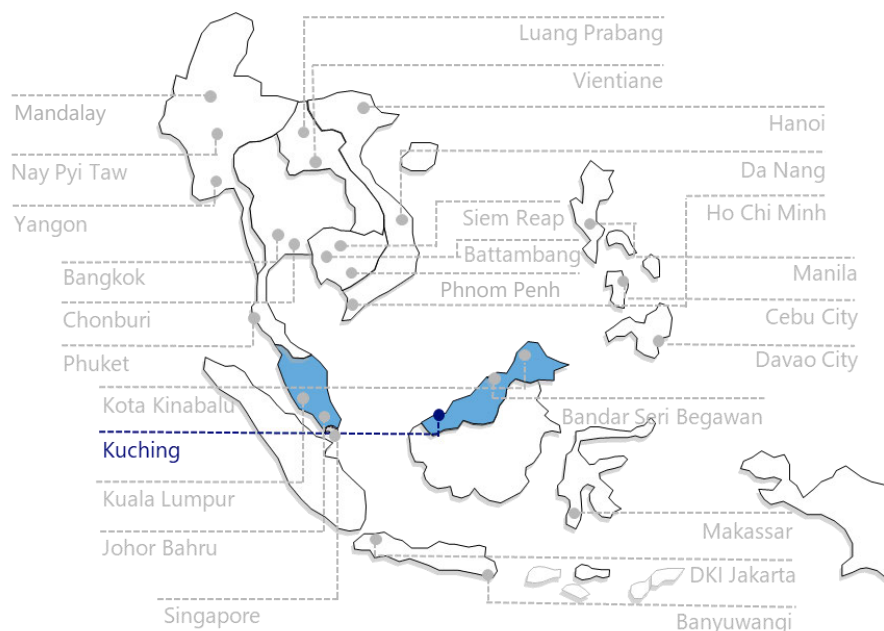
City Basic Information

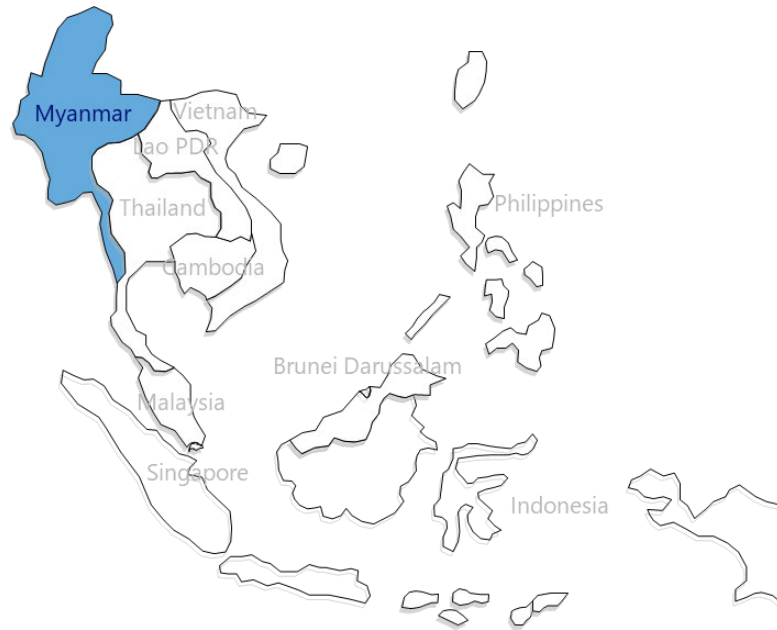| Land Area (km^2)	4,195
Population (thousand)	684
Density (person/km^2)	163
City Features	• Kuching is the capital of the state of Sarawak. • It is located in the northwestern part of Borneo.

Smart City Action Plan

Vision
To improve the quality of life and achieve smart city status through digital transformation.

Focus Areas

Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
				★	

Focus Area	Detail & Project Sample

Built Infrastructure	• To mitigate traffic congestion in the city, the Integrated Smart Traffic Light System has been developed.
	  o 32 signalised junctions covering 4 major routes (out of 140 junctions) have been digitally connected and managed as the pilot projects.
	  o The government plans to expand the project to cover all major urban roads with better synchronised traffic lights with 'real time' traffic information.
	• As a riverfront city. Kuching experienced occasional serious flooding problem so the government has implemented several flood mitigation projects including the Integrated Flood Management and Response System which monitor and alert flooding event to reduce the occurrence of flash floods and waterlogging in flood prone areas.

Myanmar

Country Basic Information

Land Area (km^2)	680,000
Population (thousand)	54,410 (in 2020)
Urban Population (thousand)	18,023 (34%) (in 2014) 32,206 (55%) (in 2050)
Capital	Nay Pyi Taw
Ethnicity	Burmese (about 70%)
Language	Burma
Religion	Buddhism (90%), Christianity, Islam, etc.
Political System	Presidential

Source: ASEAN Smart Cities Network, MLIT reports, World Bank

Key Market Index

GDP (Millions of US$) [1]	79,852
GDP per capita (US$) [1]	1,468
Median Age [2]	29
% Improved Sanitation Facilities [3]*	94
% Improved Drinking Water Source [3]*	86
Internet Subscribers per 100 persons [3]	21
Cellular Phone Users per 100 persons [3]	76

1 World Bank, GDP (current US$); World Bank, GDP per capita (current US$) *Data for 2020
2 United Nations, Department of Economic and Social Affairs, Population Division (2019) *Data for 2020
3 ASEAN Secretariat, "ASEAN Statistical Report on Millennium Development Goals", 2017. * Data as of 2015
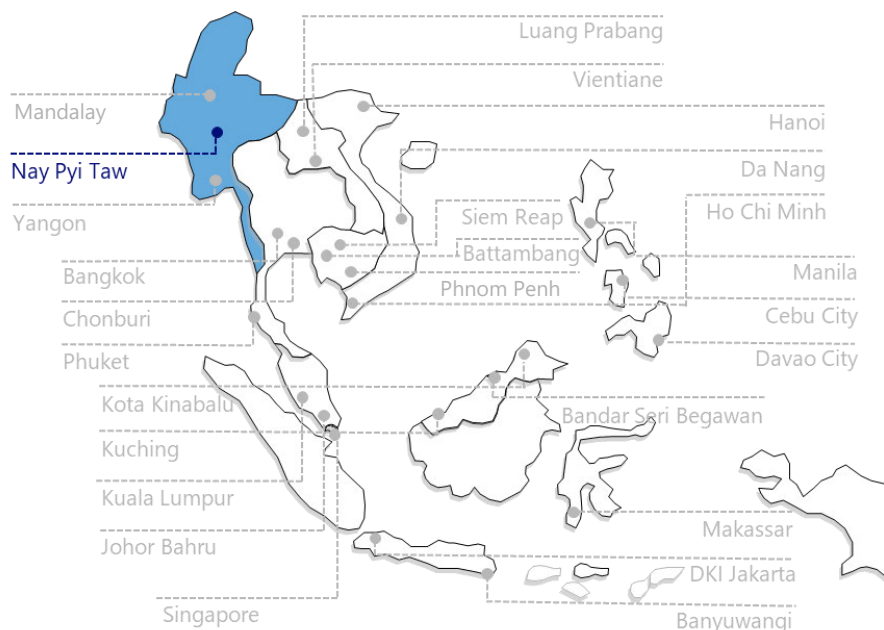
Smart City Plan & Activity (National level)

Governmental Direction

- The Smart City initiatives is part of the ASEAN Smart Cities Network where Myanmar's largest cities: Nay Pyi Taw, Mandalay and Yangon, will realise the vision of urban development with digital technology serving as an enabler to resolve urbanisation issues.
- The government aims to transform the above 3 cities into a smart city
- In 2017, the government formed the Digital Economy Development Committee (DEDC) with the aims of developing Myanmar as a knowledge, digital and innovation hub.

Partnerships with other countries

- Japan International Cooperation Agency has supported several infrastructure and smart city project e.g. a township project in Yangon.
- Thailand, Amarta Corp, has signed a framework agreement with the local government in Myanmar to jointly develop a Smart and Eco-City (2,000 acres for the first phase) in East Dagon township in Yangon.

Nay Pyi Taw in Myanmar

City Basic Information

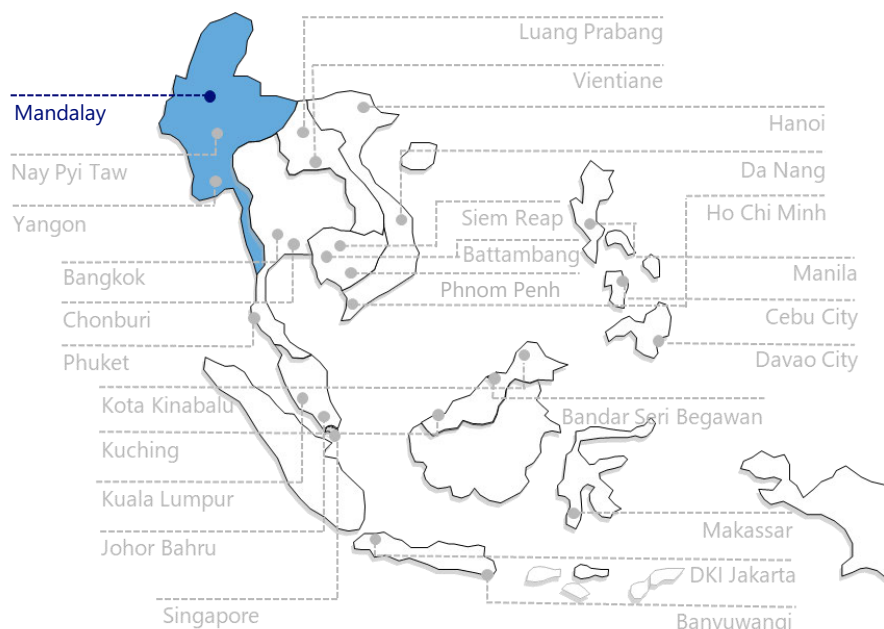|	
Land Area (km^2)	7,054
Population (thousand)	924
Density (person/km^2)	131
City Features	• Nay Pyi Taw has been the capital of Myanmar since 2006 after relocation from Yangon. • It is located in the central core region of Myanmar. • The City serves as the Union Territory and administrative functions of the country.

Smart City Action Plan

Vision

To be a green and liveable city that is environmentally sustainable, the centre of knowledge hub, an aspiring climate change resilient city, an international aviation transit, cargo and logistics hub serving the global market.

It is also meant to set examples or role model that can be replicated in other cities in Myanmar.

Focus Areas

Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
★				★	★

Focus Area	Detail & Project Sample
Civil and Social	• To provide affordable house to the citizen, the affordable Housing project for retired government officials has been started construction.
Built Infrastructure	• Transportation infrastructure has been planned e.g. Smart street lighting system, e-Bus system, air hub for passengers and logistics. • Other planned infrastructure is such as ICT Park.
Industry and Innovation	• To be the education hub, the first International University in Myanmar including an Engineering School, Business School, Medical School, and Art and Design School has been planned.

Source: ASEAN Smart Cities Network, MLIT reports

Mandalay in Myanmar

City Basic Information

Land Area (km^2)	285
Population (thousand)	1,230
Density (person/km^2)	4,300
City Features	• Mandalay is Myanmar's second largest city. • It is located in the center of Myanmar on the east bank of the Aeyawadi River. • It is the centre of Burmese culture and also the economic centre of Upper Myanmar with intensive trade with China following the influx of Chinese immigrants since 20th century.

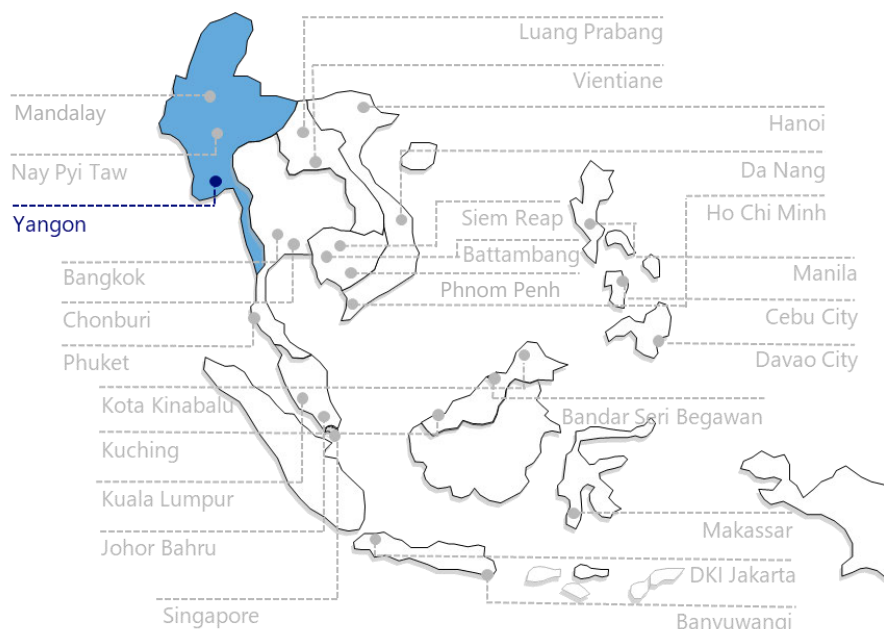## Smart City Action Plan

Vision
To be a city with safe and smooth mobility.

Focus Areas

Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
		★		★	

Focus Area	Detail & Project Sample

Safety and Security	• To improve road safety by;
	  o Installing Number Plate Reader, CCTVs and checkpoints.
	  o Installing Radio Frequency Identification tab on all vehicles to facilitate central control, payment, log and big data analysis.
	  o Installing Guard Rails, Road Signs, Warning Signs and Crossing Signs, one-way streets.

Built Infrastructure	• To reduce city traffic congestion by;
	  o Developing a Central Control Real Time Traffic System/Intelligent Traffic System or Integrated Traffic System for efficient traffic management.
	  o Promoting and commencing Bus Rapid Transit.
	  o Constructing user-friendly pavements in the city area.

Source: ASEAN Smart Cities Network, MLIT reports, World Bank

Yangon in Myanmar

City Basic Information

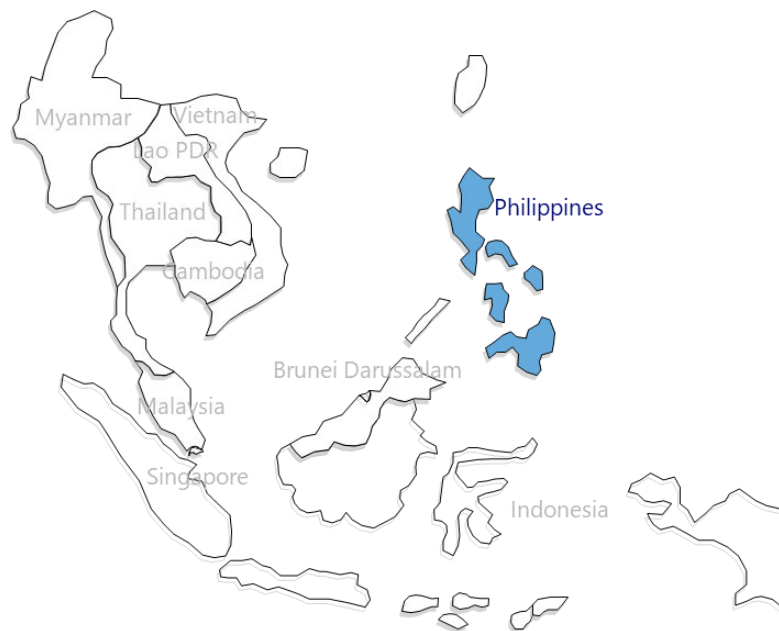| Land Area (km^2)	576
Population (thousand)	5,210
Density (person/km^2)	9,045
City Features	• Yangon is the first capital and the current largest economic center of Myanmar. • Yangon served as the capital of Myanmar until 2006, when the administrative functions was relocated to Naypyidaw. • It is one of the most important commercial centre of Myanmar.

Smart City Action Plan

Vision
To be an attractive international port and logistics hub – A city of Blue, Green and Gold.

Focus Areas

Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
★	★			★	

Focus Area	Detail & Project Sample
Civil and Social	• To boost city's attractiveness as a tourist destination, there is a Downtown Area Conservation project to improve streetscape, infrastructure and repurpose the vacant heritage buildings to outlets, and offices etc.
Health and Well-being	• To ease commuting hour of workers in industrial zone, the township with low-cost rental housing, with Smart City elements is planned. • To maintain urban land development, the GIS database that includes the results of matching land and building information and an online geospatial information system has been developed.
Built Infrastructure	• The planned township will consist traffic management, environmental protection, security system and transit terminal. • Various transportation are implemented e.g. smart card for Yangon Bus Service and piloted e.g. smart parking.

The Philippines

Country Basic Information

Land Area (km^2)	299,404
Population (thousand)	109,600 (in 2020)
Urban Population (thousand)	44,531 (44%) (in 2014) 88,381 (56%) (in 2050)
Capital	Manila
Ethnicity	Malay (Majority)
Language	National: Filipino Official: Filipino and English
Religion	Christian
Political System	Constitutional republic

Source: ASEAN Smart Cities Network, MLIT reports, World Bank, Property Guru

Key Market Index

GDP (Millions of US$) [1]	361,488
GDP per capita (US$) [1]	3,299
Median Age [2]	26
% Improved Sanitation Facilities [3*]	71
% Improved Drinking Water Source [3*]	76
Internet Subscribers per 100 persons [3]	18
Cellular Phone Users per 100 persons [3]	53

1 Euromonitor (Data for 2020)
2 Euromonitor (Data for 2020)
3 ASEAN Secretariat, "ASEAN Statistical Report on Millennium Development Goals", 2017. * Data as of 2015
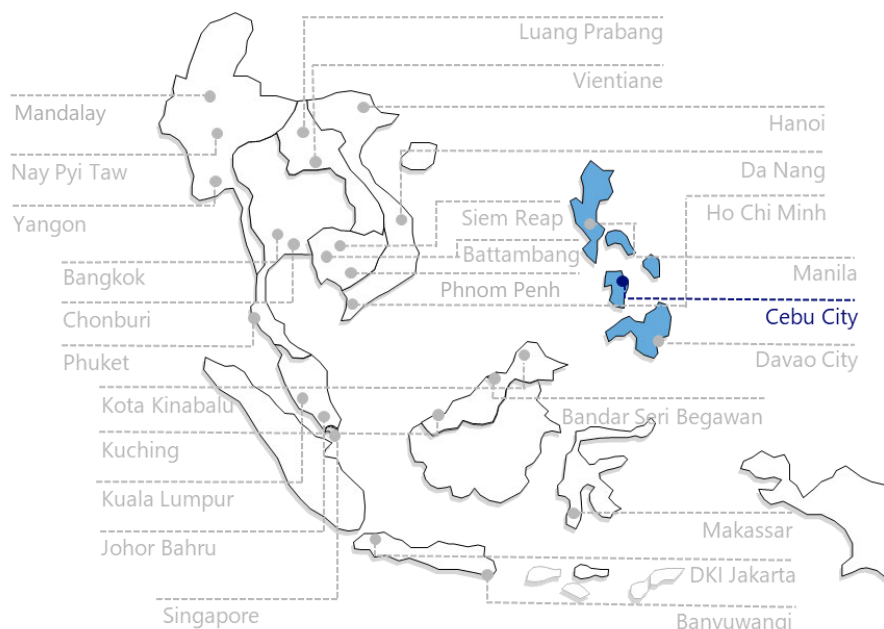
Smart City Plan & Activity (National level)

Governmental Direction

- The Smart City initiatives are recognized in the National Framework for Physical Planning 2001-2030.
- The National Economic and Development Authority (NEDA) is the main government agency responsible for national and regional planning. NEDA provides technical assistance to provinces while the Department of Human Settlements and Urban Development (DHSUD) and the Department of the Interior and Local Government (DILG) extend assistance in city/municipal level planning.
- The government committed to complete 6 smart city projects (no timeline mentioned).

Partnerships with other countries

- Filipino-Chinese consortium developed a mixed-use project (2017) designed to be a self-sustaining smart community where the city is run by artificial intelligence. The project completion is targeted in 2035.
- The Philippines Smarter & Sustainable Cities (SSC) partnered with the Council's Singapore-based KC Tay and ASEAN Smart Cities Network and others (2019) launched a training program to help local governments plan and implement smart city projects.

Cebu City in The Philippines

City Basic Information

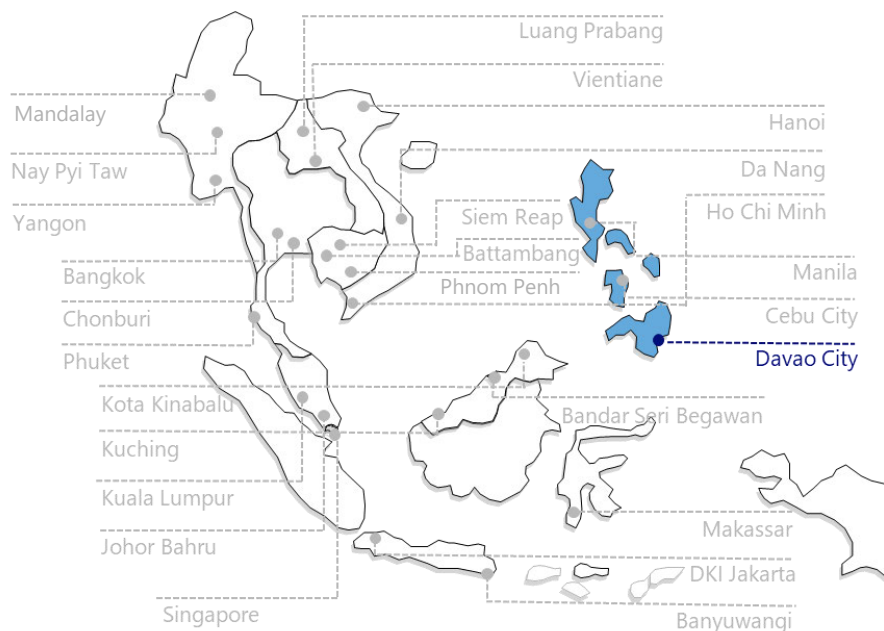|	
Land Area (km^2)	315
Population (thousand)	923
Density (person/km^2)	2,930
City Features	• Cebu is a center of culture and trade in the central and southern part of the Philippines. • Its urbanization has advanced in recent years, forming the second urban area in the Philippines, after the Metro Manila.

Smart City Action Plan

Vision
To improve urban growth through use of efficient technologies in realms of urban mobility, personal security and safety.

Focus Areas

Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
		★		★	

Focus Area	Detail & Project Sample
Safety and Security	• To upgrade the centralized monitoring and control system for security, safety, traffic management, and disaster preparedness.

Built Infrastructure	• To enhance traffic regulation and enforcement, and improve information collection and sharing, the Automated Citywide Traffic Control Systems project is initiated.
	• To mitigate traffic congestion, the 1st phase of Integrated Intermodal Transport System including monorails, two-point buses, LRTs and BRTs has been implemented.
	  o Currently, the first phase BRT connecting South Road Properties to Cebu IT Park and other city highways has been operated.
	  o The extension is planned in 2025.

Davao City in The Philippines

City Basic Information

Land Area (km^2)	2,444
Population (thousand)	1,700
Density (person/km^2)	699
City Features	• Davao is the largest city in terms of land area and the third-most populous city in the Philippines. • It is located in southeastern Mindanao, on the northwestern shore of Davao Gulf. • The city serves as the main trade, commerce, and industry hub of Mindanao, and the regional center of Davao Region.

Source: ASEAN Smart Cities Network, MLIT reports

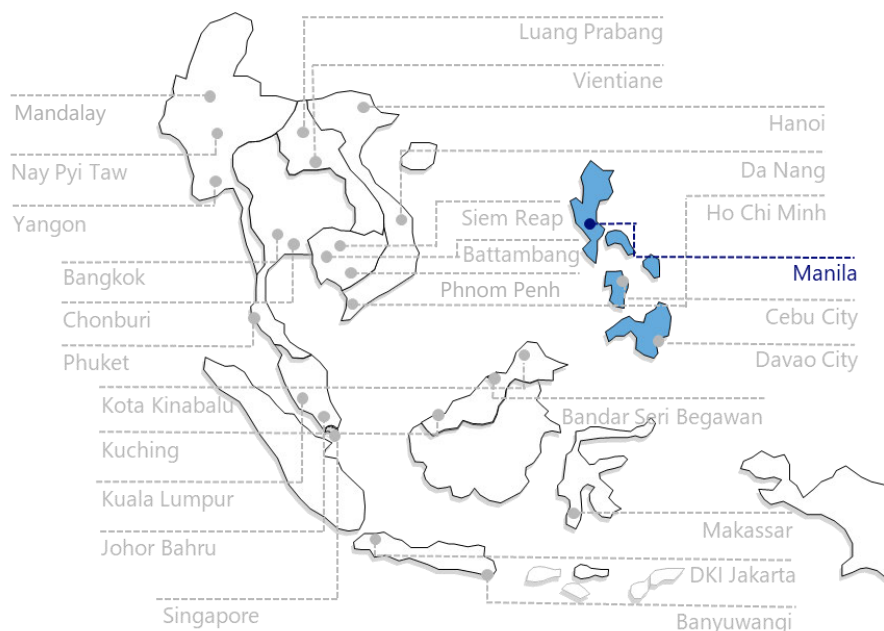## Smart City Action Plan

Vision

To create a community that harnesses digital connectivity and technological advancement in providing high-quality living and a safe and secured environment for the Dabawenyos.

Taking advantage of modern information technology systems, the city aims to strengthen its safety and security measures, enhance public service delivery, and bolster domestic and international linkages and relations to drive economic growth and achieve sustainable development.

Focus Areas

Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
		★		★	

Focus Area	Detail & Project Sample
Safety and Security	• To improve public safety and planning, the Public Safety and Security Command Center has been established to undertake all tasks related to safety and security e.g. to gather and alert on the near-time critical information. ○ The city plans to increase CCTVs to cover all intersections and key facilities by 2021.
Built Infrastructure	• To address traffic congestion, the High Priority Bus System has been pilot in the southern part of Davao City since 2018. • The intelligent traffic control system is on development process.

Manila in The Philippines

City Basic Information

Land Area (km^2)	39
Population (thousand)	1,780
Density (person/km^2)	46,173
City Features	• Manila is the capital city of the Philippines, a fast-growing political, economic, cultural, communicative, information and power center. • It is located to the west of Luzon, in the northern part of the country.

Smart City Action Plan

Vision
Governance at the palm of your hands.

Focus Areas					
Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
	★	★			★

Focus Area	Detail & Project Sample

Health and Well-being	• To integrate Medical Records, Medical Assistance/Monitoring and Patient Management System which allows;
	  o Operating room supervision.
	  o Integration with i-Hospital system for medical student training.
	  o Consultations and joint operation by experts abroad or in other hospitals.

Safety and Security	• To improve the city's Command Centre to a cloud-based system and link transport, security, order and disaster monitoring systems to a command, control and monitor and response centers.
Industry and Innovation	• To develop mobile tutorial applications, based on Department of Education's curriculum which allows students to practice study or review lessons online. • Construction of Internet-ready classrooms provided with computer/tablets.

City Profile Overview (National level)

Republic of Singapore
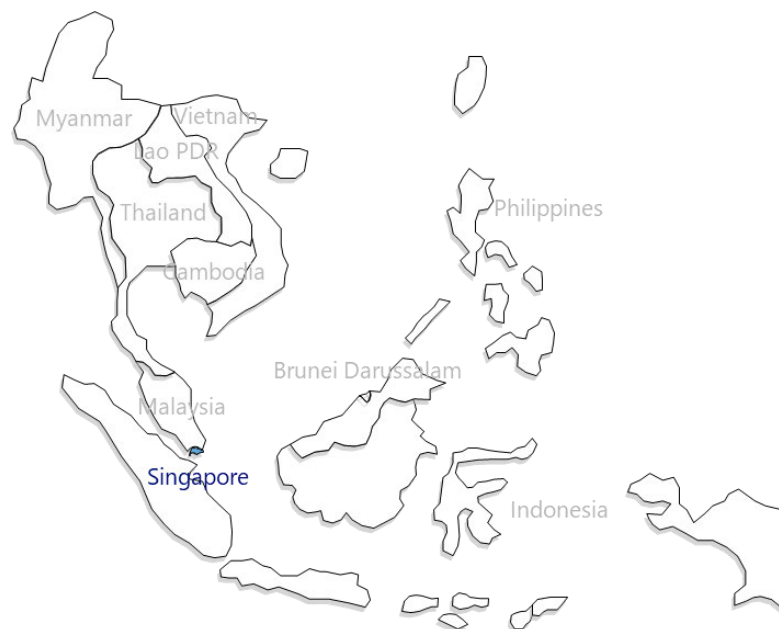
Country Basic Information

Land Area (km²)	728.3 (in 2020)
Population (thousand)	5,453.6 (in 2021)
Urban Population (thousand)	5,453.6 (100% of Singaporeans live in urban areas)
Capital	Singapore
Ethnicity	74.2% Chinese, 13.7% Malays, 8.9% Indians, 3.2% Others (in 2021)
Language	Malay (National language) English, Chinese, Tamil (Official language)
Religion	Buddhism, Taoism, Christianity, Islam, Hinduism, Others
Political System	Parliamentary Republic

Sources: Smart Nation Digital Government Office Singapore, Ministry of Trade and Industry Singapore, Prime Minister's Office Singapore, Department of Statistics Singapore

Key Market Index

GDP (Millions of US$) [1]	339,925
GDP per capita (US$) [1]	59,785
Median Age [2]	44
% Improved Sanitation Facilities [3]*	100
% Improved Drinking Water Source [3]*	97
Internet Subscribers per 100 persons [3]	82
Cellular Phone Users per 100 persons [3]	146

1 Euromonitor (Data for 2020)
2 Euromonitor (Data for 2020)
3 ASEAN Secretariat, "ASEAN Statistical Report on Millennium Development Goals", 2017. * Data as of 2015

Smart City Plan & Activity (National level)
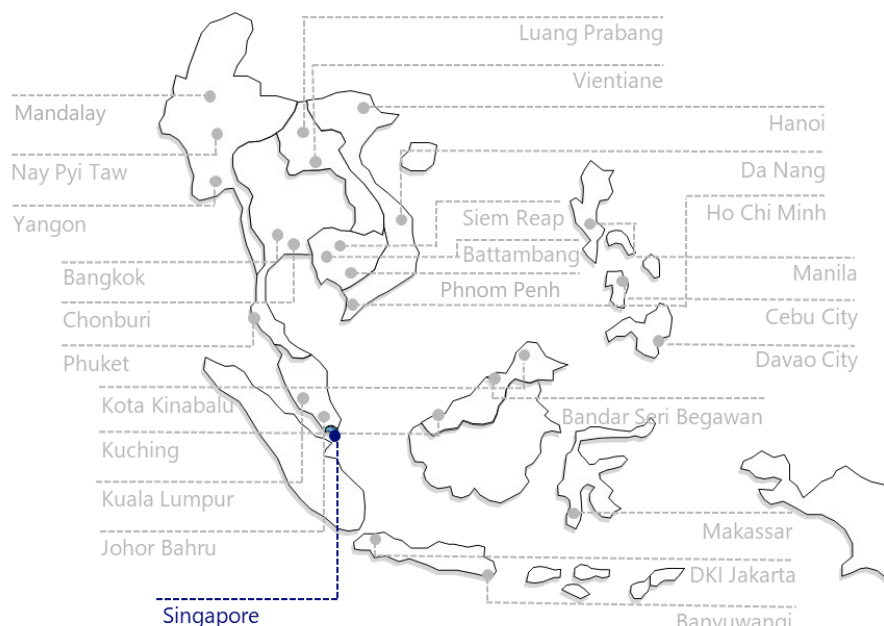
Governmental Direction

- Smart City initiatives are administered by the Smart Nation and Digital Government Group (SNDGG) together with infrastructural agencies such as the Ministry of National Development.
- In 2015, Singapore announced its Smart City Masterplan for 2016-2025.
- Smart Nation efforts are organised along four pillars: Digital Government, Digital Economy, Digital Society and Smart Cities. In 2018, the government developed three broad plans to facilitate the transformation of Singapore. This included the Digital Economy Framework for Action, Digital Government Blueprint and the Digital Readiness Blueprint.

Partnerships with other countries

- Singapore substantially concluded negotiations on its digital economy agreement (DEA) with the United Kingdom (UK) in 2021. The UK-Singapore DEA (UKSDEA) includes binding disciplines on the cornerstones of the digital economy, such as data, as well as cooperative elements in a wide range of emerging and innovative areas such as Artificial Intelligence, fintech, digital identities and legal technology. The UKSDEA is the third DEA of its kind with foreign counterparts.

Republic of Singapore

Singapore

City Basic Information

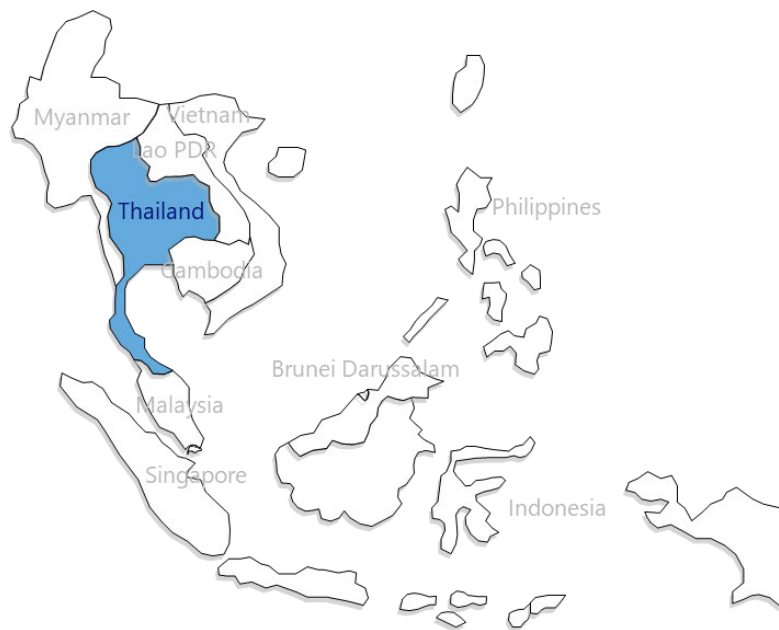| Land Area (km^2)	728.3 (in 2020)
Population (thousand)	5,453.6 (in 2021)
Density (person/km^2)	7,485 (in 2021)
City Features	• Singapore is the largest industrial and financial center in Southeast Asia. • It is an island state located at the southern tip of Malaysia, consisting of the main island and 64 offshore islands. • The main island has been expanded by land reclamation and is highly urbanized.

Smart City Action Plan

Vision

A Singapore where people are more empowered to live meaningful and fulfilled lives, enabled seamlessly by technology, offering exciting opportunities for all.

Focus Areas

Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
★	★				★

Focus Area	Detail & Project Sample
Civil and Social	• The development of a National Digital Identity Ecosystem was launched to provide users with a single digital identity to transact with government and private sector organisations more effectively.
Industry and Innovation	• Singapore launched the National Artificial Intelligence (AI) Strategy to outline plans to deepen the use of AI technologies to transform the economy and fundamentally rethink business models, making deep changes to reap productivity gains. • Singapore also addressed the severe socio-economic consequences of the Covid-19 pandemic by providing individuals and businesses through **SupportGoWhere and Covid GoBusiness Portal**.
Health and Well-being	• Singapore augmented its Covid-19 response swiftly by enhancing the speed and accuracy of contact tracing with digital solutions like **TraceTogether and SafeEntry**.

Source: Smart Nation Digital Government Office Singapore, Department of Statistics Singapore

City Profile Overview (National level)

Thailand

Country Basic Information

Land Area (km²)	514,000
Population (thousand)	69,800 (in 2020)
Urban Population (thousand)	33,056 (49%) (in 2014) 45,335 (72%) (in 2050)
Capital	Bangkok
Ethnicity	Thai (Majority)
Language	Thai
Religion	Buddhism 94%, Islam 5%
Political System	Constitutional monarchy

Key Market Index

GDP (Millions of US$) [1]	501,513
GDP per capita (US$) [1]	7,185
Median Age [2]	40
% Improved Sanitation Facilities [3]*	84
% Improved Drinking Water Source [3]*	93
Internet Subscribers per 100 persons [3]	39
Cellular Phone Users per 100 persons [3]	125

1 Euromonitor (Data for 2020)
2 Euromonitor (Data for 2020)
3 ASEAN Secretariat, "ASEAN Statistical Report on Millennium Development Goals", 2017. * Data as of 2015

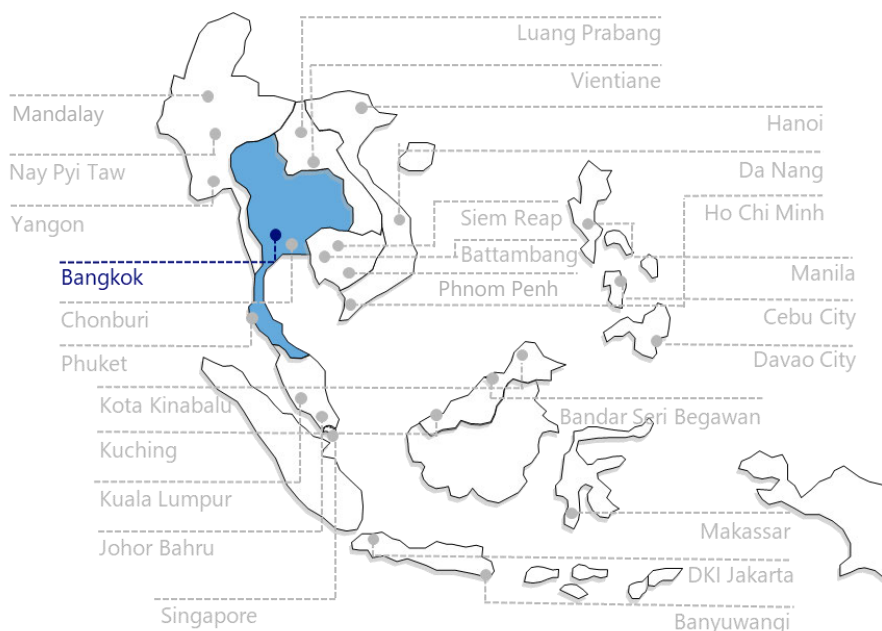## Smart City Plan & Activity (National level)

Governmental Direction

- The National Smart City Commission was formed under the "Prime Minister's Office Ordinance No. 267/2560 on the establishment of the National Smart City Commission" in October 2017. The committee is administered by the Digital Economy Promotion Agency, a public organization under the Ministry of Digital Economy and Society of Thailand.
- The Smart City Basic Plan was issued in January 2018 with established target, standard, specific benefits and measures for smart city development.

Partnerships with other countries

- Cooperation with neighboring countries through the Thailand International Cooperation Agency (TICA) for connectivity in hardware and software, and promotion of sustainable development based on UN principles.
- China has cooperated in several infrastructure projects e.g. the construction of a high-speed railway linking central and northeastern of Thailand.

Bangkok in Thailand

City Basic Information

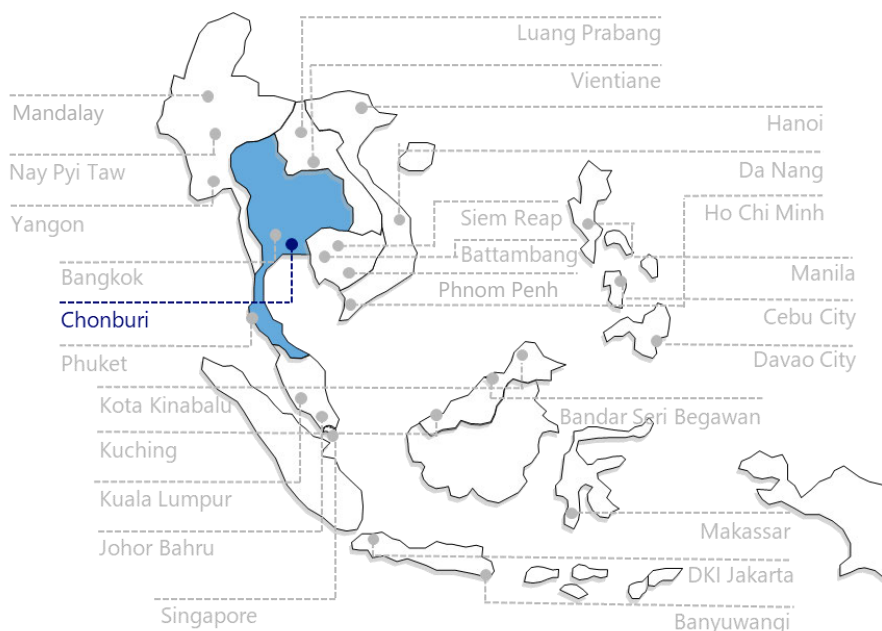|	
Land Area (km^2)	1,568
Population (thousand)	8,280
Density (person/km^2)	5,300
City Features	• The capital city of Thailand. • It is located in the central part of Thailand. • The city serves as Thailand's administrative, economic, cultural and educational center, and a major commercial and transportation hub for Southeast Asia.

Smart City Action Plan

Vision
To be a Visitor-Friendly International Community with a New Central District filled with various attractions and infrastructures.

Focus Areas					
Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
			★	★	★

Focus Area	Detail & Project Sample
Quality Environment	• Pahonyothin aims to be the ideal place for visitors with its strong international community and the New Central District full of attractions and consist of various transport systems such as pedestrianization, cycling, bus and metro.
Built Infrastructure	• Bang Sue as the main stop for the High-Speed Rail and the hub of the new Commuter Rail System that provides new lines serving the areas near the city center which aims to reduce congestion at the existing terminal while simultaneously reducing commuting time.
Industry and Innovation	• There is the study on innovation district in several areas and industries e.g. Rattanakosin District (Center for Creative Economy), Yodhi District (Center for Medicine and Research), Kluay Nam Thai District (Center for E-Commerce, Multimedia, and Digital Business).

Note: The Office of the Royal Society (ORST) has recently (specifically on February 16, 2022) announced the change of the official name of Thailand's capital, from Bangkok to "Krung Thep Maha Nakhon."

Source: ASEAN Smart Cities Network, MLIT repots, The Bangkok Metropolitan Council

Chonburi in Thailand

City Basic Information

Land Area (km²)	43
Population (thousand)	215
Density (person/km²)	5,000
City Features	• Chonburi is located along the Gulf of Thailand about 60 km southeast of Bangkok. • Chonburi is one of the three provinces of the Eastern Economic Corridor (EEC), an area-based development initiative with new S-curve industries such as comprehensive medical industry, digital technology, biofuel and biochemical, aviation and logistics, and robotics. • The popular resort town is Pattaya Beach.

Source: ASEAN Smart Cities Network, MLIT repots, Eastern Economic Corridor (EEC) Office
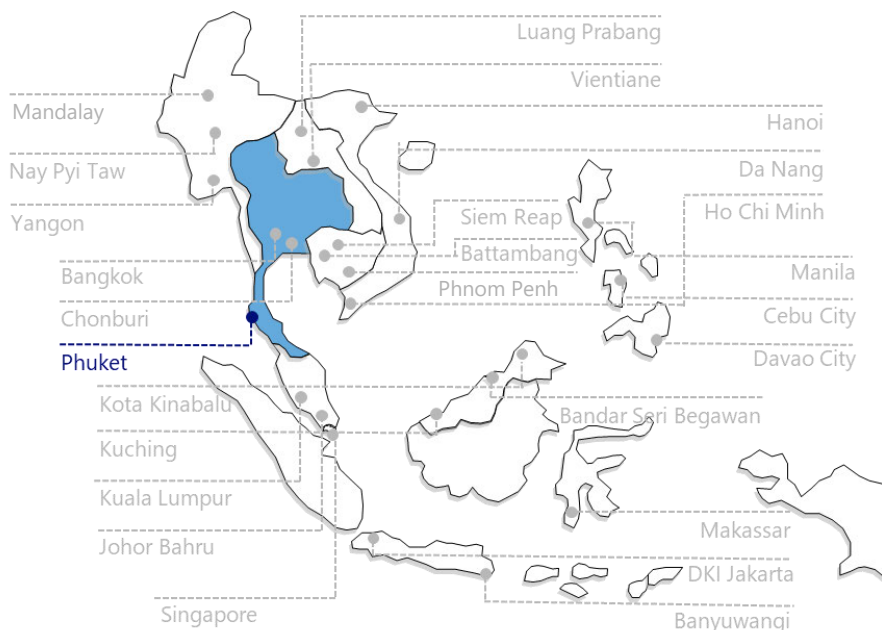
Smart City Action Plan

Vision
To be a self-reliant, energy-efficient city with renewable energy sources and sustainable environmental management.

Focus Areas					
Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
	★		★	★	★

Focus Area	Detail & Project Sample
Health and Well-being	• The Eastern Economic Corridor (EEC), a special economic zone provides a budget to create job and improve labor skill e.g. training courses for tour guides and hotel staff during Covid-19.
Quality Environment	• Waste power plant project which converts industrial waste to renewable energy by waste treatment and management system.
Built Infrastructure	• Smart grid project aims for an energy self-reliant city with renewable energy sources. o It entails the management of electrical networks, generation, transmission and power distribution systems.
Industry and Innovation	• The EEC provides facility to support both domestic and foreign investments in 10 targeted advanced industries (e.g. robotic, biological, medical tourism, digital.)

Phuket in Thailand

City Basic Information

|	
Land Area (km^2)	543
Population (thousand)	400
Density (person/km^2)	719
City Features	• Phuket is Thailand's largest island and one of the world's leading resort town, located in the Andaman Sea. • The Sino-Portuguese architecture, shrines, and food that represent the city's rich cultural history that can be observed throughout the city, particularly in the Old Town Area, reflect Phuket's multicultural mix.

Smart City Action Plan

Vision

With tourism accounting for 97% of its Gross Domestic Product, Phuket's smart city vision is to achieve sustainability in its tourism development, to become a sandbox for value-based tourism industry and development post Covid-19.

Focus Areas

Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
★		★			★

Focus Area	Detail & Project Sample
Civil and Social	• Phuket plans to build a City Data Platform that allows for better understanding of residents and tourists to prepare utility that cater the residents and tourists' demand.
Safety and Security	• To provide security for the resident and tourist, CCTVs has been in used for criminal prevention e.g. face recognition and a license plate scan features since 2017. o It aims to maximize the coverage area by inviting private firms to share their CCTV data with the government.
Industry and Innovation	• The City Data Platform also functions to build big data that can aid more efficient and accurate planning of infrastructure, public utilities, common amenities etc. • The data will also provide valuable insights to businesses and start-ups in their analysis.
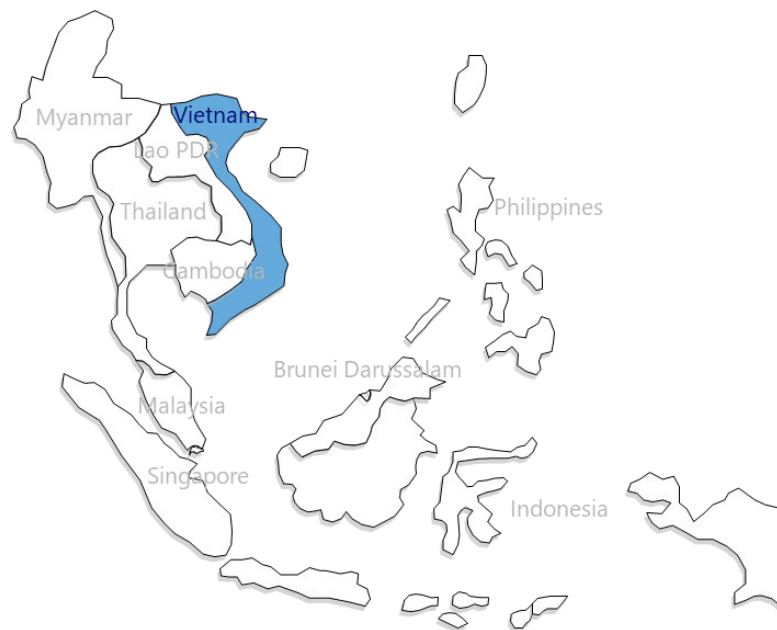
Viet Nam

Country Basic Information

Land Area (km^2)	331,212
Population (thousand)	97,340 (in 2020)
Urban Population (thousand)	30,495 (33%) (in 2014) \n 55,739 (54%) (in 2050)
Capital	Hanoi
Ethnicity	Kinh 86%
Language	Vietnamese
Religion	Buddhism, Catholicism, Caodaism etc.
Political System	Socialist republic

Key Market Index

GDP (Millions of US$) [1]	271,193
GDP per capita (US$) [1]	2,786
Median Age [2]	33
% Improved Sanitation Facilities [3*]	78
% Improved Drinking Water Source [3*]	81
Internet Subscribers per 100 persons [3]	53
Cellular Phone Users per 100 persons [3]	131

1 Euromonitor (Data for 2020)
2 Euromonitor (Data for 2020)
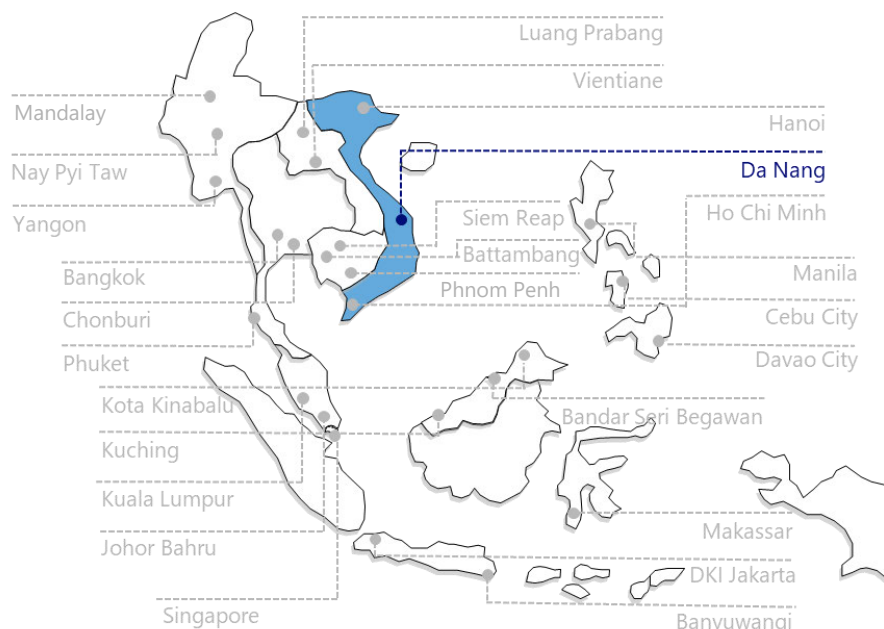3 ASEAN Secretariat, "ASEAN Statistical Report on Millennium Development Goals", 2017. * Data as of 2015

Smart City Plan & Activity (National level)

Governmental Direction

- In 2018, the strategy for sustainable smart city development in the 2018 – 2025 period, with a vision to 2030 was issued.
- Under the plan, by 2025, Viet Nam would have at least six metropolises representing six major economic zones. In five years' time, Viet Nam is set to form a network of smart cities nationwide.
- By 2022, the Ministry of Construction has scheduled to submit a draft law on urban management and development to the National Assembly, and finalize related national standards and criteria.

Partnerships with other countries

- Many Japanese companies formed a joint venture, consortium to develop smart city e.g. Sumitomo Corporation with Vietnamese developer BRG Group, a consortium of Sumitomo Corporation with NTT Communications Corporation, NEC Corporation and other 3 companies.

Source: ASEAN Smart Cities Network, MLIT reports, World Bank, Sumitomo Corporation's website, Hanoi Times

Da Nang in Viet Nam

City Basic Information

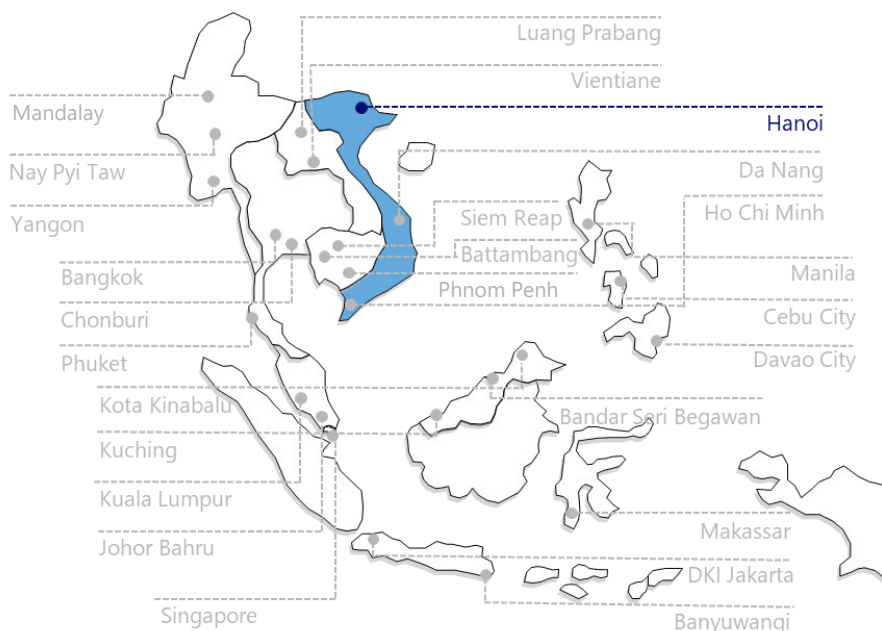|	
Land Area (km^2)	1,285
Population (thousand)	1,000
Density (person/km^2)	814
City Features	• Da Nang is the largest city in central Viet Nam. • It is located about 750 km south of Hanoi and about 960 km north of Ho Chi Minh City at the end of the East-West Economic Corridor that runs through Laos, Thailand, and Myanmar. • It is a port city and large-scale development is underway along the coast.

Smart City Action Plan

Vision

To be a smart, livable, and sustainable city by 2030. With a citizen-centric strategy, Da Nang aims to deliver high quality of life and sustainable environment for citizens while ensuring economic growth and competitiveness.

Focus Areas

Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
★	★	★	★	★	★

Focus Area	Detail & Project Sample
Civil and Social	• Da Nang e-government platform has been prepared.
Health and Well-being	• The IT facility for school and medical facility has been planned.
Safety and Security	• The security and emergency service and disaster prevention has been planned to implement through Intelligent Traffic Control System and data center.
Quality Environment	• The smart water management including water quality monitoring has been developed.
Built Infrastructure	• Da Nang Data Center has been prepared and will be utilized for various services e.g. e-government. • The Intelligent Transportation System is planned.
Industry and Innovation	• Smart economy including tourism, agriculture and commerce and smart citizen is mentioned but no concrete plan yet.

Hanoi in Viet Nam

City Basic Information

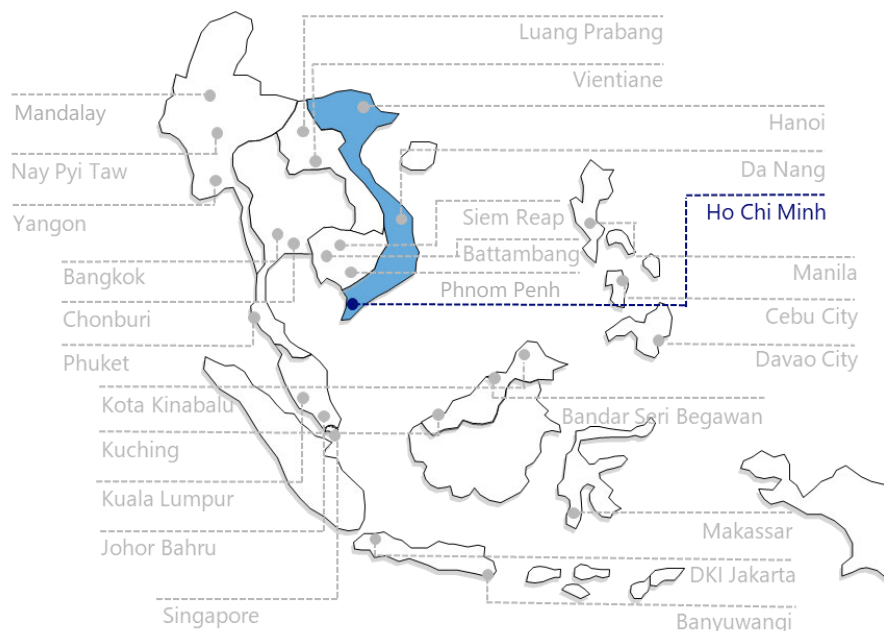|	
Land Area (km^2)	3,359
Population (thousand)	7,600
Density (person/km^2)	2,280
City Features	• Hanoi is the capital city of Viet Nam. It is the center of politics and culture. • It is located in the northern Viet Nam, on the right bank of the Hong River. • To cope with rapid urbanization, multiple urban railways were planned and are now under construction.

Smart City Action Plan

Vision
To be a green, culturally-rich, civil and modern city with sustainable development to create a better life for the people by 2030. As the national political center, Hanoi places its economic, trade, investment, culture and social priorities at heart.

Focus Areas					
Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
★	★	★		★	

Focus Area	Detail & Project Sample
Civil and Social	• Smart travel including tourism data integration infrastructure, Hanoi Tourist Portal and mobile app.
Health and Well-being	• The Intelligent Operations Centre (IOC) is planned to provide for reception and processing of emergency information, fire, search and rescue and medical treatment etc.
Safety and Security	• The IOC is planned to have the function for supervision of confidentiality and safety of information and crime control and prevention.
Built Infrastructure	• Intelligent Transport Systems is planned to have the function for traffic management including traffic signal, electronic traffic signage system, traffic monitoring and management software system etc.

Source: ASEAN Smart Cities Network, MLIT reports

Ho Chi Minh City in Viet Nam

City Basic Information

Land Area (km^2)	2,096
Population (thousand)	8,200
Density (person/km^2)	3,924
City Features	• Ho Chi Minh is prospered as the economic center of Viet Nam, accounting for about half of the country's GDP and leading the economy. • It is located in southern Viet Nam. • In accordance with the progress of urbanization, multiple subway lines were planned and are now under construction.

Smart City Action Plan

Vision

Ho Chi Minh City's vision by 2025 is to attain rapid and sustainable economic development through optimal resource utilization and citizen-centric governance.

Focus Areas

Civil and Social	Health and Well-being	Safety and Security	Quality Environment	Built Infrastructure	Industry and Innovation
	★	★	★	★	

Focus Area	Detail & Project Sample
Health and Well-being	The following projects are mentioned: • Smart public lighting management. • Solutions of food product traceability. • Online public service.
Safety and Security	• An integrated and unified emergency response center for security and public order issues, fire-fighting and disaster prevention has been developed.
Quality Environment	• The environment quality monitoring network.
Built Infrastructure	• The Smart Traffic Control Center has started operation as part of the Intelligent transportation system, traffic forecast model and traffic management.

The following are the list of acronyms used within the guidebook.

Application Programming Interface	API	Identification	ID
Area Energy Management System	AEMS	Information And Communications Technology	ICT
Artificial Intelligence	AI	Information Technology	IT
ASEAN Secretariat	ASEC	Intelligent Operation Center	IOC
ASEAN Smart Cities Network	ASCN	Iskandar Malaysia Urban Observatory	IMUO
ASEAN Sustainable Urbanisation Strategy	ASUS	Japan Association for Smart Cities in ASEAN	JASCA
Association Of Southeast Asian Nations	ASEAN	Japan External Trade Organization	JETRO
Automated Teller Machine	ATM	Key Performance Indicators	KPIs
Automatic Number Plate Recognition	ANPR	Light Rail Transit	LRT
Bus Rapid Transit	BRT	Ministry Of Internal Affairs And Communications	MIC
Business Improvement District	BID	Ministry Of Land, Infrastructure, Transport And Tourism	MLIT
Citizen Relations Management / Cepat Respon Masyarakat	CRM	Office of the Royal Society	ORST
City Operating System	City OS	Pay For Success	PFS
Closed-circuit Television	CCTV	Proof Of Business	PoB
Compound Annual Growth Rate	CAGR	Proof Of Concept	PoC
Corona Virus Disease	Covid-19	Public Private Partnership	PPP
Davao City Disaster Risk Reduction And Management Council	DCDRRMC	Public Safety And Security Command Center	PSSCC
Davao City Police Office	DCPO	Quick Response Code	QR Code
Digital Economy Agreement	DEA	Reduction, Reuse and Recycle	3R
Digital Economy Development Committee	DEDC	Smart City Supported By Japan ASEAN Mutual Partnership	Smart JAMP
Digital Economy Promotion Agency	DEPA	Smart Nation And Digital Government Group	SNDGG
Digital Transformation	DX	Smarter & Sustainable Cities	SSC
Eastern Economic Corridor	EEC	Social Impact Bond	SIB
Electronic Vehicles	EV	Task Force Davao	TFD
Geographic Information System	GIS	Traffic Management Center	TMC
Global Positioning System	GPS	UK-Singapore DEA	UKSDEA
Gross Domestic Product	GDP	United Nations Educational, Scientific and Cultural Organization	UNESCO
Home Energy Management System	HEMS	Value Added Tax	VAT
Human Resources	HR	Yangon City Development Committee	YCDC

Prepared by:

In Consultation with:

MLIT
Ministry of Land, Infrastructure, Transport and Tourism

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