MALAYSIA
SMART
CITY
FRAMEWORK

FINAL REPORT

MALAYSIA SMART CITY FRAMEWORK

2018

KPKT

Ministry of Housing and Local Government

CONTENT

ABBREVIATION

10MP	:	Tenth Malaysia Plan
11MP	:	Eleventh Malaysia Plan
3D	:	Three Dimensional
3R	:	Reduce, Reuse, Recycle
4G	:	Fourth Generation
5R	:	Refuse, Reduce, Reuse, Recycle, Recovery
AI	:	Artificial Intelligence
AIM	:	Agensi Inovasi Malaysia
AOT	:	Arrays of Things
APAC	:	Asia-Pacific
APAD	:	Land Public Transport Agency
API	:	Air Pollution Index
AR	:	Augmented Reality
ASCN	:	ASEAN Smart Cities Network
ATIS	:	Advance Travellers Information System
ATMS	:	Advance Traffic Management System
AV	:	Autonomous Vehicle
BAKAJ	:	Badan Kawal Selia Air Johor
BERD	:	Business Expenditure on Research and Development
BNM	:	Bank Negara Malaysia
BRT	:	Bus Rapid Transit
BSC	:	Balanced Scorecard
BVG	:	Berliner Verkehrsbetriebe
CAP	:	Communication Action Plan
CAPEX	:	Capital Expenditure
CAT	:	Citizen Action Technology
CBR	:	Community-Based Rehabilitation
CCP	:	Connected Citizens Programmes
CCTV	:	Closed-Circuit Television
CFM	:	Consumer Forum of Malaysia
CITP	:	Construction Industry Transformation Programme
CPTED	:	Crime Prevention Through Environmental Design
CSC	:	Caring School Community
CSSR	:	Call Setup Successful Rate
DAI	:	Digital Adoption Index
DCR	:	Dropped Call Rate
DET	:	Disability Equality Training
DID	:	Department of Irrigation and Drainage
DOE	:	Department of Environment
DOSM	:	Department of Statistics Malaysia
DRAP	:	Disaster Risk Awareness Programmes
DVM	:	Digital Video Manager
EMB	:	Electric Mobility Blueprint
EMF	:	Electromagnetic Field
EPI	:	E-Participation Index
EPP	:	Entry Point Project
ESCI	:	EasyPark Smart Cities Index
EU	:	European Union
EV	:	Electric Vehicle
FAS	:	Flood Analysis System
FDD	:	Frequency Division Duplex
FGD	:	Focus Group Discussion
G2C	:	Government to Citizens
G2G	:	Government to Government
GAPS	:	Goal Achievement and Problem Solving
Gbps	:	Gigabits-per-second
GBS	:	Global Business Services

GCA	:	Global Cybersecurity Agenda
GCI	:	Global Cybersecurity Index
GDP	:	Gross Domestic Product
GERD	:	Gross Expenditure on Research and Development
GHG	:	Greenhouse Gas
GII	:	Global Innovation Index
GIOS	:	Generation Integrated Operations System
GIS	:	Geographic Information System
GPS	:	Global Positioning System
GPT	:	Gross Pollutant Trap
GSM	:	Global System for Mobile
HEV	:	Hybrid Electric Vehicle
HIS	:	Hospital Information System
HQ	:	Headquarters
HSBB	:	High Speed Broadband
WHO	:	World Health Organisation
IBC	:	In-Building Coverage
IBS	:	Industrialised Building System
ICE	:	Internal Combustion Engines
ICT	:	Information Communication Technology
IDA Ireland	:	Investment Development Authority of Ireland
IDC	:	International Data Corporation
IDI	:	ICT Development Index
IM RMMT	:	Iskandar Malaysia River Monitoring and Management Tool
IMUO	:	Iskandar Malaysia Urban Observatory
IOC	:	Integrated Operations Centre
IoTs	:	Internet of Things
IPA	:	Investment Promotion Agency
ISP	:	Internet Service Provider
IT	:	Information Technology
ITIS	:	Integrated Transport Information System
ITU	:	International Telecommunication Union
IUWM	:	Integrated Urban Water Management
JKR	:	Public Works Department
JPDP	:	Department of Personal Data Protection Malaysia
KHTP	:	Kulim Hi-Tech Park
KII	:	Korean Information Infrastructure
KKCH	:	Kota Kinabalu City Hall
KKMM	:	Ministry of Communications and Multimedia
KKR	:	Ministry of Public Works
KLCH	:	Kuala Lumpur City Hall
KLUO	:	Kuala Lumpur Urban Observatory
KNCH	:	Kuching North City Hall
KPDNHEP	:	Ministry of Domestic Trade and Consumer Affairs
KPI	:	Key Performance Indicator
KSCC	:	Kuching South City Council
KTMB	:	Keretapi Tanah Melayu Berhad
LCCF	:	Low Carbon Cities Framework
LED	:	Light-Emitting Diode
LHR	:	Lifetime Health Record
LIDAR	:	Light Detection and Ranging
LRT	:	Light Rapid Transit
MAC	:	Media Access Control
MaGIC	:	Malaysian Global Innovation and Creativity Centre
MAMPU	:	Malaysian Administrative Modernisation and Management Planning Unit
MBIP	:	Iskandar Puteri City Council
MBJB	:	Johor Bahru City Council

Mbps	:	Megabits per second
MCC	:	Malaysia Control Centre
MCMC	:	Malaysian Communications and Multimedia Commission
MDEC	:	Malaysia Digital Economy Corporation
MEA	:	Malaysian Economic Association
MESTECC	:	Ministry of Energy, Science, Technology, Environment and Climate Change
MGGI	:	Malaysia Gender Gap Index
MHLG	:	Ministry of Housing and Local Government
NLD	:	National Landscape Department
MIDA	:	Malaysian Investment Development Authority
MIGHT	:	Malaysian Industry Government Group for High Technology
MITI	:	Ministry of International Trade and Industry
MLD	:	Millions of Litres Per Day
MMD	:	Malaysian Meteorological Department
MMLUO	:	Al-Madinah Local Urban Observatory
MOA	:	Ministry of Agriculture and Agro-based Industry
MOE	:	Ministry of Education
MOF	:	Ministry of Finance
MOFT	:	Ministry of Federal Territories
MOH	:	Ministry of Health
MOHA	:	Ministry of Home Affairs
MOHR	:	Ministry of Human Resources
MOT	:	Ministry of Transport
MOU	:	Malaysia Urban Observatory
MoU	:	Memorandum of Understanding
MoWFCD	:	Ministry of Women, Family and Community Development
MPC	:	Malaysia Productivity Corporation
MPKS	:	Kota Samarahan Municipal Council
MPP	:	Padawan Municipal Council
MPPG	:	Pasir Gudang Municipal Council
MRT	:	Mass Rapid Transit
MSAP	:	Mandatory Standard on Access Pricing
MTR	:	Mass Transit Railway
MyAin	:	Malaysian Academic Industry Network
MyGDX	:	Malaysian Government Central Data Exchange
MyHDW	:	Malaysian Health Data Warehouse
NACSA	:	National Cybersecurity Agency
NADMA	:	National Disaster Management Agency
NAHRIM	:	National Hydraulic Research Institute of Malaysia
NAP 2014	:	National Automotive Policy 2014
NAP	:	National Agro-Food Policy
NBI	:	National Broadband Initiative
NCLG	:	National Council for Local Government
NCSP	:	National Cybersecurity Policy
NDP	:	National Development Policy
NEHAP	:	National Environmental Health Action Plan
NEM	:	New Economic Model
NEP	:	New Economic Policy
NFCP	:	National Fiberisation and Connectivity Plan
NGO	:	Non-Governmental Organisation
NOSCP	:	National Oil Spill Contingency Plan
NPANM III	:	National Plan of Action for Nutrition of Malaysia III 2016-2025
NPOA-CTI	:	National Plan of Action - The Coral Triangle Initiative
NPP3	:	National Physical Plan 3
NRW	:	Non-Revenue Water
NSPEA	:	National Strategic Plan for Ending AIDS
NSTIP	:	National Science, Technology and Innovation Policy

NSWMD	:	National Solid Waste Management Department
NUA	:	New Urban Agenda
NUP2	:	National Urbanisation Plan 2
NWRP	:	National Water Resources Plan Policy
OPP2	:	Second Outline Perspective Plan 1991-2000
PAWE	:	Activity Centre for Senior Citizens
PCB	:	Public Complaints Bureau
PEKERTI	:	The National Reproductive Health and Social Education Action Plan
PFS	:	Precipitation Forecasting System
PHEV	:	Plug-in Hybrid Electric Vehicle
PHP	:	People's Housing Programme
PIB	:	Project Implementation Briefs
PISA	:	Programme for International Student Assessment
PPP	:	Public-Private Partnerships
ProBE	:	Provider-Based Evaluation
PRoMAS	:	Project Management Automated System
PTA	:	Parent Teacher Association
PUB	:	Public Utilities Board
PWD	:	People With Disabilities
QoS	:	Quality of Service
R&D	:	Research and Development
RACI	:	Responsible, Accountable, Consulted, Informed
RFID	:	Radio Frequency Identification
RHDAPS	:	Real-time Hydrological Data Acquisition and Processing System
RMP	:	Royal Malaysia Police
RWSS	:	Reservoir Water Supply System
SADP	:	Search Active Device Protocol
SAIDI	:	System Average Interruption Duration Index
SBST	:	Stage Bus Services Transformation
SDGs	:	Sustainable Development Goals
SEDA	:	Sustainable Energy Development Authority Malaysia
SisPAA	:	Public Complaints Management System
SME	:	Small and Medium Enterprise
SMOKU	:	Information Management System for Persons with Disabilities
SPAN	:	National Water Service Commission
SSC	:	Shared Services Centres
STEM	:	Science, Technology, Engineering and Mathematics
STI	:	Science, Technology and Innovation
TBC	:	Time Based Control
TDD	:	Time Division Duplex
TER	:	Telecommunication Equipment Room
TM	:	Telekom Malaysia Berhad
TNB	:	Tenaga Nasional Berhad
TPC-OHCIS	:	Teleprimary Care – Oral Health Clinical Information System
TPO	:	Tree Preservation Order
TRC	:	Traffic Response Control
TTU	:	Travel Time Index
TVET	:	Technical Vocational Education and Training
UKAS	:	Public Private Partnership Unit
UN ECOSOC	:	United Nations Economic and Social Council
UN	:	United Nations
UPENJ	:	Johor State Economic Planning Unit
URBANICE	:	Urban Wellbeing Centre of Excellence
WDC	:	World Digital Competitiveness
WEF	:	World Economic Forum
WtE	:	Waste to Energy

INTRODUCTION 01

INTRODUCTION

The rapid urbanisation that has taken place in the last decades has resulted in various urban issues such as congestion, pollution, security and deterioration of natural resources.

In the global context, smart cities are used as one of the approaches to resolve urbanisation issues and improve the quality of life in the city.

Smart city is seen as a new approach in urban management and development to make Malaysia's cities more sustainable and liveable. At the same time, technological advancement and the usage of information technology (IT) applications make smart city more practical and convenient for urban population and city managers.

The emphasis towards making Malaysian cities into smart cities and strengthening digital infrastructure has been embedded in Malaysia's development plans such as the Eleventh Malaysia Plan (11MP), the National Physical Plan 3 (NPP3) and the National Urbanisation Policy 2 (NUP2).

The development of smart cities is also to uplift Malaysian Cities competitiveness and support Malaysia's commitment towards global agenda such as Sustainable Development Goals (SDGs) and New Urban Agenda (NUA).

Study Output

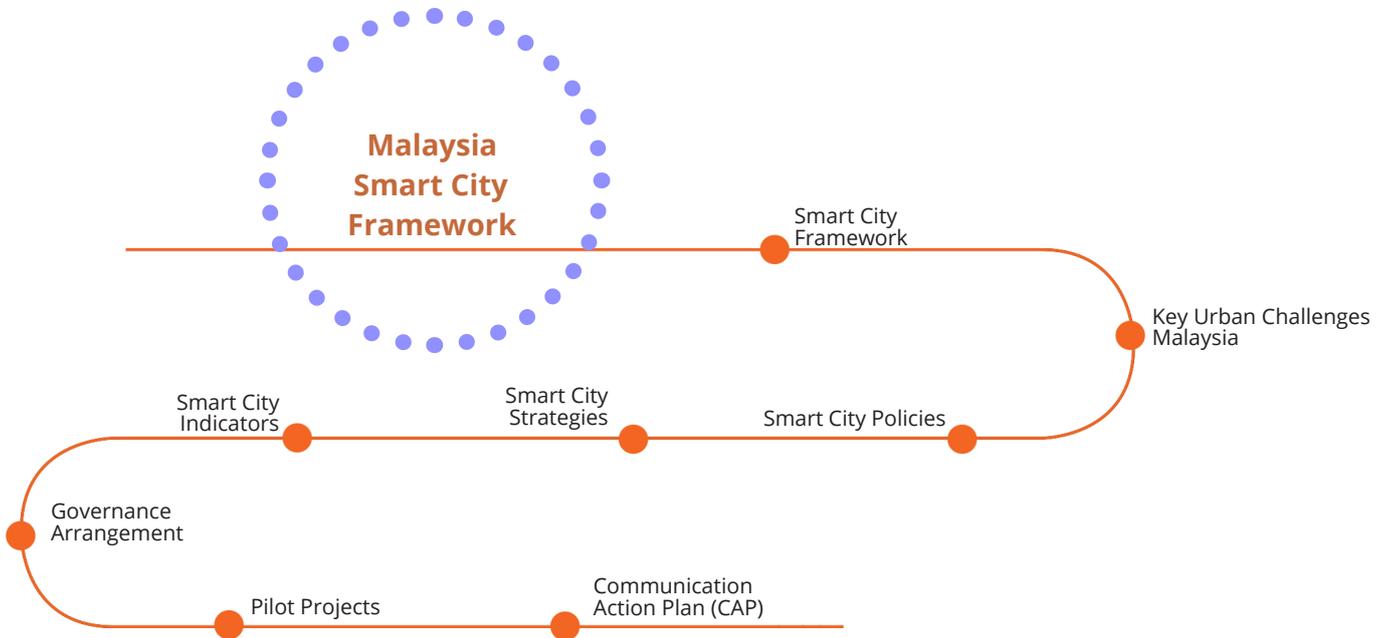| Malaysia Smart City Framework |
|---|
| 1. Policies, strategies and initiatives |
| 2. Indicators by smart city components |
| 3. Pilot projects- Project Implementation Briefs |
| 4. Governance structure |
| 5. Communication Action Plan (CAP) |

Study Outcome

i.   Fulfil the country's direction to make our cities competitive in line with national and international agendas (e.g. SDGs, NUA, etc.);

ii. Provide a collaborative space to stakeholders and strategic partners based on directions/roles in smart city development;

iii. Positioning our cities' standing on par with global smart cities; and

iv. Enabling stakeholders to address the urbanisation issues through the smart city initiatives to improve the wellbeing and quality of life.

Study Objective

1 — Determine the smart city concept including vision, definition, criteria and components of smart city

2 — Plan and prepare policies, strategies and action plan for the implementation of smart city framework in a smart comprehensive, detailed and inclusive manner

3 — Provide implementation and monitoring mechanisms to ensure that the proposals are properly implemented by the implementing agencies and stakeholders

Contents of Final Report

This report contains policies, strategies and initiatives of the development of smart cities as well as a measurable indicator to solve urban issues and key challenges of Malaysian cities as well as the measurable indicators. This report also analyses governance arrangement of the implementing stakeholders and proposes a Communication Action Plan (CAP) as a guide for the overall development of smart cities.

Malaysia Smart City Framework

- Smart City Framework
- Key Urban Challenges Malaysia
- Smart City Policies
- Smart City Strategies
- Smart City Indicators
- Governance Arrangement
- Pilot Projects
- Communication Action Plan (CAP)

Need For Smart City

In the global context, smart cities are used as one of the approaches to resolve urbanisation issues and improve the quality of life of societies. In Malaysia, the need to develop smart city can be attributed to the following:

1 To address urban challenges arising from rapid urbanisation

2 To meet national and global agendas

3 To adopt new global development trends

4 To promote digital economy

5 To position Malaysian cities to be on par with other cities globally

01   **To address urban challenges arising from rapid urbanisation**

The urban population in Malaysia is expected to increase from 74.3% in 2015 to 79.6% in 2025. The urbanisation rate is targeted at not more than 85% by 2040. The population increase in urban areas and the rapid development have resulted in various issues such as environmental pollution, urban sprawl, road congestion, and inefficient use of energy and resources (land, space, energy and clean water).

Smart city initiatives can use new technologies to optimise resource use, adopt sustainable energy management, promote investment in green infrastructure, reduce urban traffic and road congestion, and improve quality of life.

02   **To meet national and global agenda**

The smart city development in Malaysia is in line with existing global and national agenda, which will act as a basis for the formation of a smart city framework in Malaysia.

Among the agendas that have been referred for the smart city development are:

Global Agenda
- Sustainable Development Goals (SDG)
- New Urban Agenda (NUA)
- UN Habitat (Kuala Lumpur Declaration on Cities 2030)

National Agenda
- Eleventh Malaysia Plan (11MP)
- National Physical Plan 3 (NPP3)
- National Urbanisation Policy 2 (NUP2)
- Vision 2020
- Green Technology Master Plan 2017 – 2030
- Low Carbon Cities Framework

03   **To adopt new global development trends**

Smart city is an emerging trend observed in many developed countries. This trend is also supported by technologies through the use of Internet of Things (IoTs), artificial intelligence (AI), big data and integration with geographical information.

This trend has a great impact on policy makers as well as in urban planning where the ultimate goal is to integrate various information sources, improve urban management and services, and promote industrial transformation.

04   **To promote digital economy**

Digital economy is an important focus of the Malaysian government as it has contributed 17.8% to Gross Domestic Product (GDP) in 2015 and is expected to reach 20% by 2020. Hence, to foster this economic growth, aspects of communication, energy, health, education, digital media and transport infrastructure can be directly enhanced through smart city initiatives. Digital economy has also created jobs and business opportunities through innovative startups and online businesses.

05 **To position Malaysian cities to be on par with other cities globally**

To position Malaysia on par with other global cities, smart city development should be holistic and comprehensive. Based on the EasyPark Smart Cities Index (ESCI) 2017, Kuala Lumpur is ranked 84th with a score of 4.17 in the list of smart cities globally. The global index of smart cities is measured based on transportation and mobility attainment, urban sustainability, governance, economic innovation, digital technology and the quality of life of the community. The diagram below shows a list of smart cities around the world in 2018.

SMART CITIES AROUND THE WORLD (2018)
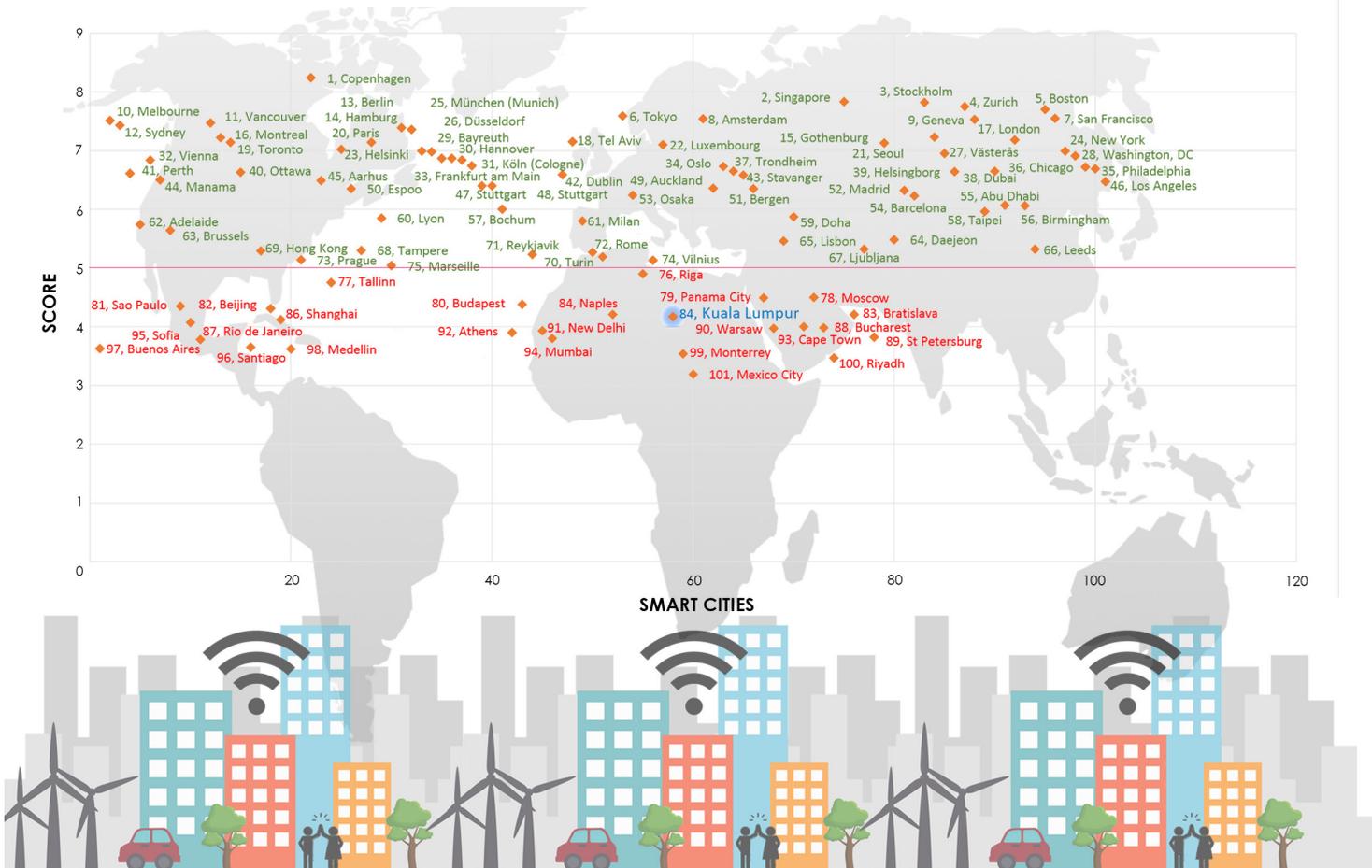
Source: EasyPark Smart Cities Index, ESCI, 2017

Global Agenda and National Policy Related to Smart City

Global declaration and national policies will act as a basis for the formation of a smart city framework in Malaysia. The referred declarations and policies are as follows:

Global

1. Sustainable Development Goals (SDGs)

The selected SDGs are those that are related to the application of smart city.

3 GOOD HEALTH AND WELL-BEING	Goal 3: Ensure healthy lives and promote well-being for all at all ages
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
4 QUALITY EDUCATION	Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
10 REDUCED INEQUALITIES	Goal 10: Reduce inequality within and among countries
5 GENDER EQUALITY	Goal 5: Achieve gender equality and empower all women and girls
11 SUSTAINABLE CITIES AND COMMUNITIES	Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable
6 CLEAN WATER AND SANITATION	Goal 6: Ensure availability and sustainable management of water and sanitation for all
12 RESPONSIBLE CONSUMPTION AND PRODUCTION	Goal 12: Ensure sustainable consumption and production patterns
7 AFFORDABLE AND CLEAN ENERGY	Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all
13 CLIMATE ACTION	Goal 13: Take urgent action to combat climate change and its impacts
8 DECENT WORK AND ECONOMIC GROWTH	Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Source : World Economic Forum, Sustainable Development Agenda, 2015

Global

2. New Urban Agenda (NUA)

NUA is a plan that provides a new global strategy on urbanisation for the next two decades. NUA was adopted by the member states of the General Assembly of the United Nations during the Habitat III Conference, in Quito, Ecuador on October 12 to 20, 2016.

NUA covers three main guiding principles:

a. Without exception, ending poverty in all its forms and dimensions, including the eradication of hardcore poverty
b. Ensuring sustainable and inclusive city economics and opportunities for all
c. Ensure environmental sustainability

The main components of NUA strategic direction are:

a. City regulation and legislation: Ensuring results in terms of quality of urban settlements based on established regulatory set; strengthening urban legislation; and providing forecasts and directions to urban development plans to enable social and economic developments

b. Town planning and design: Strengthen urban and provincial planning to leverage space dimensions in urban form and provide a good urban design advantage

c. Municipal finance: Creating an effective funding framework, enabling municipal finance to be strengthened and local fiscal systems to be created, maintaining and sharing values generated by sustainable urban development

The NUA refers to smart cities as one of the call of actions to achieve the ambitions of the Agenda.

"Commit ourselves to adopting a smart-city approach that makes use of opportunities from digitalization, clean energy and technologies, as well as innovative transport technologies, thus providing options for inhabitants to make more environmentally friendly choices and boost sustainable economic growth and enabling cities to improve their service delivery."
"It is clear that transforming our world for the better means transforming our towns and cities"
Ban Ki-moon, United Nations Secretary General (2007-2016)

3. Green growth framework for developing countries

Green growth is understood by many countries as mainstreaming inclusive economic development in ways that incorporate, create and sustain environmental and social values. It entails changing and improving the performance of government, formal and informal economic actors and consumers, and will require systematic adjustments to mainstream policy and governance systems – in other words, getting economic governance right for sustainable development.

There are three dimensions which a national government should examine when a green growth strategy is to be developed and deployed:

a. A national green growth plan to create enabling conditions
b. Green growth mainstreaming mechanisms to ensure opportunities are explored through existing economic activities
c. Green growth policy instruments to tap specific opportunities within spatial and resource systems

Dimension 1

National green growth plan to create enabling conditions

Six national enabling conditions for green growth:
a. Shift government expenditure
b. More effective enforcement of legislation
c. Education and training
d. Resource and land rights regimes
e. Creating enabling conditions for psychological and behaviour change
f. Facilitating businesses to fully integrate sustainability and equity concerns

Dimension 2

Green growth mainstreaming mechanisms

Four green growth mainstreaming mechanisms:
a. Public environmental expenditure review
b. Strategic environmental assessment
c. Councils for sustainable development
d. Greening accounting / alternative development measures

Dimension 3

Green growth policy instruments to tap spatial and resource system opportunities

Eight green growth policy instruments:
a. Certification of sustainable production and trade
b. Subsidy reform
c. Payments for ecosystem services
d. Environmental fiscal reform
e. Green energy investment frameworks and incentives
f. Inclusive green social enterprise
g. Sustainable public procurement
h. Green innovation

4. Kuala Lumpur Declaration on Cities 2030

This important document stipulates, among others, to further enhance the implementation of the NUA towards achieving the SDGs.

Framework

a. Further develop and advocate for integrated territorial development, which includes integration of sectoral policies, institutions and investment, integration among the different spheres of government, spatial integration across the urban-rural continuum, improved coordination across actors, and enhanced alignment of national, subnational and local policies with international agendas.

b. Adapt innovative and robust mechanisms for the diversification and expansion of the means of implementation, to cater for complex and integrated approaches promoted by the NUA. Technological innovations and improvements, research, capacity building, technical assistance and partnership development, among others, may require enhanced resourcing.

Governance and partnerships

a. Adopt multiple collaborative governance mechanisms that actively engage national, subnational and local governments, all groups of society, including youth, women and grassroots organisations and particularly the excluded, vulnerable and disadvantaged groups. This work in solidarity is critical to promote more buy-in and co-responsibility in the activities towards sustainable urban development and to ensure the sustainability of the results.

b. Promote multi-stakeholder constituency-based coalitions to use the implementation of the NUA to better prevent, prepare, and respond to urban crises.

Innovative solutions

a. Develop monitoring and data collection mechanisms, including community generated data, to enhance availability of information and disaggregated and comparable data at city, functional urban areas and community levels. This would promote informed and evidence-based decision making and policy formulation, assessing progress and impact at all levels.

b. Create an enabling environment and develop capacities for scaling up of good practices including municipal finance, sustainable private and public investments in urban development and job creation, and generating value while advancing the public good.

National

1. Eleventh Malaysia Plan (11MP)

The 11MP is the next critical step for our nation to become an inclusive and sustainable developed nation. Generally, developed countries are defined as progressive economics and infrastructure, which are also among the key criteria of smart cities. The 11MP outlines the initiatives and strategies of smart cities in one of the strategic thrusts as follows:

Strategic Thrust 7
Strengthening infrastructure to support economic expansion

Focus area C
Improving coverage, quality and affordability of digital infrastructure

Strategy C4
Strengthening infrastructure for smart cities through better connectivity and seamless integration of urban services

Smart City is the best approach to urban management with solutions to the current issues of cities in Malaysia such as congestion, pollution, and inefficiency of services. The strategies outlined by Malaysian smart city will comprise of seven major components: Smart Economy, Smart Living, Smart Environment, Smart People, Smart Government, Smart Mobility and Smart Digital Infrastructure.

2. National Physical Plan 3 (NPP3)

The goal of NPP3 is to achieve a sustainable and resilient nation to ensure sustainable growth. There are three interrelated cores that also form a holistic reliance to achieve resilient country goals. Smart city initiatives have been outlined in one of the strategic thrusts to prepare the country for the future.

Thrust 1
Dynamic Urban And Rural Growth

PD 3.5
Developing And Improving Digital Infrastructure

Action PD 3.5 B
Strengthening Infrastructure for Smart Cities

The steps to be taken are as follows:

- Attract more investments in the quest to develop smart cities
- Focussing on the development of broadband facilities and broad range of sensors and applications
- Provide open data to support analysis and planning as well as create opportunities for open innovation by businesses and individuals
- Implement a smart community programme at the local level.

Mid Term Review 11MP

Pillar II: Enhancing inclusive development and wellbeing
- Priority area B: Improving wellbeing for all
- Strategy B4: Making the nation safer and secure

Pillar III: Pursuing balanced regional development
- Priority area A: Strengthening regional economic development
- Strategy A3: Promoting competitive cities

Pillar V: Enhancing environmental sustainability
- Priority area C: Combating climate change and reducing disaster risks
- Strategy C3: Strengthening disaster risk management

Pillar VI: Strengthening economic growth
- Priority area B: Accelerating innovation and technology adoption
- Strategy B2: Increasing technology adoption
- Strategy B3: Aligning research and innovation
- Priority area C: Providing quality infrastructure
- Strategy C1: Developing an integrated transport system

National

3. National Urbanisation Policy 2 (NUP2)

In line with NUP2 policy statement aimed at driving and coordinating sustainable urban planning and development with an emphasis on the balance of the country's physical, environmental, social and economic development, NUP2 has also outlined the smart city initiative in one of the principles. This strategy is focussed on improving digital applications that are closely related to the intelligent Information and Communication Technology (ICT) components in this framework.

Principle 2

Competitive urban economy

**Objective 3.1
Improving competitiveness and urban economic density**

Strategy 3.1.2
Strengthening the digital applications towards the establishment of a smart city

Action 3.1.2.1
Improve the provision of urban services through the use of digital applications

Action 3.1.2.2
Promote the use of digital applications through the dissemination of information and training to the public

4. Vision 2020

The implementation of Vision 2020 is divided into three main phases. The policies and strategies for the first phase are highlighted in the Second Outline Perspective Plan 1991-2000 (OPP2) of the National Development Policy (NDP). NDP contains several changes in the dimensions to produce a more balanced development whilst maintaining the basic principles of the New Economic Policy (NEP).

Sixth Strategic Challenge

Creating scientific and progressive societies, having a high and forward-looking force, which is not only a technology user but also contributes to scientific civilisation and future technology

The third phase of Vision 2020 is implemented under the New Economic Model (NEM) launched in 2010 covering the period of 2011 to 2020. NEM will be a catalyst in generating the country's growth potential. The main goal of NEM is to improve the quality of life of the people by emphasising three dimensions of high income, sustainability and inclusiveness that emphasise the lowest income earners. NEM encompasses four pillars of the country's transformation under the idea of the Government Transformation Programme; Economic Transformation Programme, Political Transformation Programme and Rural Transformation Programme. The implementation of the NEM strategy is detailed under the Tenth Malaysia Plan (10MP) and the 11MP.

5. Green Technology Master Plan 2017 – 2030

Green Technology Master Plan 2017 - 2030, which outlines the strategic framework for the country's green technology development, will be able to create economic opportunities with low carbon consumption and efficient resource handling.

This plan is created to enable a consistent framework in coordinating stakeholders to develop green technology in the country. The plan is also an indicator of a more environmentally friendly future by laying the foundation for a holistic change in socio-economic development that follows the principle of sustainability.

There are four basic pillars for this plan:

Energy: Reducing energy dependence and promoting energy efficiency

Environment: Conserves and minimises environmental impacts

Economy: Enhanced national economic development through the use of environmentally-friendly technologies

**Social:** Improve the quality of life for all

6. Low Carbon Cities Framework

Low Carbon Cities Framework (LCCF) is an assessment framework or assessment guide in the implementation of 'Green Township'. It emphasises aspects of life cycle assessment and performance criteria as a measurement involving the emission of greenhouse gases (GHGs). LCCF is a system that calculates the level of carbon emissions based on performance criteria assessment that includes four (4) elements within the LCCF; urban environment, urban infrastructure, urban transport and building.

Each of these elements is further subdivided into 35 sub-criteria covering the best green and best practice elements of carbon calculators.

LCCF can be implemented either through a one-system approach or city-based approach. One-system approach involves 1 criteria in LCCF (waste or energy use). The city-based approach involves all 35 sub-criteria or at least 20 sub-criteria. This implementation method is dependent on the capabilities of each local authority in implementing the LCCF in their respective areas. Therefore, the implementation of the LCCF can be adjusted based on the capacity of the municipalities or as required.
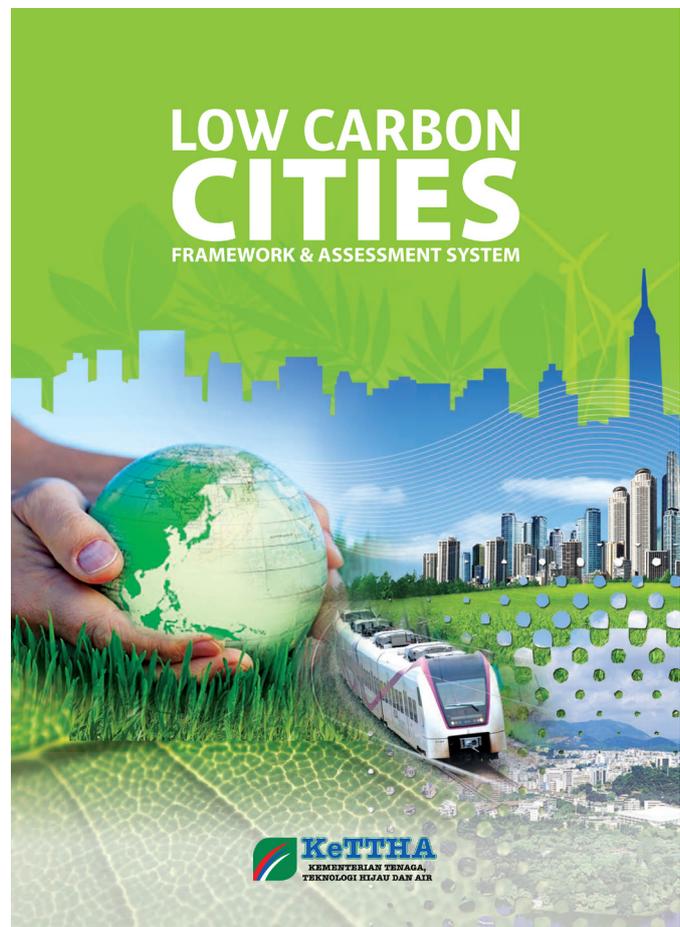
SMART CITY FRAMEWORK

02

Concept Of Smart City Globally

The concept of smart city typically has three themes:

1. Using information, communication and digital technology to address urban challenges, improve urban management and quality of life, sustainability, efficiency and security.
2. Increase economic and business activities.
3. Continuous public participation and urban innovation.

Generally, there is no universal definition for smart city. Although there is no standard for defining smart city, various organisations and researchers have defined it in their own terms. Among the smart city's definition coined by researchers and organisations across the globe are as follows:

1

*A city that **monitors and integrates** conditions of all of its critical infrastructures, including roads, bridges, tunnels, rails, subways, airports, seaports, communications, water, power, even major buildings, can better optimise its resources, plan its preventive maintenance activities, and monitor security aspects while maximising services to its citizens*
(Hall, 2000)

2

*A city well performing in a **forward-looking way in economy, people, governance, mobility, environment, and living**, built on the smart combination of endowments and activities of self-decisive, independent and aware citizens*
(Giffinger et al., 2007)

3

*A city to be smart when investments in **human and social capital** and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance (Caragliu et al., 2009)*

4

*Information technologies represent the key concept. The vision of an intelligent city is not confined to economic excellence that can be led by information technologies, but an integral part of this vision is its concern for **the quality of life for the ordinary citizen**
(Mahizhnan, 1999)*

5

*A Smart City is a city well performing in a forward-looking way in six "smart" characteristics, built on the "smart" combination of endowments and activities of **self-decisive, independent and aware citizens**.
(www.smart-cities.eu)*

Criteria Of Smart City

There are 11 criteria that can influence the success of smart city implementation. These criteria are divided into three levels: core, catalyst, and plus point.

Level 1: Core Criteria

01 Comprehensive primary and basic infrastructure

Comprehensive primary and basic infrastructure should be in place in order to advance smart city agenda. Basic infrastructure in this context refers to the fundamental physical facilities and systems serving a city which includes roads, bridges, tunnels, water supply, sewers, electrical grids and telecommunications.

02 Connected and modern digital infrastructure

Smart city anchor on the concept that everything are connected and intelligent. Shared digital infrastructure will help cities correlate data from multiple sources to generate new value and efficiencies

03 Initiatives aligned with the needs of the city

By using digital technology, smart city initiatives should align around the needs of the city based on identified urban challenges – e.g. government efficiency, sustainability, health and wellness, mobility, economic development, public safety and quality of life

Level 2: Catalyst

04 Strong political will

Support from the leaders of various levels of government helps to develop smart city agenda. Strong political shifts government project priorities to allocates more budget and focusses public attention on smart city initiatives

05 Engage broad community of innovators

Engagement of larger community (local authority, government agencies, businesses, communities, business districts, smart buildings, housing complexes), and individual residents to drive out the innovation and value creation towards co-creating the smart city together

06 Master policies and synergistic partnerships

The smart city players (policymakers, technologists and innovators) must create sensible policies to proactively seek out public and private collaborators in order to build sustainable and synergistic partnerships. Both policies and partnerships are the catalysts of a smart city. They augment and amplify limited city resources and capabilities, scale faster, while minimising risk

07 Government data sharing

Government at all levels collect valuable data on a wide range of areas. Data sharing is vital for government to government (G2G) and government to citizens (G2C) relationships in the development and operation of a smart city. Sharing non-personal and non-sensitive data whether through open data or inter-governmental platform enables citizens, businesses and government to draw insights on many areas, solve issues and improve efficiency of services

08 Data and information protection

Robust information and data protection are necessary for stakeholders buy-in and support for the smart city agenda. A secure technology infrastructure and information collection system ensures stakeholders confidence in using smart solutions. Information collected must be protected, and used in accordance to its owners' wishes. Policies, legislation and technology should continually be adapted to achieve a balance of protection, privacy, transparency and utility.

Level 3: Plus Points

09 Low carbon city and green lifestyle

Introduce the concept of green cities in Malaysia, thereby helping to reduce carbon emission in cities and townships as well as provide guidance towards green solutions for their cities and townships
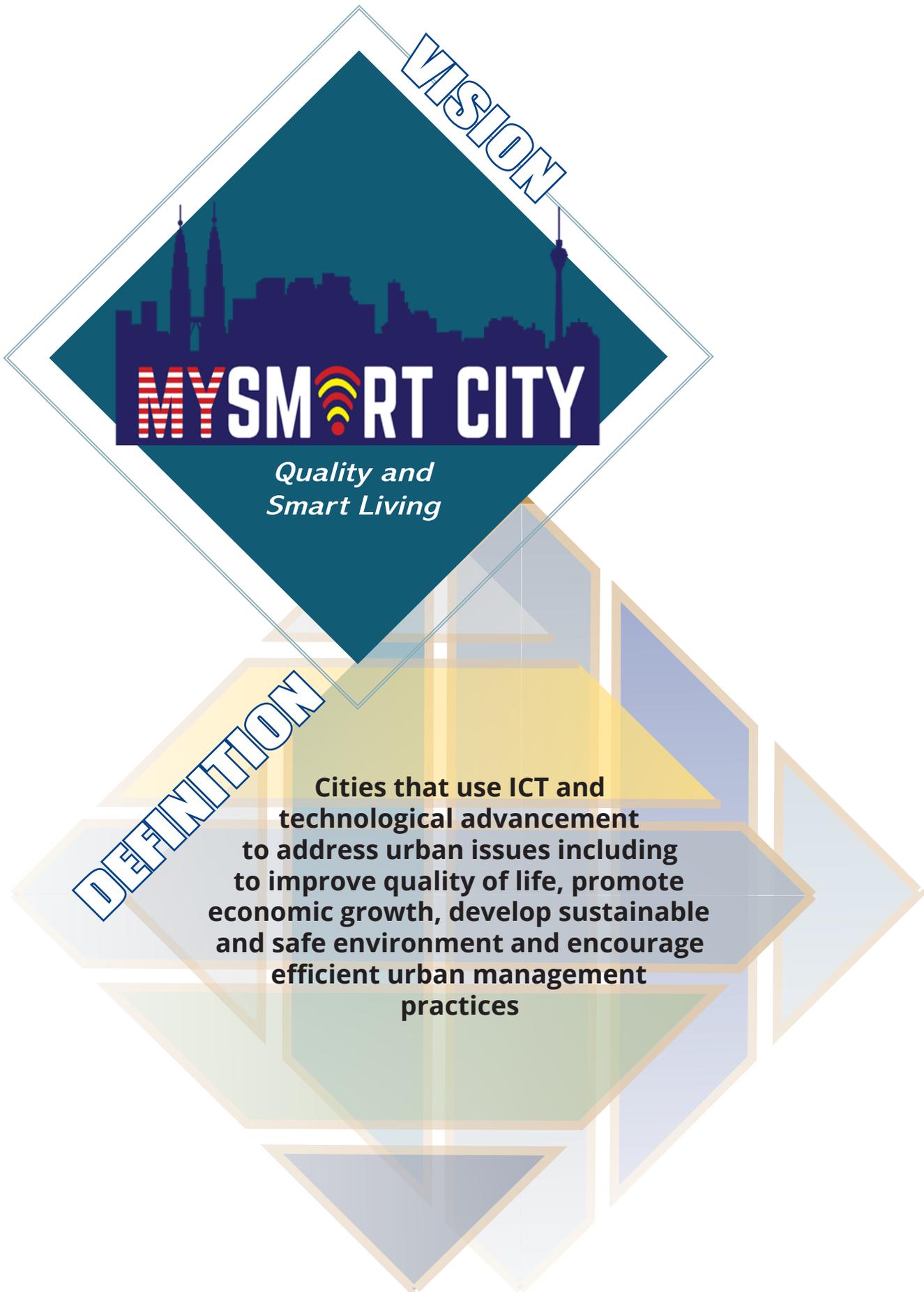
10 Gender empowerment and inclusivity of vulnerable group

Involves the empowerment of vulnerable groups as well as balancing the participation of both genders in any decision making process

11 Community empowerment

Empowering communities through open data and relevant solutions in linking communities with local authorities in order to build the community capabilities to reach mutual agreement in decision-making

Vision and Definition of Malaysia Smart City

VISION

MYSMART CITY

*Quality and
Smart Living*

DEFINITION

Cities that use ICT and technological advancement to address urban issues including to improve quality of life, promote economic growth, develop sustainable and safe environment and encourage efficient urban management practices

Smart City Components and Characteristics

Smart Economy
- High productivity
- Implementation of innovation in all sectors of the economy
- Utilisation of ICT in the economy (i.e. digital economy)
- Competitive economy and attractive for investment

Smart Digital Infrastructure
- Comprehensive network coverage
- Widespread adoption of high speed internet
- Enhanced personal data protection and cybersecurity measures

Smart Living
- Urban safety and security
- High quality of healthcare services
- High quality of life in housing areas

Smart Mobility
- Seamless and efficient connectivity
- Integrated, safe and reliable roads and public transport
- Sustainability/green as a core principle
- Offers flexible and affordable modes of transport

Smart City Components and Characteristics

Smart Environment
- Environmental protection
- Clean environment
- Sustainable resource management
- Readiness towards disaster resilient cities
- Low carbon city and green lifestyle

Smart Government
- Open data and information disclosure
- Quality e-government services
- Inter-governmental data sharing

Smart People
- Empowered community
- Talented human capital with high digital skill
- Community with good moral values
- Community with first-class mentality
- Gender and vulnerable group friendly

KEY URBAN CHALLENGES

03

02 Smart Living
- Relatively high crime index
- Increasing demand for healthcare services

01 Smart Economy
- Low productivity in the current economy
- Inadequate creation of high value-added jobs
- Low level of readiness to transition to high value-added industries
- Weak development of innovative businesses and enterprises
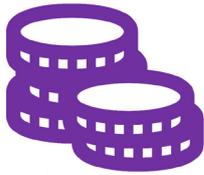
07 Smart Digital Infrastructure
- Low internet speed and connectivity
- Unsatisfactory indoor and outdoor mobile network coverage
- Cybersecurity threats

06 Smart Mobility
- Traffic congestion
- Low rail ridership and high private vehicle ownership
- Poor first and last mile connectivity and accessibility
- Low service quality and facility provision in public transportation
- High carbon footprint

Key Urban

Smart Environment

03

- Loss of green area
- Improper solid waste management
- Air pollution
- Water pollution
- Flash flood
- Landslide
- High rate of non-revenue water
- High usage of non-renewable energy
- High carbon footprint

Challenges

Smart People

04

- Low moral intelligence and low social integrity
- Low skilled manpower and talented human capital
- Lack of harmonious public interactions and community empowerment
- Lack of gender-friendly environment and inclusivity of vulnerable groups
- Low adaptability to emerging technologies

Smart Government

05

- Lack of public information sharing from government
- Low quality in e-government services
- Lack of information and data sharing in and between government agencies

Key Urban Challenges

Globally, smart city initiatives are widely used to address urban challenges as a result of rapid urbanisation. Different cities face different challenges and have different needs. In the context of this framework, the key urban challenges were derived from stakeholders' feedback during the Focus Group Discussions (FGDs). These challenges were ranked on the basis of importance by stakeholders who attended the FGDs. These challenges were consolidated and refined further with the ability of smart city solutions to solve the urban challenges in mind.

Smart Economy

1. Low productivity in the current economy	**2. Inadequate creation of high value added jobs**

Productivity has been identified as a game-changer for economic growth. Below is the comparison of Malaysia's labour productivity (measured in output per person employed) against selected developed countries that emerge as top performers in productivity. For example, Malaysia's labour productivity is less than half of Singapore's.
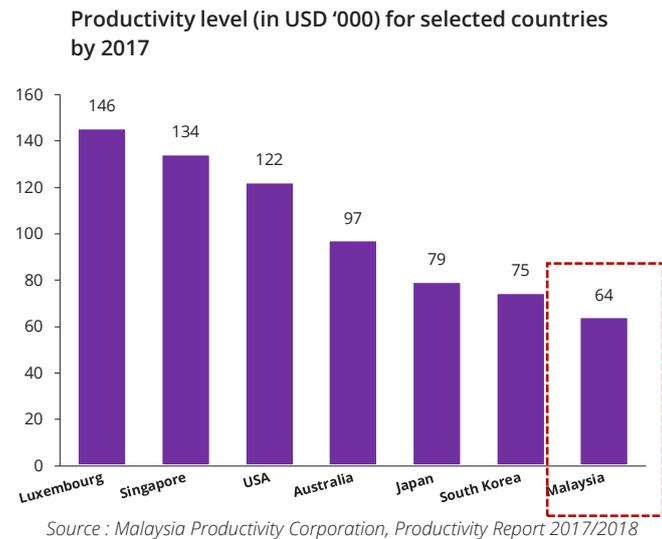
The creation of a higher value-added economy is partly attributed to the utilisation of a highly-skilled workforce and technologies which create competitive advantages.

The ICT sector, which contributes to a higher value-added economy, has experienced lower employment growth than the national employment growth from 2015 to 2017.

Productivity level (in USD '000) for selected countries by 2017

Source : Malaysia Productivity Corporation, Productivity Report 2017/2018

Number of employment and its growth rate in ICT sector vs national employment growth from 2015 -2017

Source: Department of Statistics Malaysia
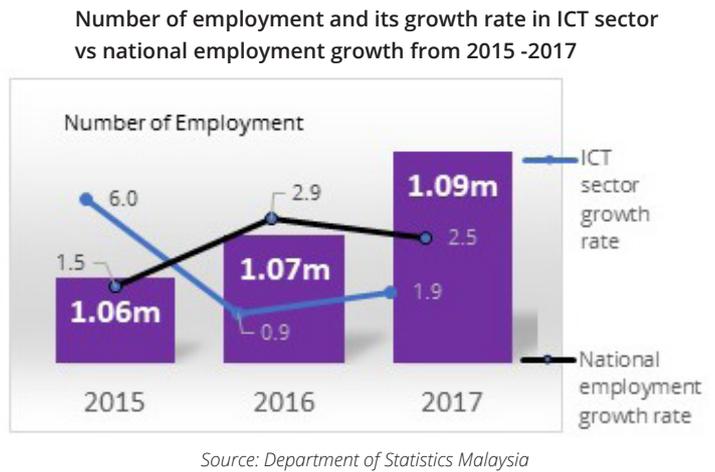
At sectoral level, Malaysia's productivity level is still lagged. Malaysia's performance in 3 main sectors internationally, is as follows:

Sector	Agriculture	Industrial	Services
Malaysia's rank	27	26	46
Malaysia's sector productivity (USD PPP per person employed in sector)	46,777	92,722	54,811
Top performance (USD PPP per person employed in sector)	166,655 (Norway)	354,150 (Ireland)	167,067 (Qatar)
Differences (Top performer vs. Malaysia)	3.6x	3.8x	3.0x

*Source : IMD World Competitiveness Yearbook 2018*

3. Low level of readiness to transition to high value-added industries

The digital adoption index (DAI) published by the World Bank indicates Malaysia's relative adoption of digital technologies to the rest of the world, across three agents; businesses, government and people. Malaysia's overall score is 0.69. Based on this score, Malaysia is classified as an 'adopter' country. Front runners are the top 20%, adopters are the 20-50% and laggards are the bottom 50% of the DAI. East Asia and Pacific countries that outperform Malaysia include Singapore, Japan, Korea, New Zealand and Australia.
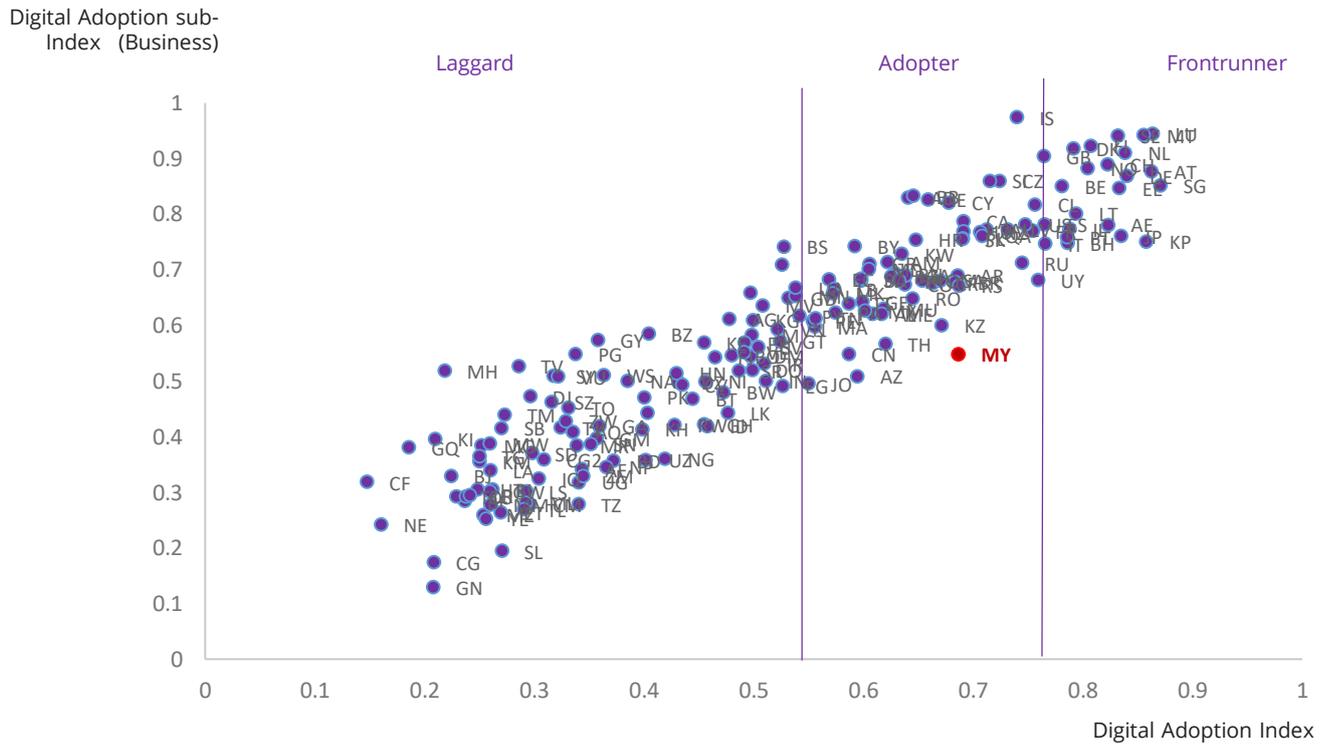
Malaysia has a lower score of 0.55 in the DAI's sub-index for businesses. This is attributable to the pattern of internet use by businesses in Malaysia. In 2015, only 29% of business establishments had a web presence of some kind.

Percentage of establishments in Malaysia with computer usage, internet connections and web presence in 2015
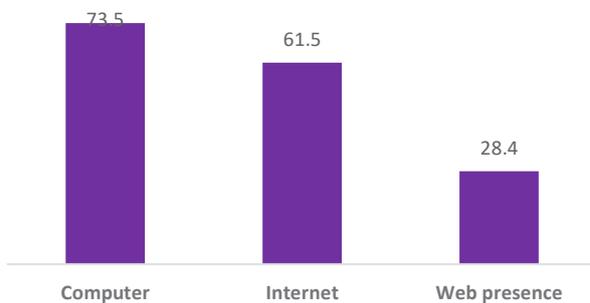
Source: Department of Statistics Malaysia

4.   Weak development of innovative businesses and enterprises

In regard to innovation practices, Malaysia's performance is indicated as follows:

Percentage of gross expenditure on R&D (GERD) to GDP

1.3%

Increase marginally →

1.44%

Of which **56.6%** is business expenditure on R&D (BERD)

2015   **2016**
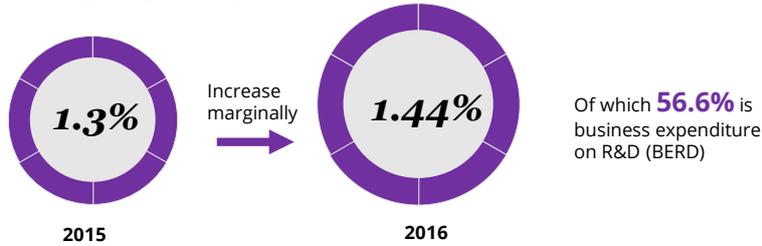
Source : Midterm Review of 11th Malaysia Plan, 2018

Malaysia's performance in innovation is also measured in the global innovation index (GII). Malaysia is ranked 35th in the GII 2018, moving up 2 positions from the previous year. The country ranks 48th in the innovation efficiency ratio. Malaysia's position in this ratio is lower than its overall GII position (35th), indicating that there is room for improvement in efficiency where Malaysia translates its innovation inputs into more outputs.

Global Innovation Index (GII) 2018

| Year	GII rank	Input	Output	Efficiency
2016	35	32	39	59
2017	37	36	39	46
2018	35	34	39	48

Source : Mid Term Review of 11th Malaysia Plan, 2018

Smart Living

1. Relatively high crime index

Based on the statistics from RMP, Malaysia's crime index is technically declining for the past few years. However, compared to other smart cities around the world, the index level for crime in Malaysia can be considered as relatively high and needs to be improved.

**The Malaysian Crime Index Trend of 2013-2016**
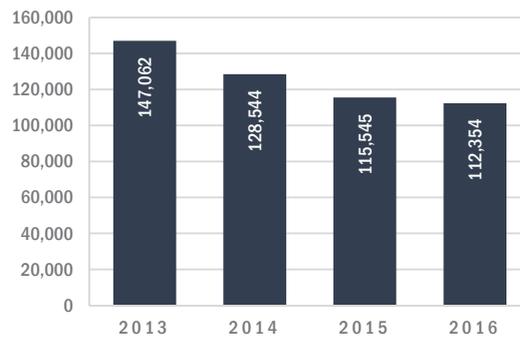
Source: Royal Malaysia Police, 2016

2. Increasing demand for healthcare services

The Malaysian healthcare system consists of both public and private hospitals. Generally, hospital care in Malaysia is still heavily dominated by the public sector with Ministry of Health (MOH) being the largest healthcare provider.

The ratio of doctors (2013) in hospitals to population is 1:656. 68% of these doctors are serving in the public hospitals while the remaining 32% serves in the private hospitals.

Distribution of doctors and bed population, 2013
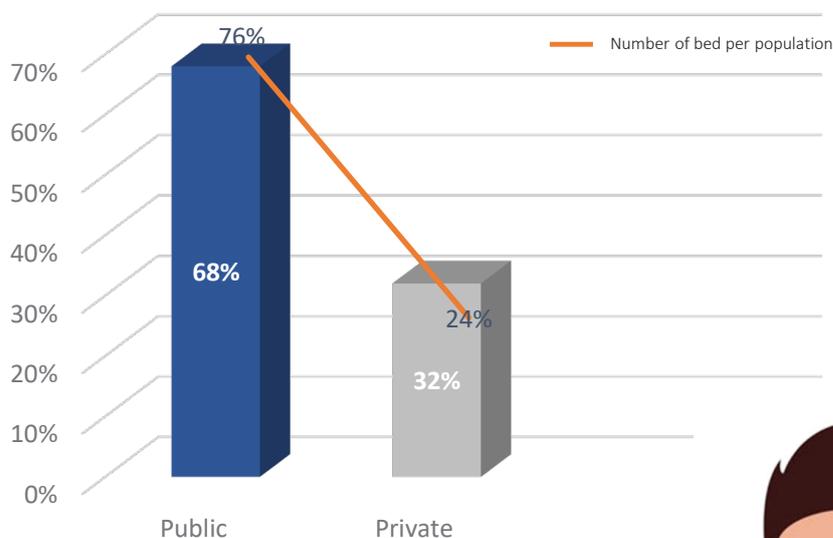
Source : Health Informatics Centre,Ministry of Health Malaysia, 2013

Smart Environment

1. Loss of green areas

Loss of green areas has been an urban challenge to any big city in the world including Malaysia. Among the main concerns is the shrinking of tree cover that eventually will relate to urban heat island effect. Furthermore, it also leads to the increase of carbon dioxide (CO_2).

Tree cover and crown spread in Kuala Lumpur from 2001 to 2014

Year	Green Cover (Hectar)	Green Cover (Percent)	Tree Cover (Hectar)	Tree Cover (Percent)
2001	6,564	27	4,282	18
2013	5,891	24	3,738	15
2014	6,215	26	3,452	14

Source : Kasturi Devi Kanniah, Quantifying Green Cover Change For Sustainable Urban Planning: A Case Of Kuala Lumpur, Malaysia, 2017.

2. Improper solid waste management

19,867 tonne/day waste nationwide needs to be treated and recycled in order to achieve the 40% waste diversion from landfill by the year 2020.

Source : Solid waste management lab, 2015

3. Air pollution

Air quality in Malaysia is monitored continuously and manually to detect any changes in the ambient for air quality status that may cause harm to human health and also to the environment. Generally, based on air pollution index (API) recorded from the year 2013 until 2016, air quality in four (4) major cities had "good" reading (below 50 API).

Average air pollution index (API) in four selected cities

4. Water pollution

Pollution is one of the largest threats to rivers in Malaysian cities. The table below indicates that the rivers in Kuala Lumpur and Johor Bahru were categorised as slightly polluted. Urbanisation significantly contributes to the increase in water pollution problems especially in the form of sedimentations from housing projects, road constructions, rubbish and domestic sewerage. Managing rivers and industrial pollution control have become more challenging to the government.

Status for Polluted and Slightly Polluted, 2016

City	River	2016		
		IKA	Category	Class
Kuala Lumpur	Sg. Gombak	72	slightly Polluted	III
	Sg. Klang	63	slightly Polluted	III
Johor Bahru	Sg. Segget	47	Polluted	IV
	Sg. Skudai	60	slightly Polluted	III
Kota Kinabalu	Sg. Inanam	77	slightly Polluted	II
	Sg. Likas	69	slightly Polluted	III
Kuching	Sg. Sarawak	80	slightly Polluted	II

Source : Department of Environment, 2016

The source of water pollution in Malaysia

1   **Contaminated Permanent Causes**
- Disposal of waste from factory
- Disposal of waste from sewage plant
- Disposal of waste from the livestock sector

2   **Contaminated Non-Permanent Causes**
- Contaminated runoff is like oil spill
- Land development activities
- Plant fertilisers and others

5. Flash flood

Flash floods and landslides are the common hazards or disasters occurred in Malaysian cities. Selangor recorded 115 cases of flash floods from 2016 until 2017. Among the causes of flash flood is the changes of land use pattern to a high density development with low water permeability.

Information on flood events in Malaysia from 2014 to 2017

State	2014 - 2015	2015 - 2016	2016 - 2017
Perlis	19	5	2
Kedah	33	37	41
Pulau Pinang	20	26	46
Perak	52	91	31
Kelantan	49	5	4
Terengganu	19	3	4
Pahang	27	20	69
Selangor	92	135	115
Melaka	11	18	8
N.Sembilan	14	17	14
Johor	8	13	8
Sabah	13	19	6
Sarawak	14	84	45
WP KL	7	8	6
WP Labuan	3	15	5
Total	381	496	404

Source : Water and Hydrology Management Division, Department of Irrigation and Drainage, Malaysia (2018)

6. Landslide

Landslides are among the common hazards that occurred mainly due to human intervention.

List of landslides in Malaysia

Date	Location
11 December 1993	Taman Hillview, Ulu Klang, Selangor
November 1998	Bukit Saujana, Paya Terubung, Penang
15 May 1999	Bukit Antarabangsa, Ulu Klang, Selangor
20 November 2002	Taman Hillview, Ulu Klang, Selangor
November 2003	New Klang Valley Expressway (NKVE) berdekatan Bukit Lanjan
November 2004	Taman Harmonis, Gombak, Selangor
31 May 2006	Kampung Pasir, Ulu Klang, Selangor
March 2007	Precint 9, Putrajaya
2 February 2009	Bukit Ceylon, Kuala Lumpur
21 May 2011	FELCRA Semungkis, Hulu Langat, Selangor
29 December 2012	Puncak Setiawangsa, Kuala Lumpur
4 January 2013	Kingsley Hill, Putra Heights, Selangor
21 October 2017	Tanjung Bungah, Pulau Pinang

Source : Haliza and Jabil (2017)

7. High rate of Non-Revenue Water (NRW)

NRW is water that has been produced and is "lost" before it reaches the customer. Losses can be real losses or apparent losses.
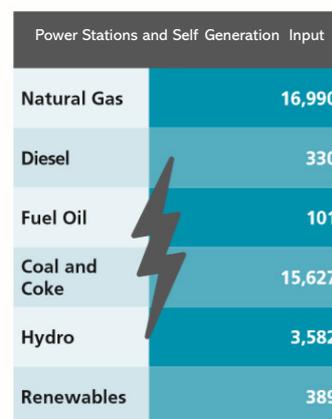
Non-Revenue Water in Malaysia for 2014 and 2015

State	2014		2015	
	NRW	NRW (%)	NRW	NRW (%)
Johor	426	25.9	436	25.6
Kedah	596	46.1	614	46.7
Kelantan	220	49.4	222	49
Labuan	20	29.5	22	30.9
Melaka	102	21.4	93	19.3
N. Sembilan	267	35.9	264	34.8
Pulau Pinang	182	18.3	202	19.9
Pahang	588	53.1	596	52.8
Perak	379	30.6	382	30.3
Perlis	121	55.8	124	56.3
Sabah	618	51.7	677	55.1
Sarawak	381	32	423	33.3
Selangor	1,545	33.6	1,497	32
Terengganu	188	31	192	31
MALAYSIA	5,633	35.6	5,743	35.5

Source : Ministry of Energy, Green Technology and Water, 2015

8. High usage of non renewable energy

Malaysia Energy Statistics Handbook (2017) shows that 90% of total energy sources is produced by non-renewable energy and 10% is produced by renewable energy sources.

Power Stations and Self Generation Input

Natural Gas	16,990
Diesel	330
Fuel Oil	101
Coal and Coke	15,627
Hydro	3,582
Renewables	389

Source : Malaysia Energy Statistics Handbook, 2017

Smart People

1. Low moral intelligence and low social integrity

Many studies have proven that low moral intelligence often lead to social problems such as drugs, vandalism and others. It is more alarming if children are involved in social problem. Based on the crime involving children in 2018, drug abuse and vandalism against property are the two most common crimes.

Statistics on Crime-Affected Children in Malaysia, 2016

Type of Crime	Gender		
	Men	Women	Total
Property Related	1,655	58	1,713
People Related	649	4	653
Minor Offences Act	93	0	93
Breach of Supervision	12	0	12
Drugs	1,410	112	1,522
Gambling	37	3	40
Weapon	45	3	48
Traffic	235	5	240
Run away from school	8	0	8
Others	463	94	557
Total	4,607	279	4,886

Source : Open Data Portal Malaysia data.gov.my, 2018

2. Low skilled manpower and talented human capital.

The percentage of skilled and talented human capital in Malaysia is relatively low at 27% compared to countries with established smart cities such as Finland (100%) and German (80%).

Percentage of workers based on skill level for 2015 - 2016

Category	2015 (%)	2016 (%)
High Skilled Workers	25.5	27.3
Semi-skilled Workers	60.7	59.7
Poor Skilled Workers	13.8	13.0

Source : https://www.talentcorp.com.my

3. Lack of harmonious public interactions and community empowerment

There are many aspects that can be used to measure the assimilation of the community including the number of community integration programmes, the happiness index, and the family wellbeing index. The happiness index in Malaysia has increased from 47th in 2016 and now stands at 35th in 2018. This indicates that the level of community integration in Malaysia is still moderate compared to Australia at 10th and Finland which ranked 1st globally.

Malaysia Happiness Index

2016 #47
2017 #42
2018 #35

Source :Women, Family and Community Statistics 2016

4. Lack of gender-friendly environment and inclusivity of vulnerable groups
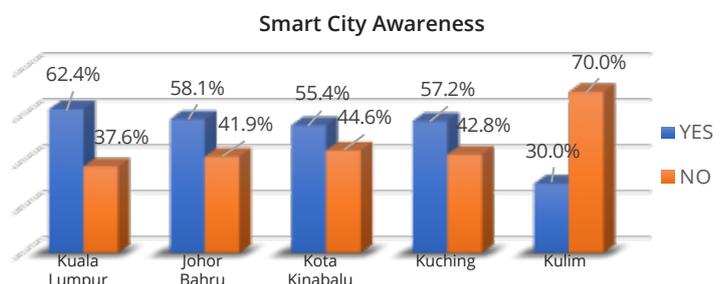
The Malaysia Gender Gap Index (MGGI) examines the gap between men and women in four fundamental categories: economic participation & opportunity, educational attainment, health, and political empowerment.

The average score for Malaysia was 0.692 in 2016 (indicates gender gap was 69.2). The score of 1.00 (100%) is defined as no gap between men and women

Source Department of Statistics, 2016

5. Low adaptability to emerging technologies

A perceptual survey was conducted in 5 pilot cities namely Kuala Lumpur, Johor Bahru, Kota Kinabalu, Kuching and Kulim. The graph below shows the percentage of respondent's awareness of smart city.

Smart City Awareness

City	YES	NO
Kuala Lumpur	62.4%	37.6%
Johor Bahru	58.1%	41.9%
Kota Kinabalu	55.4%	44.6%
Kuching	57.2%	42.8%
Kulim	30.0%	70.0%

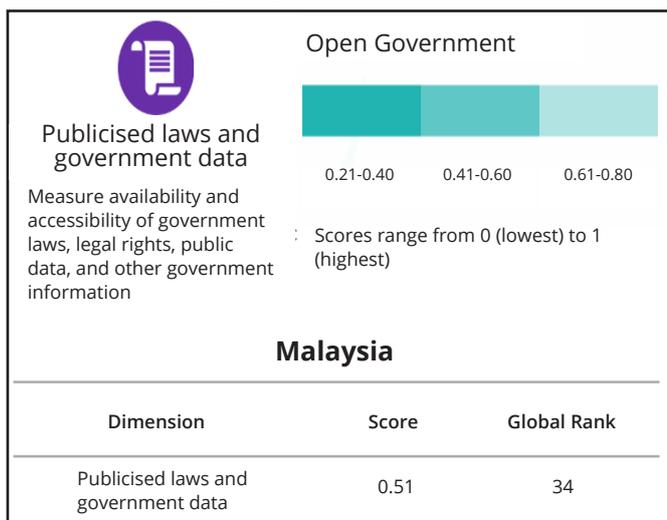*Source : Malaysia Smart City Framework study, 2018*

Smart Government

1. Lack of public information sharing from government

Various government entities in Malaysia collect and create a lot of information, but the sharing of this information is quite limited. A study done on 109 Malaysian local authorities in 2010 revealed that 64.2% of them maintain websites. Additionally, 10% of local authorities provided some disclosure of financial statements digitally.

In the publicised laws and government data dimension of World Justice Project's Open Government Index, Malaysia is ranked 34th. This suggests that the level of public information sharing in Malaysia is still quite limited. The index is an effort to measure government openness based on the general public's experiences and perceptions worldwide.

Publicised laws and government data dimension of the World Justice Project Open Government Index (2015)

Open Government

| 0.21-0.40 | 0.41-0.60 | 0.61-0.80 |

Publicised laws and government data

Measure availability and accessibility of government laws, legal rights, public data, and other government information

Scores range from 0 (lowest) to 1 (highest)

Malaysia

Dimension	Score	Global Rank
Publicised laws and government data	0.51	34

Source : Publicised World Justice Project Open Government Index 2015

3. Lack of information and data sharing in and between government agencies

In carrying out their functions, different government agencies (federal, state and local) create, collect and use certain information and data. Often times, agencies rely on information and data from other agencies to deliver public services. However, information and data sharing among government agencies, also known as knowledge management, is considered as poor. This in turn affects the performance of the public sector.

MAMPU documented behaviours of public servants in 2010 and the findings indicate that knowledge sharing / management is low among government agencies.

Findings from MAMPU knowledge management survey among government agencies, 2010


- Information is owned by own agency only
- Knowledge management strategy exist in own government agency
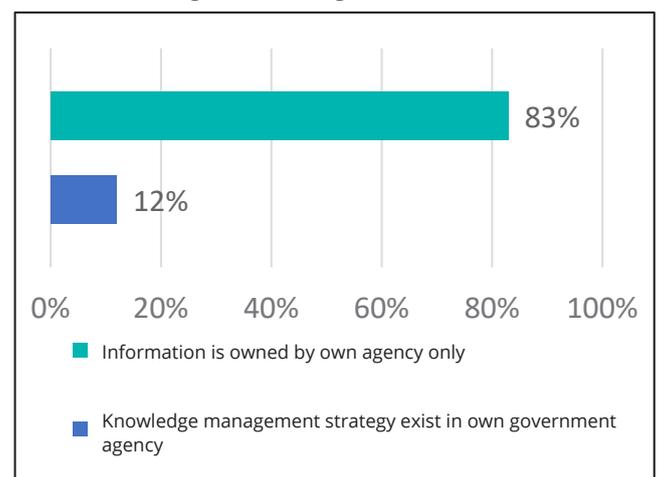
Survey of 94 government agencies and from interviews conducted on 30 selected government agencies

Source : Knowledge Management Blueprint, MAMPU, 2010

2. Low quality of e-government services

Malaysia still lags behind regional leaders in the UN E-Government Development Index. The index is a snapshot of each country's e-government development from a regional and global perspectives. Malaysia is ranked 48th, while Singapore and South Korea are at 7th and 3rd spots, respectively.

Malaysia's Profile in the 2018 E-Government Development Index of the United Nations
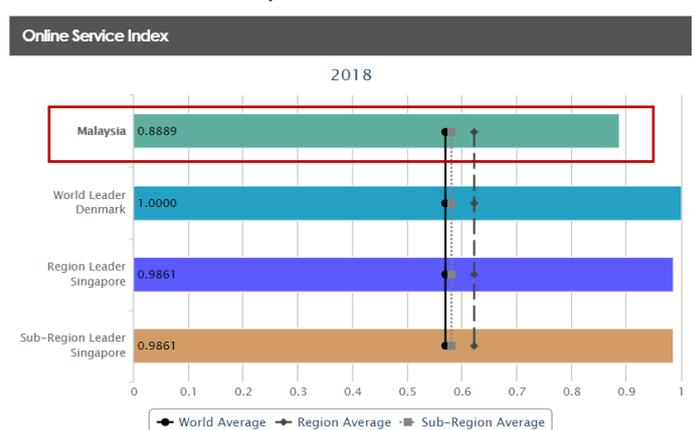
Note: Online Service Index measures the scope and quality of online services
Source : UN E-Government Development Index. United Nations, 2018

Smart Mobility

1. Traffic congestion	**2. Low rail ridership and high private vehicle ownership**

According to Mckinsey, traffic congestion costs 2% to 5% of GDP annually, equivalent to RM3,100 per person in Kuala Lumpur. Additionally, the World Bank found that KL residents spend an average of 63 minutes in traffic congestion every day, resulting in productivity loss of RM5.5 billion per year. Malaysia is ranked 95th (out of 100 cities) in Arcadis Sustainable Mobility Index.

Public transport modal share in Malaysia is only 20%, compared to 66% recorded in Singapore, while 82% of Malaysian households owns a car. Currently in Malaysia, there are more than 28 million vehicles on the road.

Public Transportation Mode in Malaysia, 2017 (%)

Target: 40%

Year	%
2008	10%
2009	12%
2010	15%
2011	21%
2012	25%
2017	20%
2030	40%

Average of **63 minutes** in traffic congestion every day

Productivity loss of **RM5.5 billion** per year

Source : World Bank, 2018
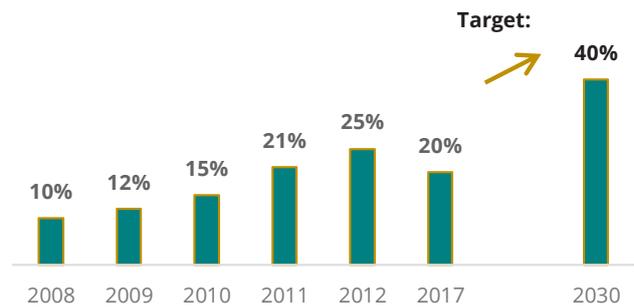
Source : GTP, The Star Online

RAIL RIDERSHIP

Line	Ridership
Kelana Jaya Line	254,854
Ampang / Sri Petaling Line	185,131
MRT Line	110,000
Monorail Line	63,778
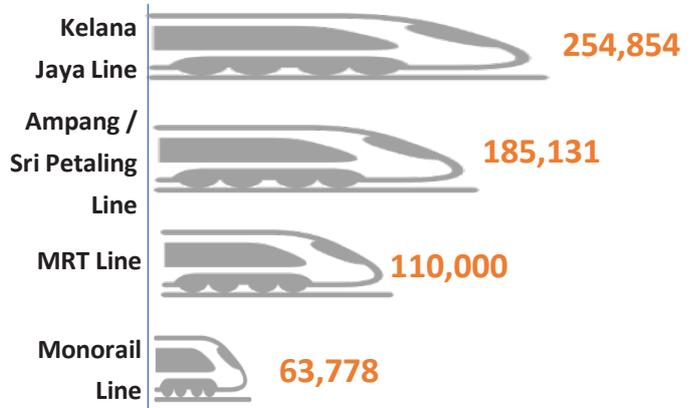
Source : Prasarana Sdn Bhd, 2017

3. Poor first and last mile connectivity and accessibility

Greater KL currently has 6 rail lines running, serving an area of 10,180.8 hectares (or approximately 42% of Kuala Lumpur's total area). However, 58% of Kuala Lumpur are still not accessible by rail transport (or more than 400 metres outside the transit catchment area). Furthermore, due to price hike in 2015, BRT ridership has reduced from 13,000 to 4,000 ridership.

Existing rail network in Kuala Lumpur
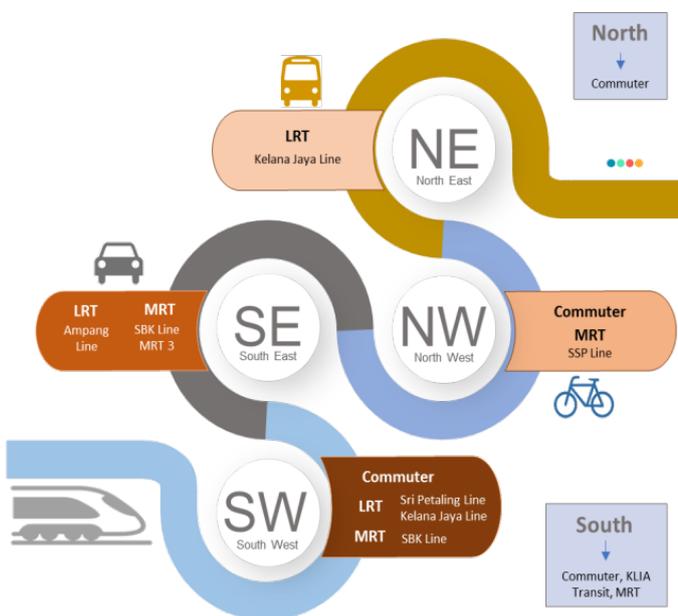
Source : Malaysia Smart City Framework study, 2018

4. Low service quality and facility provision in public transportation

Park and ride: Some rail stations in the Klang Valley still lack a proper Park n Ride infrastructure, persons with disabilities (PWD) friendly facilities as well as shaded and safe walkways for the convenience of public transport users.

Public transport fare: The current fare integration between public transportations in Malaysia is still limited (some are calculated based on distance while some are based on number of stops/zones travelled).

Smart Parking: At present, the adoption of smart parking systems in Malaysia is relatively low. Less than 1% of Selangor population use the Smart Selangor Parking app.

Data sharing: Data sharing and integration remain an ongoing issue among the public and private agencies.

5. High carbon footprint

Malaysia's CO_2 emissions is relatively high at 255.78 million mt in 2017 compared to 252.08 million mt in 2016.

One way to minimise carbon footprint in terms of mobility is by promoting the use of hybrid or electric vehicles (EV). However, this initiative is less accepted in Malaysia because of the following reasons:

1. High cost – EVs command a price premium of at least 60% over its petrol counterparts.

2. High maintenance cost – Battery replacement for EVs proves to be rather costly and complicated, costing as high as RM25,000.

3. Lack of supporting infrastructure - There are only approximately 150 EV charging stations being set up across the country, with some of them does not even supports the latest fast charging technology.

Malaysia Carbon Dioxide Emission, 2017
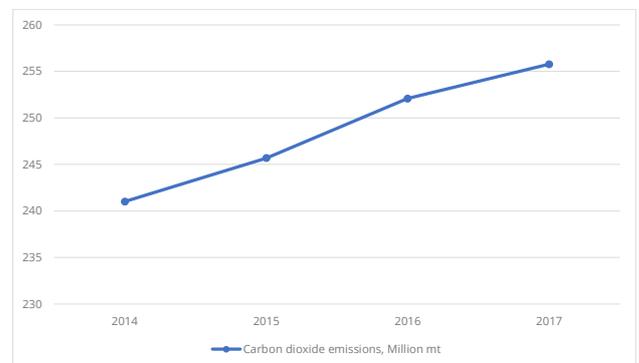
Source : BP Statistical Review of World Energy Report, 2017

Smart Digital Infrastructure

1. Low internet speed and connectivity

Used international internet bandwidth refers to the average usage of all international links, including fibre optic cables, radio links and traffic processed by satellite ground stations and teleports to orbital satellites. The average is calculated over the 12-month period of the reference year. Malaysia recorded a low internet bandwidth of 42.6 (kbit/s) compared to neighbouring countries such as Singapore which recorded an average of 982.9 (kbit/s) per year.

Key Indicator for ICT in Malaysia

		Asia & Pacific	World
Fixed-telephone sub. per 100 inhab.	15.6	10.0	13.6
Mobile-cellular sub. per 100 inhab.	141.2	98.9	101.5
Fixed-broadband sub. per 100 inhab.	8.7	11.3	12.4
Active mobile-broadband sub. per 100 inhab.	91.7	47.4	52.2
3G coverage (% of population)	95.0	87.6	85.0
LTE/WiMAX coverage (% of population)	88.0	73.6	66.5
Mobile-cellular prices (% GNI pc)	0.7	3.2	5.2
Fixed-broadband prices (% GNI pc)	1.1	14.5	13.9
Mobile-broadband prices 500 MB (% GNI pc)	0.8	2.7	3.7
Mobile-broadband prices 1 GB (% GNI pc)	1.4	5.4	6.8
Percentage of households with computer	72.2	37.8	46.6
Percentage of households with Internet access	76.9	45.5	51.5
Percentage of individuals using the Internet	78.8	41.5	45.9
Int. Internet bandwidth per Internet user (kbit/s)	42.6	48.0	74.5

Source : Measuring the Information Society Report, ITU, 2017

2. Unsatisfactory indoor and outdoor mobile network coverage

The Malaysian Communications and Multimedia Commission (MCMC) has conducted quality of services measurement for public cellular services throughout the year 2017 and the outcome shows all service providers achieved the required performance for both dropped call rate (DCR) and call setup successful rate (CSSR) in all region for year 2017. DCR and CSSR were the two main criteria that were monitored and recorded throughout the cellular test by MCMC. From the top five (5) categories of complaints received by Communications and Multimedia Consumer Forum of Malaysia (CFM) on telcos, network coverage complaints recorded an increase of 101% from 619 complaints reported in 2016 to 1,247 complaints in 2017. One of the main issues discussed was the unavailability of 4G network coverage in certain areas in Malaysia in spite of billboards featuring 4G services in the area. MCMC explained that some of the issues found to be causing call dropped and call setup failure were: poor coverage and signal quality due to blocking, blind spots, coverage overshooting, uplink interference, frequency overlapping and handover issue.

5 Highest Categories of Complaints Received by CFM

2016	Total Complaints	2017	Total Complaints
Billing & Charging	2,914	Billing & Charging	1,669
Quality of Service	2,506	Network Coverage	1,247
Network Coverage	619	Quality of Service	817
Unfair Practice	442	Unfair Practice	295
No Coverage	404	Misleading Promotions	224

*Source : Malaysian Wireless, CFM Telcos Complaints, 21 March 2018*

3. Cybersecurity threats

The cybersecurity field is growing in importance due to the increasing reliance on computer systems and the internet, wireless networks such as bluetooth and wifi, the growth of "smart" devices, including smartphones, televisions and tiny devices as part of the IoT. According to market research company Gartner, there could be 20.4 billion IoT connected devices between now and year 2020.

Statistics from Cybersecurity Malaysia:

1. Cybersecurity Malaysia receives between 9,000 and 10,000 incident reports each year on various matters of contention happening in cyberspace.
2. Fraud cases detected in cyberspace jumped 20% in 2016 compared to 2015.
3. 2,428 cybercrime incidents reported between January to April in 2017.

Reported incidents based on General Incident Classification (2017):

Total Incidents Reported (2017): 7,962
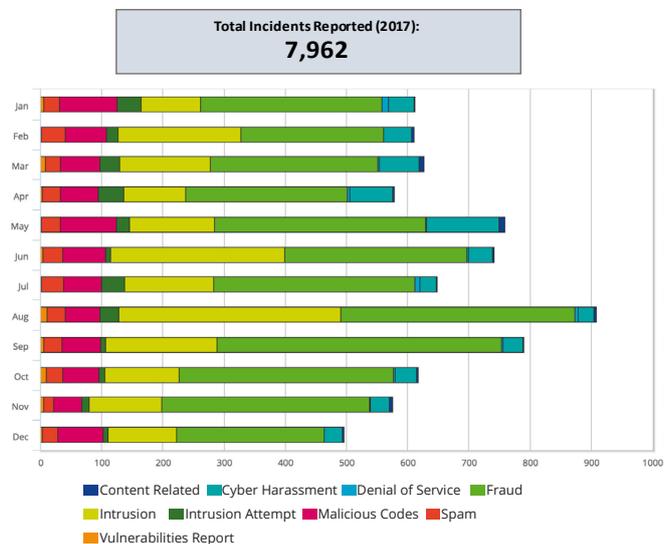
Source: MyCert / Cybersecurity Malaysia 2017

MySMART CITY POLICIES

MYSMART CITY POLICIES

This section recommends policies that can help spur smart city development in Malaysia. These policies are formulated based on Malaysia's urban challenges and benchmarking against leading smart cities.

01   Primary infrastructure shall be upgraded to incorporate smart and IoT elements towards addressing core urban challenges

Rationale

Data is the backbone of a smart city. To capture data, IoT sensors and trackers need to be rolled out in strategic places that can leverage these sensors to solve urban challenges.

Description

Existing primary infrastructure such as traffic lights, street lights, roads, drainage, waste bins and others can be upgraded or retrofitted with IoT sensors for tracking and monitoring the current conditions to solve prevailing urban challenges such as traffic congestion, slow emergency response and ineffective waste management.

02   Shared digital infrastructure and internet connectivity shall be enhanced for all cities in Malaysia

Rationale

High speed internet is a critical enabler for smart city development. At present, Malaysia is lacking in terms of internet speed, connectivity and coverage due to insufficient digital infrastructure and adoption rate throughout the country.

Description

Sharing infrastructure will enable telcos to share their infrastructure with other telcos and also across other industries. For instance, a telco can utilise Tenaga Nasional Berhad (TNB)'s power grid to lay down their fibre cable or communication network infrastructure to enhance speed or coverage in a particular area, instead of building their own infrastructure. This will reduce the capital expenditure (CAPEX) spend and promote the usage of modern technologies.

03   Quality of human capital shall be enhanced to meet future demands of industry and evolving environment in a smart city

Rationale

Living in the smart city's environment requires human capital with the right skills, knowledge and attitude to ensure seamless integration between various elements. From the economic perspective, skilled workforce is highly favoured. In 2017, 112,300 jobs in the skilled jobs category were created. Meanwhile, the overall atmosphere in smart city eventually aims to promote social inclusiveness, greater connectedness, active collaboration and creativity.

Description

This policy covers the essence of human capital empowerment to become a productive and prosperous society, which is currently being championed at the national level. Focus areas include creation of talented human capital, attainment of quality education, emphasis on moral education as well as community empowerment.

04 **Open data and open government practices shall be promoted**

Rationale

Malaysia was ranked 34th in the publicised laws and government data dimension of the World Justice Project's Open Government Index in 2015. Responses from Malaysian household surveys and in-country expert questionnaires indicated that disclosure of government information to the public is still limited in terms of scope and quality. Additionally, Malaysian Administrative Modernisation and Management Planning Unit (MAMPU) documented a low degree of willingness to share information and data within government agencies in 2010.

Description

Open government practices, where appropriate, such as disclosing relevant and timely information to the public, publishing open datasets and institutionalising public consultation leads to enhanced public trust, a conducive business environment and an adaptive government - all of which are necessary for a smart city. Within the government, openness to share information and data is crucial for efficient government function.

05 **Cybersecurity shall be strengthened in smart city context**

Rationale

Cybersecurity Malaysia receives an increasing number of incident reports, now averaging between 9,000 and 10,000 incident reports each year. Cybersecurity threats deter the usage and confidence in ICT including smart city applications. Additionally, the seamless sharing of data among the public and private sectors could be hindered by the fear that cybersecurity infrastructures by various entities are weak.

Description

A strengthened cybersecurity environment will increase the sense of security among citizens, businesses and government officials, alike to use the ICT and smart city applications. Getting people to share data will also be easier when they know that their data is protected and handled properly. This policy would require revisions and stronger enforcement of laws, and the upgrading of security systems and procedures from the public and private sectors.

06 **Accreditation of smart city standards shall be introduced to set a standard for smart city qualification and recognition**

Rationale

There is no current standard to measure a city's qualification to be recognised as a smart city in the nation. However, there are several existing rating agencies and organisations that have developed standards in smart city-related elements such as ICT, building specifications, energy efficiency, environmental impact, mobility, and security.

Description

This accreditation of smart city standard policy will be used for sharing purpose, common understanding, integration, investment, procurement and scaling for smart city development, taking into consideration the elements specified by the relevant existing agencies

07 Social inclusion, especially gender equality shall be given emphasis in smart city development

Rationale

As crimes against women and vulnerable groups are still rising, it is crucial to emphasise and encourage safe environment in a smart city. In addition, this policy aims to promote fair and equity between gender and vulnerable groups in the context of their needs to live in smart, sustainable and safe cities.

Description

This policy aims to promote equality and inclusion for women and vulnerable groups in terms of providing supportive physical infrastructure and programmes during the development of smart city. In addition, the participation of women and vulnerable groups in decision making will be necessary in ensuring a safe and inclusive city environment

08 Sustainable and smart environment practices shall be encouraged in all development of smart city

Rationale

The sustainable and smart environment practices aims to provide healthy, resilient and sustainable place to live by addressing existing and rising environmental issues such as loss of green areas, improper solid waste management, air pollution, water pollution, flash flood, landslide, high rate on non revenue water and high usage of non renewable energy.

Description

Sustainable and smart environment practices will comply with all the current and proposed initiatives of preserving and conserving the environment by using smart solutions through the usage of advance technology for the betterment of society.

09 Public transport system shall be physically and digitally integrated with seamless accessibility

Rationale

Connectivity and accessibility remain the biggest hurdles for public transportation system. One of the key common trends observed among the developed smart city such as Singapore, United States and Copenhagen is the availability of a well-connected and integrated public transport system. The public transport modal share in Malaysia remains very low due to poor first and last mile accessibility, besides other factors such as cost, safety, and reliability.

Description

In this digital age, it is important for the public transport to not only be physically integrated but also digitally integrated as well as to give real-time information access to the public. Moreover, the public transit system should also be physically accessible with proper first and last mile solutions, combined with a seamless inter-connectivity. This policy aims to capture significant smart solutions and initiatives to resolve urban issues with the adoption of advance technology to ease the overall process.

10 E-Government shall be strengthened in the development of smart city

Rationale

Malaysia's e-government services is ranked 48th in the 2018 United Nation (UN) E-Government Development Index. Malaysia is still behind global leaders such as Singapore, South Korea and Denmark in terms of e-government effectiveness in delivering basic economic and social services to people.

Description

Smart city requires efficient and transparent government administration. Installation of basic and new smart digital infrastructure or simplifying ease to do business are fundamentally tied to government processes and set-up. As the public and businesses are carrying out more activities over the internet, government at all levels must ensure that its functions and services have an adequate presence online. Increasing the scope and quality of e-government will ensure that public services are accessible and convenient to citizens, businesses and even government themselves.

11 Safety and security shall be improved to enhance quality of life

Rationale

In the context of Malaysia, the current crime rate is relatively high for the past few years. This policy aims to provide relevant solutions by using smart initiatives through the application of advanced technology in the lifestyle of communities in Malaysia.

Description

The main direction of this policy is to reduce crime and provide safe environment as a mean to increase quality of life of the people.

12 Development of digital economy in Malaysia shall be intensified to complement smart city initiatives

Rationale

Digital economy plays a pivotal role to unlock the potential of the overall economy in becoming a high-income nation. By leveraging the advancement of digital technologies, Malaysia can increase its productivity and spur further economic growth. However, Malaysia is still classified as an 'adopter' in regards to digital adoption. This standing reflects notable lags in accessibility and usage of digital services by consumers, businesses and the government in Malaysia.

Description

The main direction of this policy is to ensure growth in the digital economy. This includes development of digital economy enabler such as essential digital infrastructure. In addition, incentive should be focussed on enhancing digital adoption and allowing for various parties to engage in innovation.

13 **Community empowerment shall be enhanced in smart city planning and governance**

Rationale

Empowered community will be able to develop long-term capacity to solve and manage challenging social issues, often overcoming long-standing differences and misunderstandings. Public authorities will also likely to make better implementable decisions that reflect public interests and values, and are easily understood by the public

Description

Enhancing the process of enabling communities to increase control over their lives and reduce dependency on relevant authorities. Especially in decision making which will include all aspects of daily lives such as healthcare and healthy lifestyle, infrastructure and facilities needed, as well as security and safety.

14 **Public private partnerships (PPPs) shall be emphasised in smart city initiatives**

Rationale

PPPs have saved the government an estimated RM220 billion from year 1983 to 2016 according to Public Private Partnership Unit (UKAS). In line with government's priorities under the 11MP Mid Term Review, PPPs are seen as enhancing government procurement management.

Description

PPPs should be practised more regularly in the context of smart city initiatives. PPPs help the public sector to fulfil commercial objectives. However PPPs do not occur often, as private vendors prefer commercial arrangement. A strong stated preference for PPPs by different levels of government and active engagement with the private sector is needed to ensure more and mutually beneficial PPPs in smart city initiatives.

15 **Local government capabilities and resource base shall be enhanced**

Rationale

Local governments are facing budget constraints with an aggregated budget deficit of RM650 million in 2017 according to figures obtained from the Ministry of Finance (MOF). Local governments also face difficulty in hiring qualified professionals in their workforce based on interviews done by the World Bank.

Description

Enhanced capabilities such as modern geospatial information systems, more advanced IT architecture and more skilled workforce will better prepare local governments to roll out smart city initiatives. Additionally, more budget allocation will likely promote a wide variety of smart city initiatives to be pursued by local governments. State, federal and local governments must work together to strengthen the capabilities and resource base of local governments.

16 **Healthy lives and well-being at all ages shall be promoted**

Rationale

The overarching goal of smart city is to create societal conditions of equal terms with healthy life and wellbeing for the entire population.

Description

This policy aims to ensure universal healthcare coverage for people from all ages. This include the ability to obtain quality healthcare protection from all healthcare service agencies.
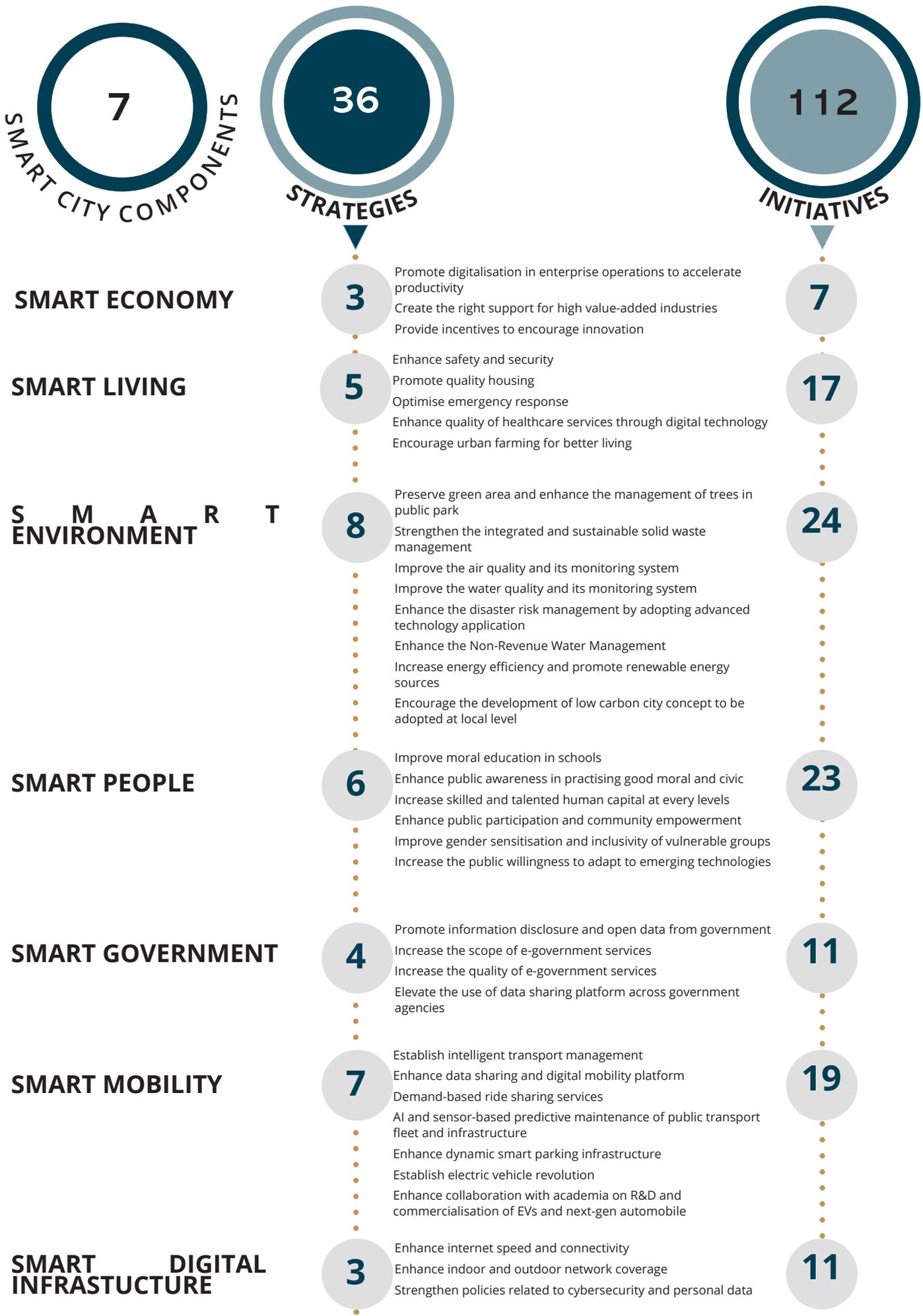
Policy and Development Agenda Matrix

Policy \ Agenda	NUA	SDG	11MP	NPP3	NUP2
1. Primary infrastructure shall be upgraded to incorporate smart IoT elements towards addressing core urban challenges	Element 2 Element 7	Goal 6 Goal 7 Goal 8	Thrust 7	Thrust 1	Principle 3
2. Shared digital infrastructure and internet connectivity shall be enhanced for all cities in Malaysia	Element 2 Element 7	Goal 9	Thrust 7	Thrust 1	Principle 3
3. Quality of human capital shall be enhanced to meet future demands of industry and evolving environment in a smart city	Element 10	Goal 4	Thrust 5		
4. Open data and open government practices shall be promoted	Element 3 Element 4	Goal 16	Thrust 9		Principle 1 Principle 3
5. Cybersecurity shall be strengthened in smart city context	Element 4	Goal 9 Goal 16	Thrust 9		Principle 1 Principle 3
6. Accreditation of smart city standards shall be introduced to set a standard for smart city qualification and recognition	Element 3				Principle 1
7. Social inclusion, especially gender equality shall be given emphasis in smart city development	Element 11 Element 13	Goal 5 Goal 10	Thrust 3	Thrust 3	Principle 4
8. Sustainable and smart environment practices shall be encouraged in all development of smart city	Element 2 Element 12	Goal 6 Goal 7 Goal 11 Goal 13	Thrust 6	Thrust 2	Principle 2 Principle 5
9. Public transport system shall be physically and digitally integrated with seamless accessibility	Element 5 Element 7	Goal 9	Thrust 7	Thrust 1 Thrust 2	Principle 3
10. E-Government shall be strengthened in the development of smart city	Element 3 Element 4	Goal 16	Thrust 9		Principle 1
11. Safety and security shall be improved to enhance quality of life	Element 4 Element 7	Goal 16	Thrust 7 Thrust 9		Principle 4
12. Development of digital economy in Malaysia shall be intensified to complement smart city initiatives	Element 6	Goal 8	Thrust 8		Principle 3
13. Community empowerment shall be enhanced in smart city planning and governance	Element 11	Goal 16	Thrust 3	Thrust 3	Principle 4
14. Public private partnerships (PPPs) shall be emphasised in smart city initiatives		Goal 17			Principle 1
15. Local government capabilities and resource base shall be enhanced	Element 15		Thrust 9		Principle 1
16. Healthy lives and wellbeing at all ages shall be promoted	Element 7	Goal 3	Thrust 4		

MySMART CITY STRATEGIES

05

7

SMART CITY COMPONENTS

36

STRATEGIES

112

INITIATIVES

SMART ECONOMY

3

- Promote digitalisation in enterprise operations to accelerate productivity
- Create the right support for high value-added industries
- Provide incentives to encourage innovation

7

SMART LIVING

5

- Enhance safety and security
- Promote quality housing
- Optimise emergency response
- Enhance quality of healthcare services through digital technology
- Encourage urban farming for better living

17

SMART ENVIRONMENT

8

- Preserve green area and enhance the management of trees in public park
- Strengthen the integrated and sustainable solid waste management
- Improve the air quality and its monitoring system
- Improve the water quality and its monitoring system
- Enhance the disaster risk management by adopting advanced technology application
- Enhance the Non-Revenue Water Management
- Increase energy efficiency and promote renewable energy sources
- Encourage the development of low carbon city concept to be adopted at local level

24

SMART PEOPLE

6

- Improve moral education in schools
- Enhance public awareness in practising good moral and civic
- Increase skilled and talented human capital at every levels
- Enhance public participation and community empowerment
- Improve gender sensitisation and inclusivity of vulnerable groups
- Increase the public willingness to adapt to emerging technologies

23

SMART GOVERNMENT

4

- Promote information disclosure and open data from government
- Increase the scope of e-government services
- Increase the quality of e-government services
- Elevate the use of data sharing platform across government agencies

11

SMART MOBILITY

7

- Establish intelligent transport management
- Enhance data sharing and digital mobility platform
- Demand-based ride sharing services
- AI and sensor-based predictive maintenance of public transport fleet and infrastructure
- Enhance dynamic smart parking infrastructure
- Establish electric vehicle revolution
- Enhance collaboration with academia on R&D and commercialisation of EVs and next-gen automobile

19

SMART DIGITAL INFRASTUCTURE

3

- Enhance internet speed and connectivity
- Enhance indoor and outdoor network coverage
- Strengthen policies related to cybersecurity and personal data

11

Smart Economy

Policies	Policy 3:	Policy 12:
	Quality of human capital shall be enhanced to meet future demands of industry and overall environment in smart city	Development of digital economy in Malaysia shall be intensified to complement smart city initiatives

Smart Economy

Strategies	Initiatives		Indicator
Strategy 1 : Promote digitalisation in enterprise operations to accelerate productivity		1. Intensify technology application and digitalisation in core business functions 2. Enhance the usage of e-payment	1. Percentage of establishments with internet that apply it for specified purposes by sector 2. Number of employment in ICT sector 3. Gross expenditure on Research and Development (GERD) to GDP 4. Number of companies benefitted from collaboration through intermediaries
Strategy 2 : Create the right support for high value-added industries	1. Attract investment in high value-added industries 2. Create workforce to match jobs in high value-added industries		
Strategy 3 : Provide incentives to encourage innovation		1. Provide technology labs and collaborative platforms 2. Establish incubators and accelerators 3. Leverage on existing government assistance and funding	

Smart Economy

Strategy 1: Promote digitalisation in enterprise operations to accelerate productivity

Digitalisation is the process of converting information, material or processes into a digital form. This transformation is foreseen to benefit businesses, consumers and even government to ease the process and reduce the cost of operations. Some studies also suggest that digitalisation may positively affect productivity and output of all sectors. For enterprises in general, the adoption of digital applications in the operations may elevate outreach to the global market, increase in production capacity, reduction in labour and overhead costs and consequently improvement in the overall quality.

Emerging digital technologies that have been identified include AI, virtual reality, IoT, blockchain and robotics. Utilisation of digital technology seems largely restricted to large and sophisticated establishments, particularly in the manufacturing sector. The use of digital technology for business functions such as banking and customer services is still low. In this regard, adoption of digital applications in actual enterprise operations in Malaysia has been identified in a number of national strategic plans and policies. Primarily, digital applications can be adopted at large via following initiatives:

Proposed Initiatives:

01

Intensify technology application and digitalisation in core business functions

Digital technology can be applied in core business functions such banking, internal communication, customer service, sales and marketing. Primarily, the manufacturing sector has leveraged on ICT and automation in the third industrial revolution. However, technology application in the service sector is still limited. In recent years, national policy documents have spelt out technology to be adopted in certain industries. For instance, the 11MP includes the adoption of industrialised building system (IBS) and building information modelling in the construction sector, as well as precision-farming technology in the agriculture sector.

Lead Agency:
- Malaysia Economic Association

Supporting Agencies:
- Construction Industry Development Board
- Malaysia Productivity Corporation
- Sectoral associations
- Sectoral players

02

Enhance the usage of e-payment

In future, financial transactions are expected to be performed digitally. Instead of physical money, transactions will involve transfer of digital information that can be performed promptly, through cashless transactions. The use of debit and credit cards are widely used in Malaysia. Therefore, it is a good opportunity to enhance the usage of other types of e-payment. This can be a major step for the communities to adapt to the advances in technology. Cashless initiatives are also in line with the Financial Sector Blueprint launched by Bank Negara Malaysia (BNM). Some of the successful e-payment platforms are Alipay, BigPay, GrabPay, Mpay, Touch n Go, and FavePay.

Lead Agency:
- Bank Negara Malaysia

International Exemplification
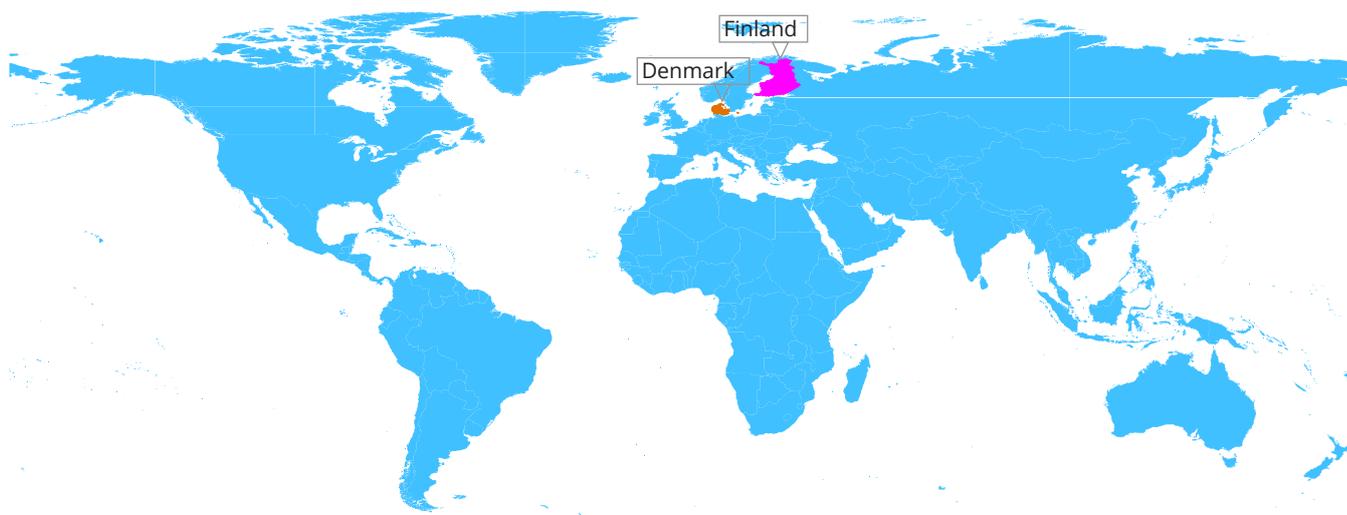
Denmark:
- Danish businesses record 15% of their turnover from online sales.
- 25% of SMEs carries out business via online.
- Danish businesses adopt e-business technologies - 59% adopt e-invoices and 27% adopt cloud services.

Finland:
- Finland ranked as the second best in the world in using ICT to boost competitiveness and well-being (*Source: WEF, Global Information Technology Report, 2016*).
- Finland is known as a leader in mobile game development. Angry Birds and Clash of Titans are examples of popular game titles originated from Finland.
- Its expertise in IoT provides the brains behind efficient energy production and management. Finnish companies have come out with technologies to monitor, automate and optimise energy streams, from production all the way to the end-users.

LOCAL REFERENCE

Eleventh Malaysia Plan Mid-Term Review
- Promote digitalisation of business operations and greater adoption of technologies to leverage the benefits of Industry 4.0
- Implement productivity initiatives at sector level with the establishment of nine Productivity Nexus
- Encourage digitalisation and innovation to boost growth
- **Pillar VI:** Strengthening Economic Growth
    - ◊ Enhancing Sectoral Growth through Productivity Improvements
    - ◊ Facilitating Ease of Doing Business
    - ◊ Harnessing the Fourth Industrial Revolution
    - ◊ Increasing Technology Adoption

National Industry 4.0 Policy Framework
- **Strategy I2:** Enhance the digitalisation and integration of government processes and infrastructure along the supply and manufacturing value chains
- **Strategy R1:** Increase awareness of the need, benefits and opportunities of Industry 4.0 technologies and business processes among manufacturing firms

Construction Industry Transformation Programme (CITP)
- **Initiative P3:** Accelerate adoption of IBS, mechanisation and modern practices
- **Initiative P4:** Roll out technology advantage across project life-cycle

Strategy 2:   **Create the right support for high value-added industries**

Malaysia has to ensure that its economy is conducive in supporting industries with high value-add to remain as an attractive and competitive business destination. From 1998 to 2008, more than 20% of job titles under ICT operations and user-support technicians has been created in Malaysia, indicating the emergence of new occupations fuelled by the production and use of digital technologies. Nevertheless, technology disruptors such as robotics and analytics are shifting the traditional services towards value-adding and non-traditional service areas. Correspondingly, the national focus moving forward has been brought to opportunities in Industry 4.0.

Apart from direct investments, the presence of businesses from high value-added industries are likely to generate employment with high value-add, which is favourable to our economy. Specific actions to ensure Malaysia is conducive and attractive for high value-added sectors shall be devised to reap its benefits in the near future.

Proposed Initiatives:

01

Attract investment in high value-added industries

Malaysia needs to attract investment monies to industries with high value-add. Other advanced economies have identified the next-wave industries and their investment promotion activities have been remodeled to target those industries. Investment Promotion Agencies (IPAs) in Malaysia shall act as the main agent to connect targeted investors to high value-added industries and to describe desired business outcomes to investors and the targeted industries.

Lead Agency:
• Malaysian Investment Development Authority

Supporting Agency:
• Other IPAs

02

Create workforce to match jobs in high value-added industries

Human capital with adequate skills and knowledge to fill jobs in high value-added industries needs to be available for the development of the industries and the national economy. Adequate education and training helps ensure a competent workforce for these industries. The share of proficiency in mathematics and science at all education levels should be increased. Computer science and critical thinking modules should also be more widespread as high value-added industries are likely to require a workforce that is creative and innovative.

Lead Agencies:
• Ministry of Human Resources
• Ministry of Education

Supporting Agencies:
• Malaysia Economic Association
• IPAs
• Sectoral participants

International Exemplification
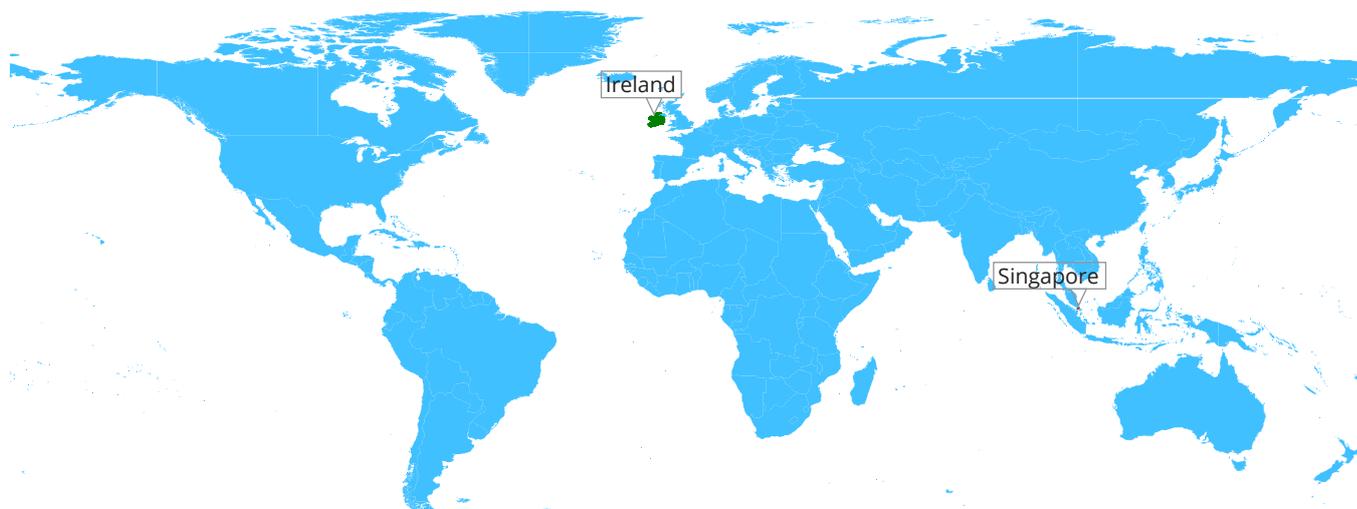
Ireland:
- IDA Ireland has shifted its focus away from promoting the conventional shared services centres (SSC) to a more complex business model of global business services (GBS).
- IDA has been supporting Irish-based service centres in the transition to GBS and managing digital disruption around three core components of GBS: services, technology and people.

Singapore:
- Singapore's industrial policy is already reflecting increased investment in high value-added industries; chemicals and electronics manufacturing, as well as headquaters (HQ) and professional services.
- Its government also continues to promote biomedical manufacturing as another key growth sector.

LOCAL REFERENCE

Eleventh Malaysia Plan Midterm Review
- Pillar IV: Empowering Human Capital
   ◊ Raising quality of education
   ◊ Prioritising quality over quantity of Technical and Vocational Education and Training (TVET)
   ◊ Developing industry-relevant skills
- Pillar VI: Strengthening Economic Growth
   ◊ Enhancing capacity building

National Industry 4.0 Policy Framework
- **Strategy R1:** Increase awareness of the need, benefits and opportunities of Industry 4.0 technologies and business processes among manufacturing firms
- **Strategy S1:** Enhance the capabilities of the existing workforce through national development programmes specially designed for specific manufacturing sectors and support re-skilling and re-deployment
- **Strategy S2:** Ensure the availability of future talent by equipping students with the necessary skill sets to work in the Industry 4.0 environment

Strategy 3:	Provide incentives to encourage innovation

Malaysia has expended a large amount of effort and resources to become a knowledge-based economy. Firms are encouraged to accelerate innovation and adopt technology to boost their productivity and therefore remain competitive in the wider market. The e-commerce concept for example, is a manifestation of how technological advancements have expanded market outreach for businesses. Nevertheless, the most effective innovation is unique for each enterprise and often research and development (R&D) is required. Offering incentives to embark on the innovation culture may entice firms to eventually adopt technology in their operation. The following initiatives seek to encourage innovation.

Proposed Initiatives:

01
Provide technology labs and collaborative platforms

Strengthen and build technology labs and collaborative platforms to help entrepreneurs speed up product and solution development processes up to commercialisation and global market penetration. This constitutes inter-collaboration between the government, academia, industry and the people. Existing initiatives such as PlaTCOM Ventures aims to facilitate any phase in the entire development process of products, from idea generation to products and service completion. Apart from that, Malaysian Academia Industry Network (MyAIN) also facilitates university-industry interactions to increase knowledge exchange in various areas.

Lead Agency:
• Ministry of Energy, Science, Technology, Environment and Climate Change

Supporting Agencies:
• Ministry of Communications and Multimedia
• Malaysia Digital Economy Corporation Sdn Bhd
• Malaysian Global Innovation and Creativity Centre
• SME Corp

02
Establish incubators and accelerators

Incubators and accelerators may be organised to support innovation in two ways. Firstly, incubators and accelerators can work closely with the cities tailoring products for local needs and market. Alternatively, incubators and accelerators can be set up to assist startups from various industries. These incubators and accelerators will help startups transition from new ideas into viable businesses that bring high-impact solutions and products to the cities and their communities. Incubators are geared for startups in their infancy stage, while accelerators are suitable for startups that are at a more mature stage of development.

Lead Agencies:
• Ministry of Energy, Science, Technology, Environment and Climate Change

Supporting Agencies:
• Malaysian Global Innovation and Creativity Centre

03
Leverage on existing government assistance and funding

Utilise existing government assistance and funding provided by various agencies to assist enterprises in undertaking R&D and implementing innovation in their operations.

Lead Agencies:
• Ministry of Finance
• Malaysian Economic Association

Supporting Agencies:
• Ministry of Energy, Science, Technology, Environment and Climate Change
• Agensi Inovasi Malaysia
• SMECorp

International Exemplification
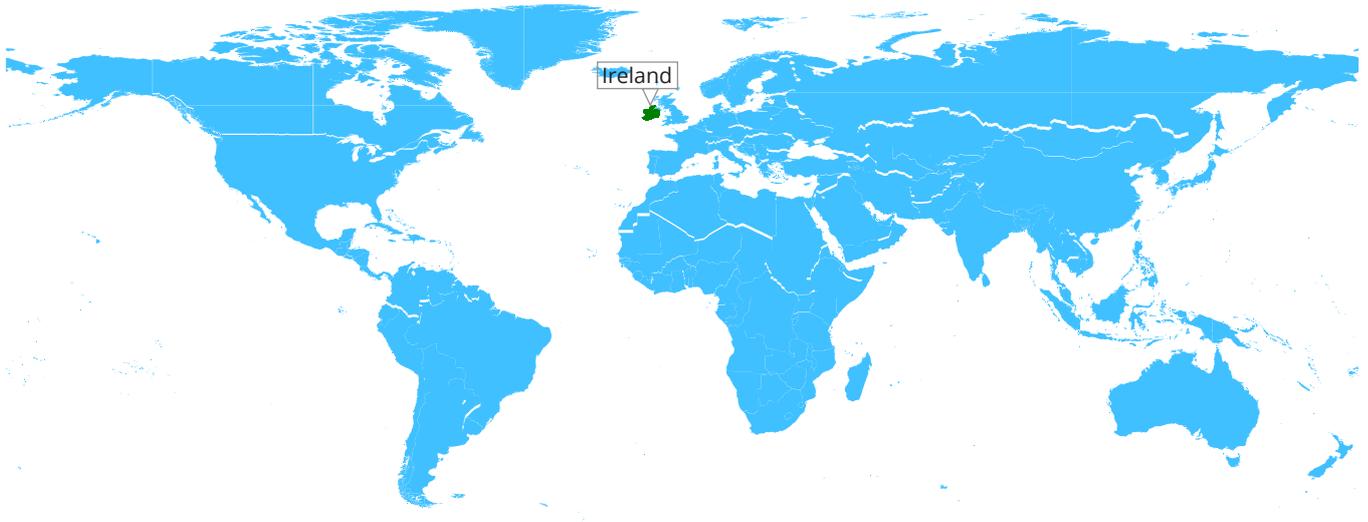
Ireland:
- Enterprise Ireland, Science Foundation Ireland, IDA Ireland, InterTrade Ireland drive the innovation and R&D policy agenda.

LOCAL REFERENCE

Eleventh Malaysia Plan Midterm Review
- Pillar VI: Strengthening Economic Growth
    - ◊ Increasing technology adoption
    - ◊ Aligning research and innovation

National Industry 4.0 Policy Framework
- Strategy F1: Provide outcome-based incentives, including tax incentives to encourage investments in, and adoption of, Industry 4.0 technologies and processes
- Strategy T1: Establish digital/technology labs and collaborative platforms, especially PPPs, to create awareness and understanding, foster the adoption of new technologies and facilitate the transfer of knowledge

National Science, Technology and Innovation Policy (NSTIP)
- Policy to provides strategic guidelines for National Science, Technology and Innovation (STI) policy and investment for Malaysia's transition to an innovation economy by 2020

Smart Living

Policies	Policy 11: Safety and security shall be improved to enhance quality of life	Policy 13: Community empowerment shall be enhanced in smart city planning and governance	Policy 16: Healthy lives and wellbeing at all ages shall be promoted

Smart Living

Strategies	Initiatives			Indicator
Strategy 1: Enhance safety and security	1. Enhancing real-time crime mapping 2. Implementing predictive policing 3. Installation of analytical proactive surveillance 4. Strengthening the implementation of Crime Prevention Through Environmental Design (CPTED) 5. Personal alert applications			1. Ratio of crime rate 2. Safe cities index (global) 3. Percentage of clinic/hospital using ICT and integration through e-health 4. Increase in the number of bed per population 5. Reduce the gap in doctors to population ratio 6. Increase of doctor per population per year 7. Number of smart home implementation per year 8. Happiness index per community 9. Number of urban farming activity by community
Strategy 2: Promote quality housing		1. Promoting smart home development 2. Enhancing quality of life at public housing		
Strategy 3: Optimise emergency response	1. Optimising emergency response system 2. Optimising field operations 3. Real-time mobile rescue application			
Strategy 4: Enhance quality of healthcare services through digital technology			1. Enhancing patient monitoring system 2. Enhancing readiness of electronic health data records 3. Enhancing healthcare facilities as first response centre 4. Promoting healthy lifestyle	
Strategy 5: Encourage urban farming for better living		1. Innovation of new approach in urban/ community farming 2. Smart farming 3. Encouraging community engagement in urban community farming		

Smart Living

Strategy 1: **Enhance safety and security**

Safety and security challenges are the most pressing issues of contemporary society. The main concerns of these issues are reducing crime rates, providing peaceful and safe environment, reducing vandalism cases and providing better security. Addressing crime as a whole will have the impact of increasing a sense of security in addition to enabling Malaysia to remain in the ranks of safe countries as well as enhancing quality of life of the community.

Generally, the application of IoT adopts effective technologies to help police officers in solving urban security problems and strengthening public safety, city surveillance and crime prevention. The application of IoT technology enables the police to detect crimes in real-time by using comprehensive software, smart phone applications and other smart technologies.

> **CPTED is effective in reducing the crime rate as follows:**
> **Reduction of crime on petty traders by as much as 50% for petty thefts and 65% for robberies**

Proposed Initiatives:

01
Enhancing real-time crime mapping

Utilisation of statistical analysis to highlight high crime areas using retrospective data (often to support hot-spot policing strategies) and anticipating crime before it happens to head off incidents in advance.

Accident detection service - Real-time collection and management of information related to unusual traffic incidents (including traffic accidents, vehicle breakdowns and roadwork) and systematically responds to and handles those incidents.

Lead Agency:
• Royal Malaysia Police

Supporting Agency:
• Telecommunication service providers

02
Implementing predictive policing

Intelligence operation centre/ command and control centre
Integrated data from the surveillance site to the local police station and from the local police station to the central police office.

Predictive crime mapping –
The software using crime type, crime location, date and time and then based on past crime data, it generates a hotspot map identifying areas where crime is most likely to happen.

Cloud computing and big data technologies
• To perform cloud-based data storage and in depth data mining exploiting full benefits of data.
• To store vehicle photos and vehicle data records.

Lead Agency:
• Royal Malaysia Police

Supporting Agency:
• Telecommunication service providers

03
Installation of analytical proactive surveillance

Analytical CCTV - Facial recognition system, flood sensor, detect illegal parking, illegal dumping activities and vandalism activities.

Digital video manager (DVM) - To easily secure large-scale security operations with features that improve operator efficiency and situational awareness for faster incident identification and resolution, accuracy and reliable security operations.

Installation of smart pole - This is a structure/platform built on the street that can perform various functions, including placing emergency calls, making announcements, lighting the street and generating solar energy.

Lead Agency:
• Local authorities

Supporting Agency:
• Telecommunication service providers

04

Strengthening the implementation of Crime Prevention Through Environmental Design (CPTED)

- **Installation of intelligent closed-circuit television (CCTV) -** an intelligent system which recognises a moving person or automate.
- **Enhancing pedestrian safety support services –** Enhancing safety of pedestrians by providing voice messages and musical system to enhance walking experience while waiting.
- **Installation of smart traffic light for pedestrian crosswalk -** This service employs vocalised guidance devices to discourage pedestrians from jaywalking and provides information about changes in traffic signals in front of the crosswalk in drivers' field of vision to encourage them to pay attention and slow down.
- **Installation of audio-based surveilance detector -** Installation of crime sound and scream detector that can help detect crime in public area.
- **Installation of smart bollard –** Smart bollard with analytical CCTV to capture crime cases.

Lead Agency:
- Local authorities

Supporting Agencies:
- Royal Malaysia Police
- Ministry of Federal Territories
- Public Works Department
- Service providers
- Developers
- Non-Governmental Organisations

05

Personal alert applications

Applications can help cities fight crime and improve other aspects of public safety:

- **Crime early-warning mobile application -** Tracks crime and emergencies nearby.
- **Police officers with body-worn cameras -** A video recording system typically utilised by law enforcement to record their interactions with the public or gather video evidence at crime scenes
- **Smart glasses** by police officers to identify potential suspect.
- **Panic button -** An electronic device designed to assist in alerting somebody in emergency situations where a threat to persons or property exists which is linked directly to police command centre.

Lead Agency:
- Royal Malaysia Police

Supporting Agencies:
- Service providers
- Private security corporation

Strategy 2:	**Promote quality housing**

Good quality housing can improve the social wellbeing and quality of life. It can bring public health benefits, increase property values and reduce crime. Residential developments designed according to secure design standards showed lower reported crime rates and less fear of crime than those without.

Neighbourhood crime, social issues and pollution are the most highlighted issues for many households in public housing. As the rate of crime involving robbery, murder and fires is increasing, smart solutions such as surveillance system can be used to keep up with the increasing crime rate. The adoption of smart home is one of the future perspectives to solve the housing privacy problem and improve the living conditions of local residents. The strategy to enhance the quality of public housing is mainly focussed on providing affordable quality housing, management, maintenance, public facilities and other housing related services in smart and proactive ways.

Proposed Initiatives:

01

Promoting smart home development

New building
- Strengthen the regulations on the requirement for renewable energy initiatives on new development during the planning approval process
- Introduce a dynamic electricity pricing and remote energy metering service
- Enforce the building energy automation systems for energy consumption tracking

Existing building
- Enforce the use of solar panel and rainwater harvesting on existing government buildings through retrofitting
- Encourage existing commercial buildings to embed the renewable energy initiatives such as installing a solar panel and rainwater harvesting system
- Encourage building energy automation systems for energy consumption tracking

Adoption of smart home applications
- **Smart mailbox -** a mailbox that informs users when mail has been delivered and opens for retrieval at the approach of user holding a smart device
- **Facial recognition system –** a system that recognises the resident's face and opens the door without requiring any additional movement
- **IoT lighting –** the colour of the lighting can be variously adjusted according to one's mood, while IoT devices can be linked and communicate with each other
- **Smart refrigerator –** the food alert makes it always possible to check on the food in the refrigerator and its expiration date
- **Home care –** this connects with various sensors to improve home functions through condensation prevention, indoor temperature management, and human-activated lighting
- **User motion-activated device control –** with this system, hand gestures can be used to turn on the lights and to operate fans
- **IoT technology-based health management –** data collected from your smart band and smart scale are collected for storage and health management
- **Smart mirror –** check the day's weather and news in real time
- **Sleep sensor –** monitoring and management of sleeping habits
- **Voice recognition –** control home appliances with your voice
- **Smart vanity –** a system for checking your skin status with a skin diagnostic apparatus and to virtually apply makeup
- **Virtual clothes fitting system with augmented reality (AR) technology –** after a sensor scans your body type, you can virtually try on clothes that have been registered with the system
- **Wall pad –** check the traffic situation, bus information and weather information before leaving the house and set the mode to away to control electricity, gas and lighting in the house all at once

Lead Agency:	**Supporting Agencies:**
• Local authorities	• Developers
	• National Housing Department

02

Enhancing quality
of life at public
housing

- **Smart lighting** - Installation at housing and public areas.
- **Installation of analytical CCTV -** With facial recognition system, flood sensor, and able to detect illegal parking, illegal dumping activities and vandalism cases.
- **Mobile application -** To channel public complaints to the local authority.
- **Monitoring facilities and enhancing maintenance works -** Especially at housing areas and public spaces.
- **Strengthening the role of Resident Association-** To enhance security and community management.
- **Safe neighbourhood improvement area plan -** Upgrading and maintaining public parks and facilities.
- **Household crime and fire prevention service -** Security devices, fire detectors and short circuit sensors are installed in various households and small buildings so that the authorities can verify unusual circumstance remotely and send a response team, family members can also check the building online or on their mobile phones.
- **Public housing management information system -** This system handles the disclosure of apartment maintenance fees, number of vacant unit, repairs and maintenance history, external financial audits, electronic bidding, system management and integrated units information.

Lead **Agency:**
- State governments

Supporting **Agencies:**
- Local authorities
- Royal Malaysia Police
- Ministry of Housing and Local Government
- National Housing Department
- Non-Governmental Organisation
- Non-Governmental Organisation
- Residents Association

| **Strategy 3:** | **Optimise emergency response** |

Emergencies are incidents that threaten public safety, health and welfare. If severe or prolonged, they can exceed the capacity of first responders, local fire fighters or law enforcement officials. Responding effectively to matters of life, death, and trauma is the most fundamental function of city government and anxiety about crime can be the foremost issue affecting the quality of life in many of the world's cities.

The delivery of public services to citizens is becoming a challenging task, as urban populations increase and the related networks are becoming more complex and entangled. It deals with life-threatening situations, demands efficiency and effectiveness of operations including optimising the emergency response time and utilising resources and personnel as best appropriate for each incident.

> By optimising emergency call dispatching and synchronising traffic lights for emergency vehicles, cities can cut emergency response times by **20–35**%.

Proposed Initiatives:

01

Optimising emergency response system

02

Optimising field operations

03

Real-time mobile rescue application

- **Emergency call centre -** Enhancing the efficiency of emergency call centre and enabling quicker processing through more accurate triage and digital call routing.

Lead Agency:
- Local authorities

Supporting Agencies:
- Royal Malaysia Police
- Ministry of Health
- Fire and Rescue Department
- Malaysia Civil Defence Force
- Malaysian Maritime Enforcement Agency
- Telekom Malaysia

Speedy dispatch of emergency vehicles
- **Planning coordination generated by the system -** In order for the ambulance to reach its destination in the shortest possible time, a police car is dispatched in an intermediate location.

Lead Agency:
- Malaysia Control Centre

Supporting Agencies:
- Royal Malaysia Police
- Ministry of Health
- Fire and Rescue Department
- Malaysia Civil Defence Force
- Malaysian Maritime Enforcement Agency
- Telekom Malaysia

- **Emergency medical assistance service** - Through this service, individuals who are in disaster area or otherwise need help can alert the authorities to their situation using their mobile devices and the authorities can identify their location in real time and provide them with assistance.
- **Fire fighting assistance service -** This serves to ensure the safety of firefighters by providing them with the route to the fire, the building plans and enable prior viewing of the structure as well as tracking their location on the scene and determining whether they are moving in real time.

Lead Agency:
- Malaysia Control Centre

Supporting Agencies:
- Royal Malaysia Police
- Ministry of Health
- Fire and Rescue Department
- Malaysia Civil Defence Force
- Malaysian Maritime Enforcement Agency
- Telekom Malaysia

International Exemplification

South Korea

South Korea:
- Operates 21 types of smart safety solutions including transportation safety and crime/disaster prevention employed at cities, monitoring major spots of a city in real time through CCTV at integrated information centre, responding to car accidents and crime by cooperating with concerned agencies such as police and fire stations, and taking swift action on natural disaster.

LOCAL REFERENCE

National Physical Plan 3
- Preventing crime through safe city programme and CPTED
- Enhancing quality of living environment
- Improving emergency response system
- Providing safe urban environment
- Enhancing safe neighbourhood improvement area plan for crime-prone neighbourhood area to be more vibrant and safer
- Enhancing quality and creating open space area as a recreational area
- Enhancing urban safety and quality by using smart technology

Eleventh Malaysia Plan
- Ensuring access to quality and affordable housing
- Strengthening planning and implementation for better management of public housing
- Encouraging environment-friendly facilities for enhanced liveability
- Enhancing crime prevention by enforcement agencies, private players, and the public to elevate perception of feeling safe
- Tightening regulations and strengthening enforcement to stem crime
- Promoting crime awareness for effective prevention
- Improving road safety to reduce accidents
- Improving emergency services to save lives

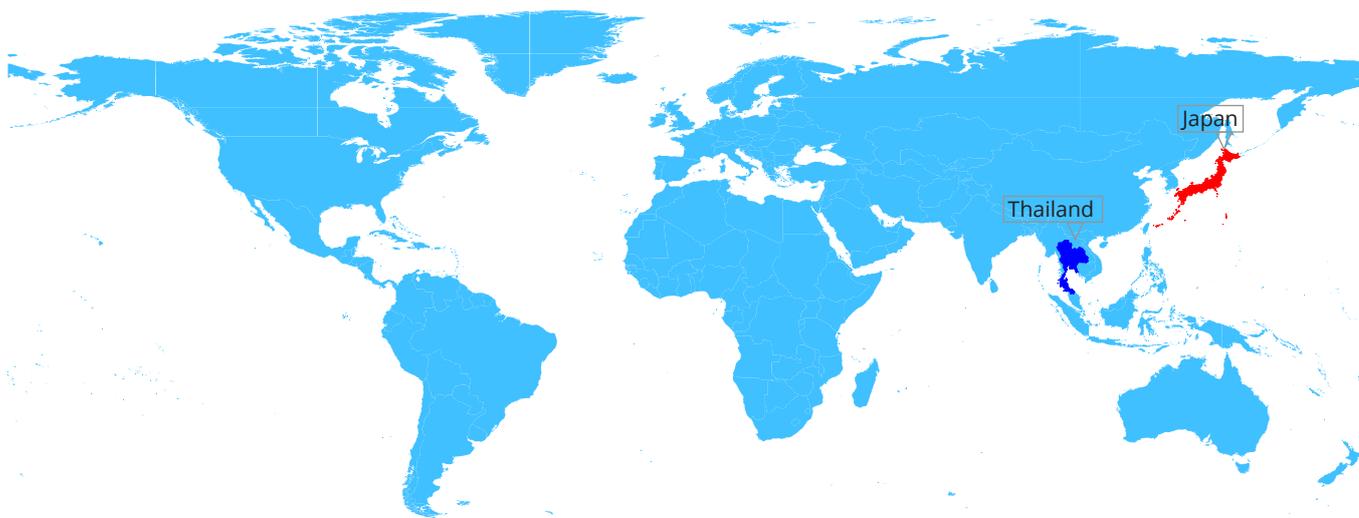| Strategy 4:	Enhance quality of healthcare services through digital technology

Technology can empower people to take charge of their own health, preventing disease rather than treating it after having the illness. Applications that help prevent, treat, and monitor conditions could make the biggest difference in developed world. Remote patient monitoring systems that use smart applications, which take a proactive and preventive approach to treatment, have the potential to reduce the health burden in high-income cities.

Primarily, technology can be adopted to improve access to quality healthcare services by upgrading healthcare infrastructure, enhancing the capacity of healthcare personnel, promoting healthy lifestyles and extending nationwide preventive care programmes.

Proposed Initiatives:

01

Enhancing patient monitoring system

02

Enhancing readiness of electronic health data records

03

Enhancing healthcare facilities as first response centre

04

Promoting healthy lifestyle

- **Integrated patient flow management systems** - Hospital queue management system manages patient flow across all departments from reception, through multiple treatment stages, until the patient is released.
- **E-health -** Clinical consultations by video conference decreases the barriers to seeking treatment. It can be lifesaving in low-income cities with doctor shortages. New ways to engage with patients is via mobile applications.

Lead Agency:
- Ministry of Health

Supporting Agency:
- MIMOS Berhad

- **Establishment of Malaysia Health Data Warehouse (MyHDW)** - To help policy makers and healthcare providers in policy planning. A central database that will consist of health-related information from both public and private hospitals in Malaysia.
- **Establishment of lifetime health record (LHR) -** System that develops a longitudinal health record of every individual and implements a proactive health plan thus enabling continuity in care.

Lead Agency:
- Ministry of Health

Supporting Agency:
- MIMOS Berhad

- **To preserve workforce capacity, reduce the workload and enhance healthcare service.**
- Upgrade existing primary care at neighbourhood area.

Lead Agency:
- Ministry of Health

Supporting Agency:
- Local authorities

- Health promotion enables people to have better control of their own health. It covers a wide range of social and environmental interventions that are designed to benefit and protect individual health and quality of life by addressing and preventing the root causes of ill health, not just focussing on treatment and cure.
- **Implementing community empowerment programme (wellness)** - To improve health and healthy behaviours within the communities.
- **Enhancing policies and interventions** - To address health services interventions.

Lead Agency:
- Ministry of Health

Supporting Agency:
- Local authorities

International Exemplification

Thailand:

- Thailand healthcare system is advanced and affordable, and these are the two most important criteria for Thailand as a medical hub. Investments in medical tourism are concentrated in top tourist areas – Bangkok, Chiang Mai, Phuket, Surat Thani, Pattaya and Hua Hin.
- The most popular treatments among foreign patients in Thailand for medical equipment and supplies for 2010-2015 include general check-ups, dental care, hip replacement, laser eye surgery, kidney transplants and heart surgeries. Expatriates, executives of international corporations and embassy staff are frequent healthcare service customers. The cost of surgery services in Thailand compared to the US can be up to 90% less.

Japan:

- Hospital authority set up a big data analytics platform to facilitate healthcare related research in 2019, and start adopting a smart hospital approach, including the use of automatic system interface with vital sign devices or hospital navigation applications for piloting in new hospital projects by 2020
- Commission the stage two Electronic Health Record Sharing System in phases by 2022, which will support a broader scope of data sharing, consider the development of a patient portal and sharing restriction features to facilitate patients' active management of their health, and enhance core functionalities and security/privacy protection

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LOCAL REFERENCE

National Physical Plan 3
- Improving health facilities
- Providing adequate, fully equipped and user-friendly public amenities with continuous management and maintenance
- Improving emergency system

Eleventh Malaysia Plan
- Improving access to quality healthcare services
- Enhancing targeted support, particularly for underserved communities
- Improving system delivery for better health outcomes
- Expanding capacity to increase accessibility
- Intensifying collaboration with the private sector and NGOs to increase health awareness

Strategy 5:	Encourage urban farming for better living

Urban farming is an informal set of activities focussing on farm production in the urban environment. It generally differs from high technological application in sophisticated farming ventures. Urban farming is rather a potential socio-economic survival and livelihood enhancing strategy for those operating at the economic margin. The urban farming activity encourages residents in urban area to produce food and is seen as a practical approach in reducing daily spending due to the rising cost of living in the city.

To reach the strategic objective of innovation-driven national development, it is fundamentally important to further promote agricultural scientific and technological innovation and to guide modern agricultural development towards efficient production, product safety, resource economy, and environment–friendly improvement.

The expected outcome of urban/ community farming:
- Kitchen expense of project participants is expected to be reduced
- Open spaces around the house would be optimally utilised
- The landscape of houses / residence areas
- Interest in farming could be cultivated and turn into a beneficial hobby
- Food safety could be guaranteed in terms of being pesticide-free and sufficient food supply for urbanites

Proposed Initiatives:

01

Innovation of new approach in urban/ community farming

Farmers and producers implement a new practice to drive efficiency and improve operations through:

Raised-bed gardening, greenhouse, hydroponics, aeroponics, vertical farming, rooftop gardens/ rooftop farming, container gardening

Machine vision technology- tracking urban farming using overhead cameras.

Lead Agencies:
- Ministry of Agriculture and Agro-based Industry
- Department of Agriculture

Supporting Agency:
- Local authorities

02

Smart Farming

- Smart Farming involves the incorporation of information and communication technologies into machinery, equipment, and sensors for use in agricultural production systems.
- **Big Data applications -** to provide predictive insights in farming operations, drive real-time operational decisions, and redesign business processes for game-changing business models.
- **Smart sensors and data analytics smart farming monitoring solution -** including farming applications, farm management applications, information system applications, and extension service applications.
- **Upgrading community farming technology in neighbourhood area.**

Lead Agencies:
- Ministry of Agriculture and Agro-based Industry
- Department of Agriculture

Supporting Agency:
- Local authorities

03

Encouraging community engagement in urban/community farming

- **Provide more farmland -** The space to be focussed as urban farms are warehouses, houses, institutions, offices, government reserve lands with permission from the relevant parties, availability of and suitable lands.
- **Usage of allowable utilities reserve for urban farming.**

Lead Agency:
- Local authorities

Supporting Agencies:
- Tenaga Nasional Berhad
- Department of Agriculture

International Exemplification

China:
- China is a country with wide-scale deployment of smartphones and IoT systems. This led to rapid adoption of precision agriculture solutions. China's initiatives to promote precision farming techniques are expected to drive the growth of the market further.

LOCAL REFERENCE

National Physical Plan 3
- Modernisation of the agriculture sector

Eleventh Malaysia Plan
- Improving productivity and income of farmers and smallholders
- Promoting training and youth agropreneur development
- Strengthening institutional support and extension services
- Building capacity of agricultural cooperatives and associations along the supply chain
- Improving market access and logistics support
- Scaling up access to agricultural financing

Urban Farming Programme, Ministry of Agriculture and Agro-based Industry
- To encourage urban communities to grow and produce their own food to meet their daily needs and reduce the cost of living
- As an additional income for urban community through the sale of surplus produce
- Support the government's efforts to ensure food quality and food security
- Promote awareness and interest on the importance of agriculture as a direct contributor to the wellbeing of urban communities and their surroundings
- The project is carried out in urban and suburban areas in all states of Malaysia
- The area to be focussed as urban farms are those around houses, institutions, offices, government reserve lands with permission from the relevant parties, and the availability of and suitable lands
- The Department of Agriculture (DOA) will provide technical advice and incentives to encourage urbanites to plant their own food crops. Incentives are in the form of seeds / planting materials, inputs, agricultural and small tools
- The Department of Agriculture at the state-level would determine the proposed area of for urban farms and crops based on the area's suitability
- The implementation of this programme will involve collaboration with local authorities, government departments and agencies

Smart Environment

<table>
<tr><td rowspan="2">Policies</td><td>Policy 8:</td></tr>
<tr><td>Sustainable and smart environment practices shall be encouraged in all development of smart city</td></tr>
</table>

Smart Environment

Strategies	Initiatives	Indicator
Strategy 1 : Preserve green area and enhance the management of trees in public parks	1. Improve the tree inventory system for tree protection and management towards radio frequency identification (RFID) 2. Specify the tree choice based on durability, maintenance cost and crown dimensions 3. Increase the frequency of tree inventory	1. Percentage of relative tree canopy cover 2. Percentage of land cover and land use 3. Recycling rate per year 4. Percentage of waste diversion (recycle and recovery) 5. Total hazardous waste generated tonnes per year 6. Number of days recorded as 'Good' and 'Medium' measured by the API in the study area in a year 7. Reduction in the number of rivers in Class IV and Class V in a year 8. Number of initiatives for disaster risk management and implementation in a year 9. Number of deaths by disaster per 100,000 people 10. Number of missing persons by disaster per 100,000 people 11. Number of person affected by disaster per 100,000 people 12. Rate of national NRW reduction to reach 25% in 2025 13. Percentage of electricity production from renewable sources 14. Renewable energy share in the total final energy consumption 15. Efficiency of buildings: GDP per unit of energy use 16. Energy intensity measured in terms of primary energy and GDP
Strategy 2 : Strengthen the integrated and sustainable solid waste management	1. Strengthen the waste separation and reduction from source 2. Implement the smart waste management using IoTs 3. Introduce the waste to energy (WtE) technology	
Strategy 3 : Improve the air quality and its monitoring system	1. Reduce vehicle emissions by increasing public transportation usage and decreasing private vehicle use 2. Strengthen the air quality regulations 3. Improve and enhance the air monitoring system technology	
Strategy 4 : Improve the water quality and its monitoring system	1. Enhance better management of wastewater 2. Strengthen the water quality regulations 3. Enhance the water monitoring system technology 4. Promote a sustainable, well-coordinated development and management of water resources	
Strategy 5 : Enhance the disaster risk management by adopting advanced technology application	1. Adopt smart planning to support planning decision making and enhance disaster risk management 2. Enhance the management in landslide risk area 3. Develop a cloud-based flood prevention and monitoring system 4. Enhance engagement with the community for disaster risk awareness programmes	
Strategy 6 : Enhance the Non-Revenue Water Management	1. Introduce a systematic smart water management 2. Replace the water supply pipes with infrastructure equipped with sensor technology and applications 3. Monitor leakage by using scientific supply management	
Strategy 7 : Increase energy efficiency and promote renewable energy sources	1. Make government and commercial buildings comply with the building energy efficiency requirement 2. Implement the smart grid system to enhance energy efficiency and reliability 3. Build up the renewable energy capacity	
Strategy 8 : Encourage the development of low carbon city concept to be adopted at local level	1. Promote and enhance the low carbon city and societal initiatives at every level	

Smart Environment

Strategy 1: **Preserve green area and enhance the management of trees in public parks**

Loss of green spaces has been an urban challenge to any big city in the world including Malaysia. Among the main concern is the shrinking of tree cover that will eventually increase the urban heat island effect. Apart from that, it is also associated with the size of the green area in the city as it is getting smaller each year due to pressure from new developments. For some reasons, trees in the city centre have been removed due to safety, maintenance cost and other reasons. Green area and tree cover are significant:

1. To reduce carbon emissions and energy costs all year round
2. To provide natural stress relief, increase social interaction, encourage physical exercise and even help soothe mental illness
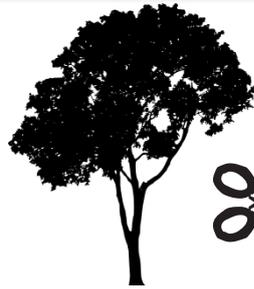
Each tree will absorb 1 tonne of CO_2 over its lifespan

22 kg of CO_2 `
per year

40%
17%
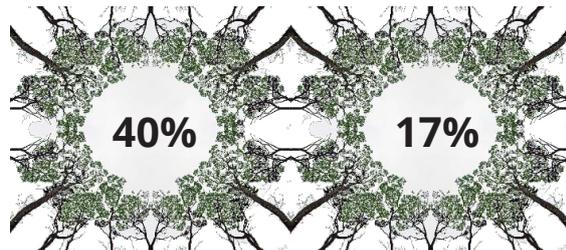
SINGAPORE   KUALA LUMPUR

Proposed Initiatives:

01
Improve the tree inventory system for tree protection and management towards RFID

- RFID as a prerequisite of IoT application to ease the local authority' operational activity in tree inventory programmes.
- RFID can improve the inventory by dealing with the labour intensive, physical counting of the thousands of plants in a nursery, tracking stages of plant growth, and tracking plant losses from mechanical damage, cultural problems and disease.

Lead Agency:
- Local authorities

Supporting Agency:
- State governments

02
Specify the tree choice based on durability, maintenance cost and crown dimensions

- The durability of the tree is an important aspect to convince stakeholders to invest in tree planting as it require lesser cost and lower maintenance.
- Crown dimension is essential in improving tropical tree biomass estimation to absorb carbon emission.
- Implement urban tree planting programmes at every level.

Lead Agency:
- Local authorities

Supporting Agencies:
- Ministry of Housing and Local Government National Landscape Department
- Local Government Department
- State governments
- PLANMalaysia

03
Increase the frequency of tree inventory

- Tree inventory system is crucial for maintenance purposes and is being practised by a few local authorities.
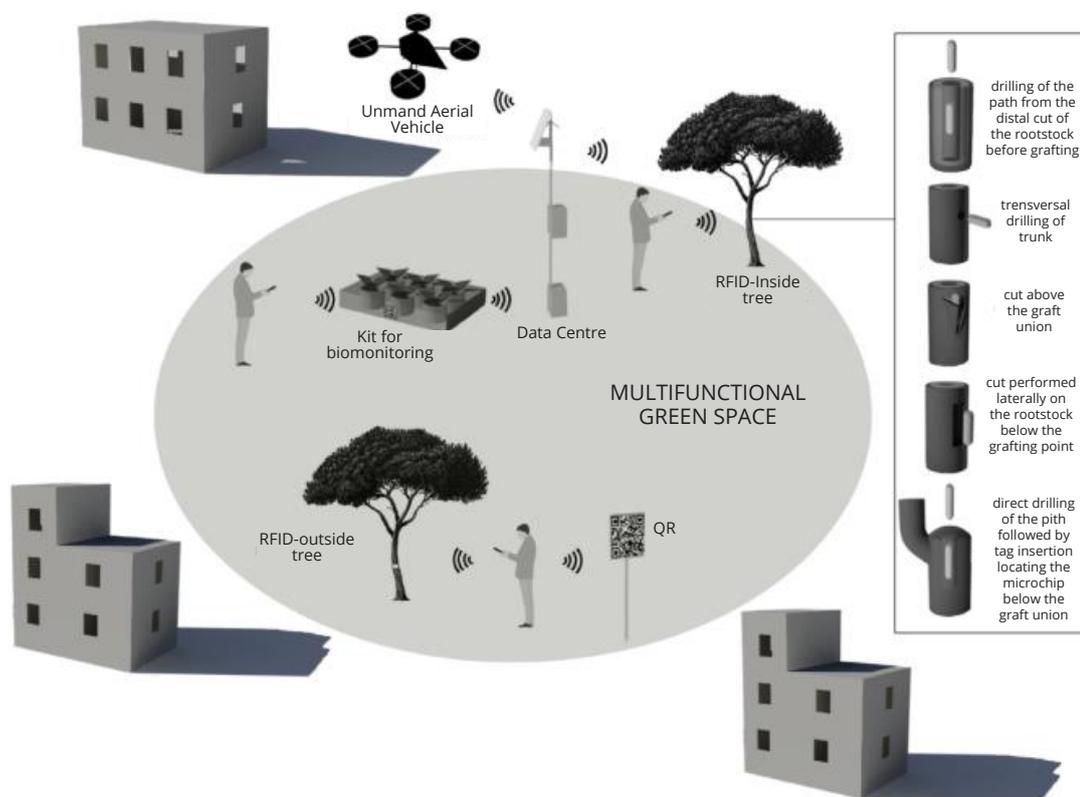- Prepare tree planting plan and implement inventory system/plan digitally.

Lead Agency:
- Local authorities

Supporting Agency:
- State governments

International Exemplification

Italy:
- TreeCity by University of Pisa, Italy
- RFID tags in trees, combined with towers, base stations, personnel on the ground, and even drones can be used for getting updated information on tree status in an area

Singapore:
Sustainable Singapore Blueprint
More green and blue spaces
- 9% of land for nature reserves and parks
- 9 out of 10 homes to be within 10-min walk of a park
- 400 km of park connectors
- Enhanced ecological connectivity with 180 km of nature ways
- Over 100 potential Active, Beautiful, Clean Waters (ABC) projects identified for implementation island-wide
- 200 ha of skyrise greenery, equivalent to about 650 school fields

South Korea:
Seoul Action Plan
- To expand awareness of the benefits that urban forests and trees provide to communities throughout the Asia-Pacific Region
- To sustain and foster the growth of urban forests and trees as key contributors to resilient cities
- To support the local and national decision makers in planning, designing and managing their green capital
- To provide guidance on the key actions to be taken towards more sustainable urban development

LOCAL REFERENCE

National Urbanisation Policy 2
- Strengthen the Tree Preservation Order (TPO) under the Town and Country Planning (TCP) Act 172
- Preparing tree inventory plan within a city to ease the implementation of TPO
- Encouraging tree planting in cities every year

State Structure Plan
- Conserve all green areas

Strategy 2:	Strengthen the integrated and sustainable solid waste management

Solid waste management often becomes the priority in managing a city since it concerns with the comfort of city dwellers. However, scarcity of land has made it difficult for the local authority to allocate a new area for landfill development since the lifespan of a landfill varies for each city. Malaysia's waste generation was 41,368 tonnes per day in 2015. The generation of waste in the country is expected to increase to 49,670 tonnes per day by the year 2020. Whilst Malaysia's recycle rate was 10.5% in 2015 and about 88.8% of waste was sent to landfills.

With the rising trend of waste generation, waste reduction and separation at source are essential initiatives to halt or slow down the high rate of waste generation per capita. The reduction in waste generation can reduce the demand for a new landfill.

World's best municipal waste recyclers

Austria	55.90%
South Korea	59%
Wales	60.20%
Singapore	60.60%
Germany	66.10%

In order to reduce over-demand of landfill, waste disposal should adopt the concept of waste to energy which leads towards sustainable waste management system by using advanced technology.

Proposed Initiatives:

01

Strengthen the waste separation and reduction from source

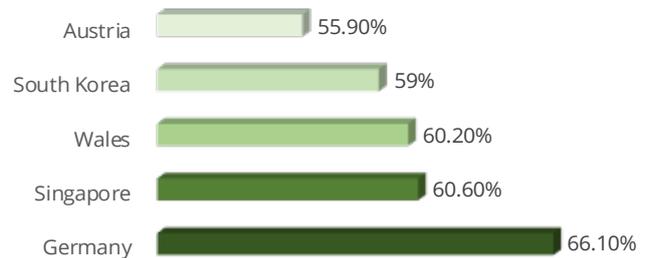**Enforcement on waste separation at source**
- The implementation of waste separation and reduction from source should be enhanced.
- Only seven (7) states and two (2) federal territories are implementing the Solid Waste and Public Cleansing Management Act 2007 and it should be extended to all states in Malaysia.
- Introduce a polluter pays principles system.
- Encourage the food waste to be turned into composting.
- Reduce construction waste by following the stages: project planning, pre-construction, off-site activities and on-site activities.
- Promoting waste management by the community: community empowerment especially at the public housing areas.
- Enhance awareness to reduce solid waste disposal through the new concept of 5R 'Refuse, Reduce, Reuse, Recycle, Recovery'.
- Encourage bio-composting.
- Promote waste to wealth as part of a reward system.

Lead Agencies:
- Ministry of Housing and Local Government
- Ministry of Energy, Science, Technology, Environment and Climate Change
- National Solid Waste Management Department

Supporting Agencies:
- SWCorp
- Department of Environment
- Local authorities
- State governments
- Sustainable Energy Development Authority Malaysia

02
Implement the smart waste management using IoT

03
Implement the Waste to Energy (WtE)

- Introduce technology advancement to facilitate relevant authorities in managing waste generation of the city.
- Introduce the smart bin and digital tracking system to optimise the waste collection routes.
- Transform waste recycle programmes by using advanced technology.
- Encourage relevant authorities to monitor the waste generation on daily basis.

WtE technology is able to convert the energy content of different types of waste into various forms of valuable energy.
- Integrate the power generated from WtE technology to the national smart grid systems.
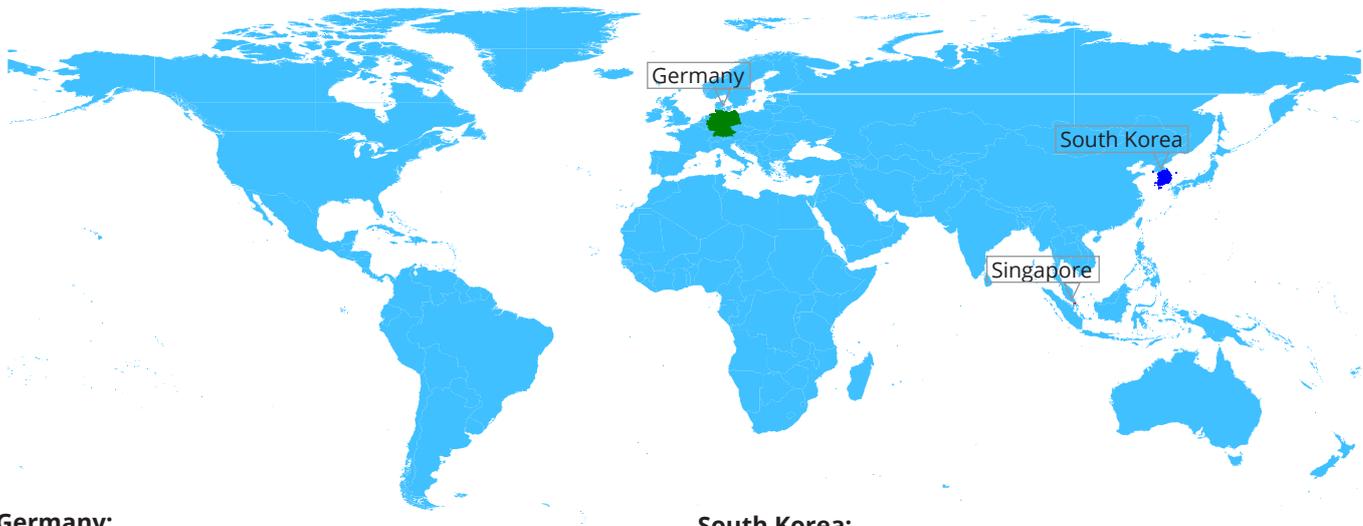
Lead Agencies:
- Ministry of Housing and Local Government
- Ministry of Energy, Science, Technology, Environment and Climate Change
- National Solid Waste Management Department

Supporting Agencies:
- SWCorp
- Department of Environment
- Local authorities
- State governments
- Sustainable Energy Development Authority Malaysia

International Exemplification

Germany:
Waste Management Act
Waste management measures apply:
• Prevention
• Preparation for recycling
• Recycling
• Other types of recovery, particularly use for energy recovery
• Disposal

Singapore:
Clean Land Policy
Keeping the land clean by managing the solid and hazardous waste well
• Reducing and recycling the waste as much as possible
• Minimising the volume of waste disposed
• Dispose hazardous waste safely

South Korea:
• 'Volume-based fee system' that reduces waste generation and considerably boosts the recycling rate ratio
• Separate disposal and collection of recyclables
• Recycling stations to which residents bring their own recyclables
• Urban mines to promote recycling of household appliances
• Resource recovery facilities, from waste to energy
• A volume-based food waste disposal system has been in place since 2013
• Some flats require residents to pay for garbage bags, while others have a centralised bin that uses RFID technology to weigh how much waste each household dumps and bill it accordingly.

LOCAL REFERENCE

National Physical Plan 3
• Strengthen the integrated and sustainable solid waste management
• Creating the solid waste management facility parallel with the social and low carbon needs within a city area
• Recovering the value of municipal solid waste
• Strengthening a law/act related to solid waste management

National Urbanisation Policy 2
• Increasing the 3R initiatives

Green Technology Master Plan
Waste treatment and disposal
• Policies improvement and technology upgrading in landfill operation
• Introducing policy on food waste management
• Introducing market enablers through Entry Point Project (EPP)

Waste and resource recovery
• Mandating the installation of methane capturing facilities
• Conducting research to expand the use of biogas as by-product of palm oil mills
• Establishing a working group to promote biogas captured at all mills
• Implementing grading and certification mechanism, and talent development initiatives
• Implementing tax allowance and import duties

Solid Waste and Public Cleansing Management Act 2007
Solid Waste Public Cleansing Management Corporation Act 2007
National Solid Waste Management Policy

Strategy 3:	**Improve the air quality and its monitoring system**

Air quality in Malaysia is monitored continuously and manually to detect any changes in the ambient air quality status that may cause harm to human health and the environment. DOE monitors the country's ambient air quality through a network of 51 stations.

The monitoring stations are strategically located in residential, traffic and industrial areas to detect any significant change in the air quality which may be harmful to human health and the environment. World Health Organisation (WHO) has set 50 μg/ m3 24-hour mean reading that is safe for health. In 2016, all cities in Malaysia shows good air quality by recording below 50 API reading.

Average Air Quality in Malaysia Year 2016

Source: Department of Environment, 2016

Proposed Initiatives:

01

Reduce vehicle emissions by increasing public transportation usage and decreasing private vehicle use

Control traffic emission at source by:

- Maintaining and increasing the modal share of public transport is essential for increased mobility while decreasing transport emissions.
- Policies and standards that require the use of cleaner fuels and advanced vehicle emissions standards can reduce vehicle emissions by 90% or more.
- Increase the provision of EV charging stations to support the usage of EVs.

Lead Agency:
- Local authorities

Supporting Agencies:
- Ministry of Energy, Science, Technology, Environment and Climate Change
- Ministry of Transport
- Malaysian Meteorological Department
- Department of Environment

02

Strengthen the air quality regulations

- Regulatory efforts include identifying and categorising air pollutants, setting limits on acceptable emissions levels, and dictating necessary or appropriate mitigation technologies.

Lead Agencies:
- Department of Environment
- Local authorities

Supporting Agencies:
- Ministry of Energy, Science, Technology, Environment and Climate Change
- Malaysian Meteorological Department

03

Improve and enhance the air monitoring system technology

- Install an air quality monitoring systems based on IoT technologies and electrochemical sensors to analyse pollution, pollen and toxins on a street-by-street basis, providing real-time data by time and location.
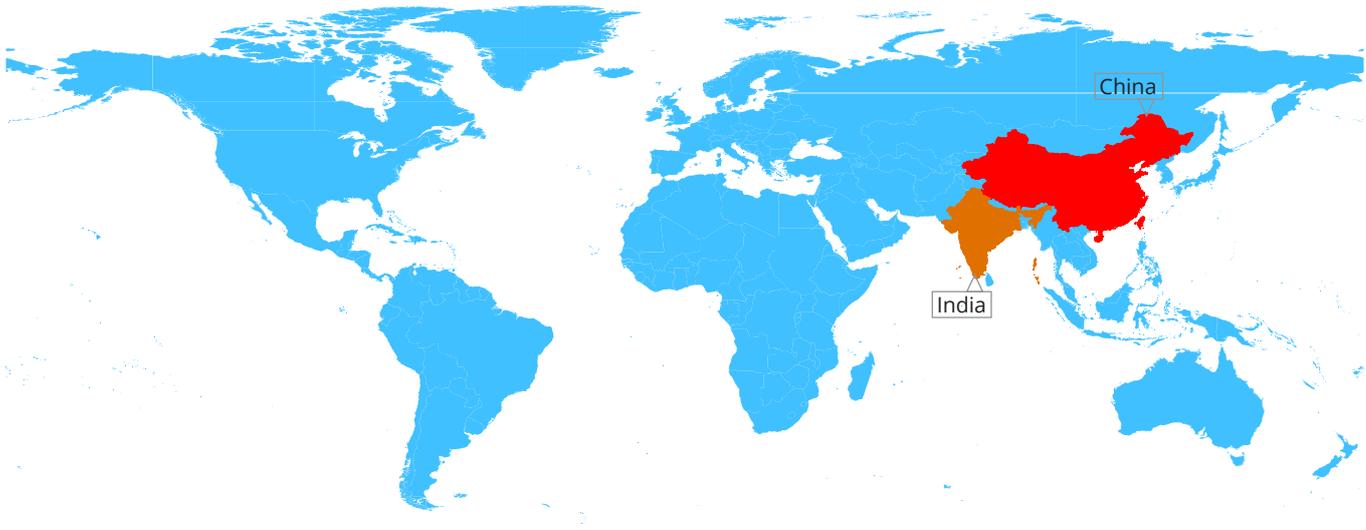- Introduce data sharing on air quality to the public via smart application.

Lead Agencies:
- Department of Environment
- Local authorities

Supporting Agencies:
- Ministry of Energy, Science, Technology, Environment and Climate Change
- Malaysian Meteorological Department

International Exemplification

China:
- China's air quality monitoring system consists of a national-level network and a local-level network. Monitoring objectives and settings are similar. Both have four types of stations:
  - ◊ Monitoring station
  - ◊ Assessment station
  - ◊ Control station
  - ◊ Background station
- Each station monitors several air pollutants. The Provincial Environmental Protection Departments are responsible for supervising quality control of urban air quality monitoring stations, while the Ministry of Environmental Protection carries out the spot-checking, flight check and cross-check for quality control
- Air quality monitoring legislation

India:
- Air quality monitoring that would be able to report and visualise scientifically validated PM 2.5 and gas measurements
- Collect air quality information to allow policy makers and citizens to deploy data-driven control and preventive mechanisms
- The idea is to integrate hardware, communication and software stack, from local sensing to distributed analytics
- A high resolution air quality monitoring and air pollutant data analytics
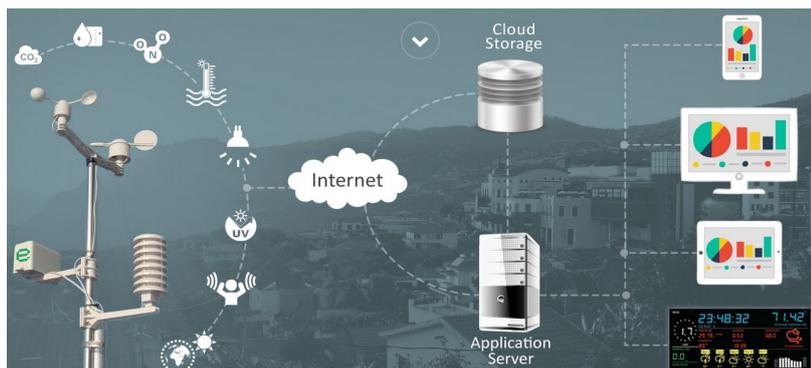
LOCAL REFERENCE

National Urbanisation Policy 2
- Reduce the air pollution in the city
- Reducing the use of personal motorised vehicles in the city
- Encouraging eco-industry development at integrated industrial area

Malaysian Ambient Air Quality Guidelines 1989
New Malaysia Ambient Air Quality Standard
Environmental Quality Act 1974 Environmental Quality (Clean Air) Regulations 2014

Strategy 4:	Improve the water quality and its monitoring system

Due to urbanisation and rapid economic development, the provision of quality water and sewerage services has become more challenging to the government. Different issues and challenges are identified in the water supply and wastewater treatment which are reliability of water supply and limited coverage of clean and treated water. While wastewater treatment faces high operational and maintenance costs and environmental threats from non-connected systems.

Looking at the water quality status of polluted rivers, data from 70 river quality stations in 2016 recorded that 24 rivers have fallen under class 3 and 22 rivers were under class 4. In Malaysia, 38% of public sewage treatment plants are mechanical plants. These plants operate using mechanical equipment that accelerates sewage break down. There are 6,966 public sewage treatment plants in the country and 3,625 units of communal septic tank which are contributing to water pollution.

Understanding the life cycle of water is essential. Water will be consumed, polluted, treated, discharged and then returned as water resource again through various sources such as rain. It is especially critical to monitor the wastewater discharge from factories to protect the water resources.

Proposed Initiatives:

01
Enhance better management of wastewater

- Improve the recycling of treated effluent and sludge technology.
- Enforce the technical standard for recycling of treated effluent and composting of sludge
- Increase the upgrading of non-compliant wastewater treatment plants.
- Investment in wastewater infrastructure for an integrated sewerage system is needed to ensure lasting protection of water quality.

Lead Agencies:
- Sewerage Service Department
- National Water Service Comission

Supporting Agencies:
- Indah Water Konsortium
- Sewerage Service Department
- Sewerage Department (Sarawak)

02
Strengthen the water quality regulations

- Water quality laws govern the release of pollutants into water resources, including surface water, groundwater and stored drinking water.
- Regulatory efforts may include identifying and categorising water pollutants, dictating acceptable pollutant concentrations in water resources, and limiting pollutant discharges from effluent sources.

Lead Agencies:
- Ministry of Water, Land and Natural Resources
- State Water Management
- Natural Resources and Environment Board Sarawak
- Department of Environment Protection Sabah

Supporting Agencies:
- Department of Environment
- Department of Irrigation and Drainage
- Local authorities

03

Enhance the water monitoring system technology

- Increased monitoring and notification are needed to understand the health of water resources such as river water, groundwater, and others.
- Improve water quality monitoring by smart water.
- Introduce a water monitoring management through the integration of ICT products tools and solutions.
- Introduce a wireless sensor network for water quality monitoring system.

Lead Agencies:
- National Water Services Commission
- Local authorities

Supporting Agencies:
- Department of Environment
- Natural Resources and Environment Board Sarawak
- Department of Environment Protection Sabah

04

Promote a sustainable, well-coordinated development and management of water resources

- Increase the river cleaning programmes by using advance technology.
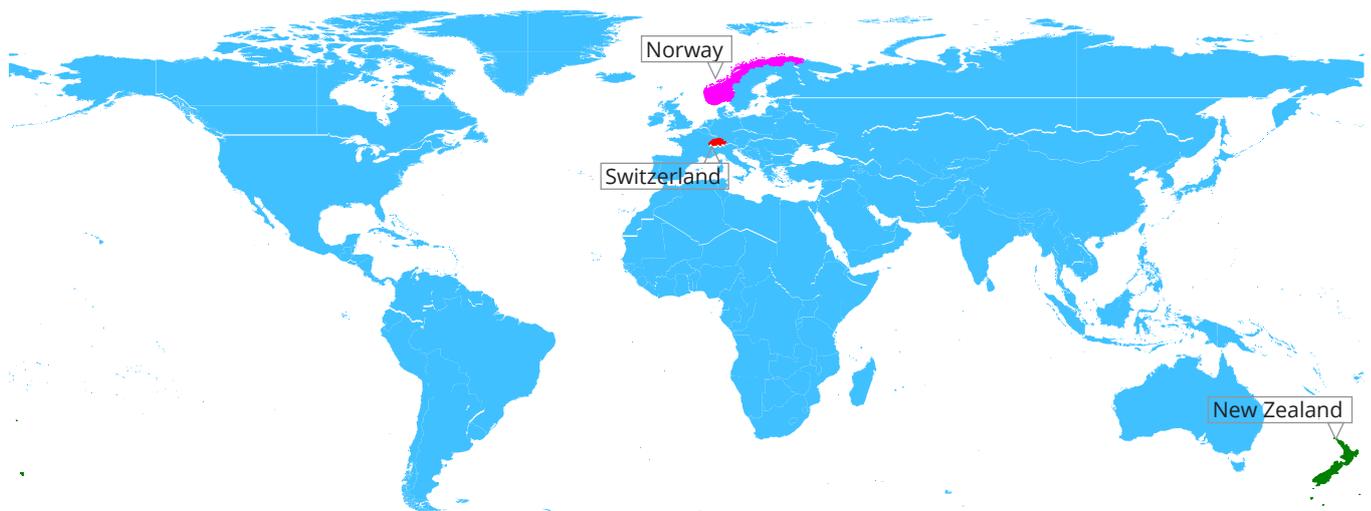- Construct more gross pollutant trap (GPT) near main drains.

Lead Agencies:
- National Water Services Commission
- State Water Department

Supporting Agencies:
- Department of Environment
- Department of Irrigation and Drainage
- Natural Resources and Environment Board Sarawak
- Department of Environment Protection Sabah

International Exemplification

Switzerland:
- Switzerland is repeatedly recognised as a country with the best quality tap water in the world
- The country has strict water treatment standards and superior natural resources with an average rainfall per year of 60.5 inches
- 80% of the drinking water comes from natural springs and groundwater

Norway:
- Norway suffered from deteriorating and ageing water infrastructure
- Since 2001, the Norwegian Institute of Public Health and water suppliers have made significant strides in infrastructure and 9 out of 10 Norwegian residents receive water from a waterworks monitored by the government

New Zealand:
- The country has strict water quality standards set by its Ministry of Health
- In 1995, New Zealand set a goal of reaching 95% compliance with its bacterial and chemical compliance standards for drinking water
- The 2015-2016 Annual Drinking Water Report shows that 97.6% of its drinking water met bacteriological standards and 98.4% met chemical standards

LOCAL REFERENCE

National Water Resources Policy
- Develop a comprehensive water resources information system
- Strengthen database framework
- Standardise multiple scientific processes and methods related to evaluation and analysis of state, status and condition of water resources
- Set national standards to determine thresholds for water resources to protect their availability and integrity of waterbodies
- Reduce vulnerability of water resources to impacts and threats as well as strengthen adaptability to ecosystems and physical changes
- Develop water resources conservation plans for strategic, sensitive and critical water resources areas and bodies
- Optimise options for alternative, conjunctive or contiguous use of different types of water resources to reduce stress on existing sources
- Implement integrated water cycle management

Water Demand Management Master Plan
National Sewerage Catchment Plan

Strategy 5:	Enhance the disaster risk management by adopting advanced technology application

Disaster risk is defined as the potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or community in a specific period, determined probabilistically as a function of hazard, exposure, and capacity. Therefore, when a hazard event such as a landslide, drought, flood, earthquake or tsunami occurs, it triggers a loss of life and damage to infrastructure. Flash flood and landslide among the common hazards which occurred due to climate change and human intervention.

Flash flood and landslide are the common hazards or disasters occurred in Malaysia cities. Selangor recorded 115 cases of flash floods from 2016 until 2017.

Meanwhile, 18 cases of landslide occurred in cities around Malaysia including the latest tragedy at Tanjung Bungah, Penang.

With the threat from climate change, it is necessary for Malaysian cities to embark on smart planning as a tool in planning decision making in order to prevent the occurrence of hazards in the future and to reduce the risks of disaster in existing cities.

In managing disaster risks, co-development of the social aspects and technological systems is necessary. Technology is continuously being developed and become the key element of people's daily lives which can mean benefits and convenience.

Proposed Initiatives:

01
Adopt smart planning to support planning decision making and to enhance disaster risk management

- Installation of a network of interactive, modular sensor boxes to collect real time data on the city's environment, infrastructure etc.
- Introduce a three dimentional (3D) model that will be fed by big data and could assist in everything from urban planning to disaster mitigation in the city.
- The model holds a real-time/ dynamic data which can be used in simulations and virtual tests of new solutions to urban planning problems.

Lead Agency:
- Local authorities

Supporting Agencies:
- Malaysian Meteorological Department
- National Hydraulic Research Institute of Malaysia
- Department of Irrigation and Drainage
- Public Works Department
- National Disaster Management Agency

02
Enhance the management in landslide risk area

- Manage and predict landslide movement.
- Smart autonomous self-powered wireless sensor networks based on low-cost landslide detection system.
- Smart geophone sensor network for effective detection of landslide-induced geophone signals.
- Real-time wireless sensor network for landslide detection.

Lead Agencies:
- Department of Mineral and Geoscience
- Local authorities

Supporting Agencies:
- Malaysian Meteorological Department
- National Hydraulic Research Institute of Malaysia

03

Develop a cloud-based flood prevention and monitoring system

- Improve warning delivery system.
- Provide a useful tool for issuing early warnings to the population and improve existing prediction models.
- Develop an ultra low-cost environmental monitoring device designed to enable, through a cloud-based data collection mechanism, extensive and real-time monitoring of the status of floods in urban areas.

Lead Agencies:
- Department of Irrigation and Drainage
- Local authorities

Supporting Agencies:
- Malaysian Meteorological Department
- National Hydraulic Research Institute of Malaysia
- National Disaster Management Agency

04

Enhance engagement with the community for disaster risk awareness programmes

- Enhance community engagement to increase city citizen participation in disaster risk awareness programmes at local level.
- Introduce an online communication platform to promote disaster risk awareness programmes at local level.
- Advertise all Disaster Risk Awareness Programmes (DRAP) from various agencies. DRAP needs to detail out the information on the programmes especially the date, type of awareness and agency involved.

Lead Agency:
- District and Land Office

Supporting Agencies:
- Local authorities
- National Disaster Management Agency
- State Health Department
- State Education Department
- Social Welfare Department
- Royal Malaysia Police
- Fire and Rescue Department
- Non Government Agencies
- National Disaster Management Agency

International Exemplification

The 🌐 ANRICA **Landslide and Flood Risk Management System**
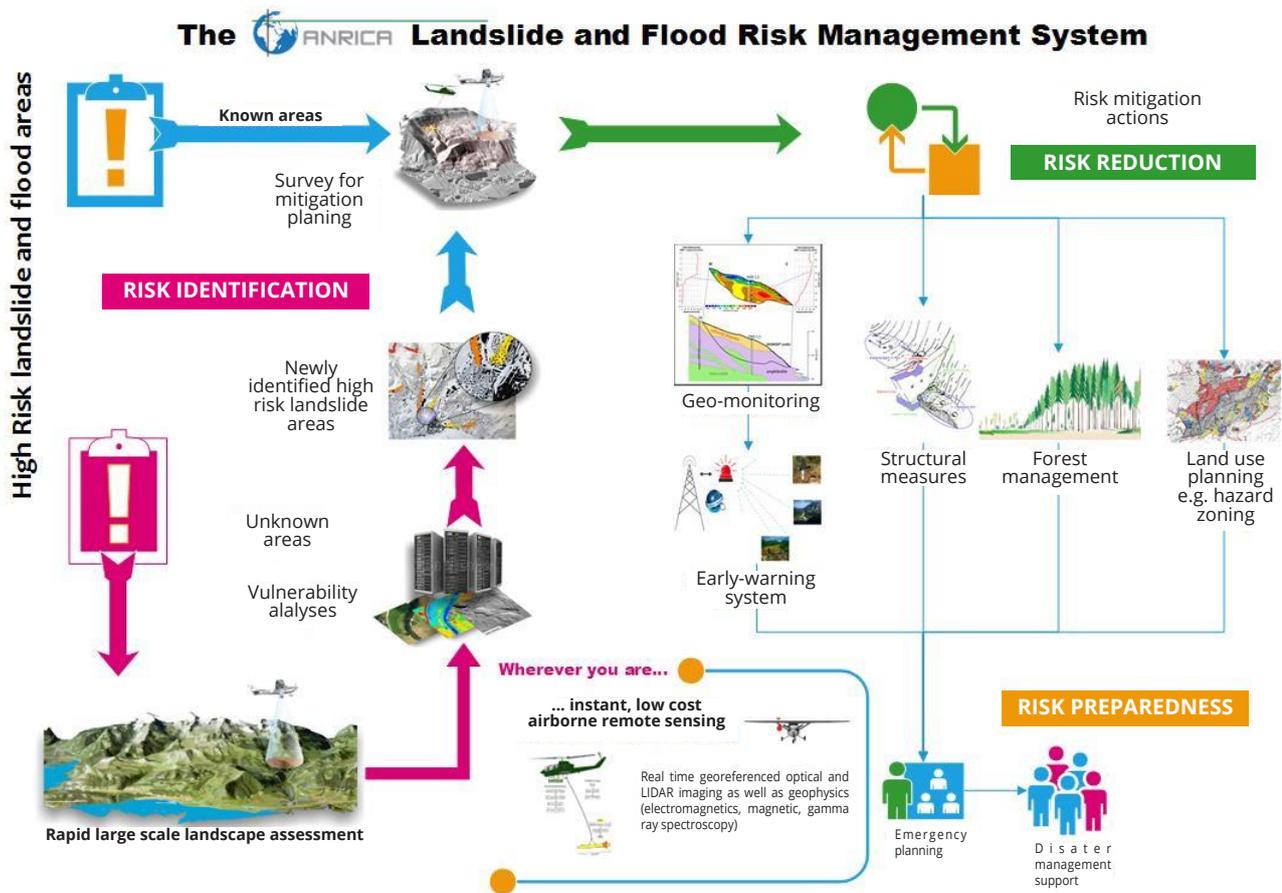
Austria:

- Combines geological surveys and rapid large-scale landscape assessments with early warning systems by geo-monitoring, forest management, structural measures and land use planning by hazard risk mapping to manage natural disaster crises
- Using a tried participatory communications approach, where communities and policy makers take part in finding solutions, a consortium of scientists, private sector and technological research experts
- To identify hazard areas, assess risk, and provide keen advice and action for risk management, reduction and mitigation

LOCAL REFERENCE

National Physical Plan 3
- Managing natural disaster risk areas
- Strengthening the management of flood areas
- Managing landslide risk areas

Guidebook for Urban Resilience: Building Disaster and Climate Resilient Cities in ASEAN (in accordance to the Sendai Framework for Disaster Risk Reduction 2015 – 2030 for Disaster)
- To understand the disaster risk of a city
- To understand issues and response to urban disaster risks or critical issues regarding Disaster Risk Reduction (DRR)
- To introduce DRR in urban planning and management including land use and development regulations
- To learn and share good practices and teach about building resilient cities derived from the experiences of other countries / cities

Guidelines for Disaster Resilient City in Malaysia (in accordance to the Sendai Framework for Disaster Risk Reduction 2015 – 2030 for Disaster)
- Disaster risk management cycle
- Climate change adaptation
- Town planning and redevelopment after disaster

Strategy 6:	Enhance the non-revenue water management

NRW is water that has been produced and is "lost" before it reaches the customer. Losses can be real losses (through leaks, sometimes also referred to as physical losses) or apparent losses (for example through thef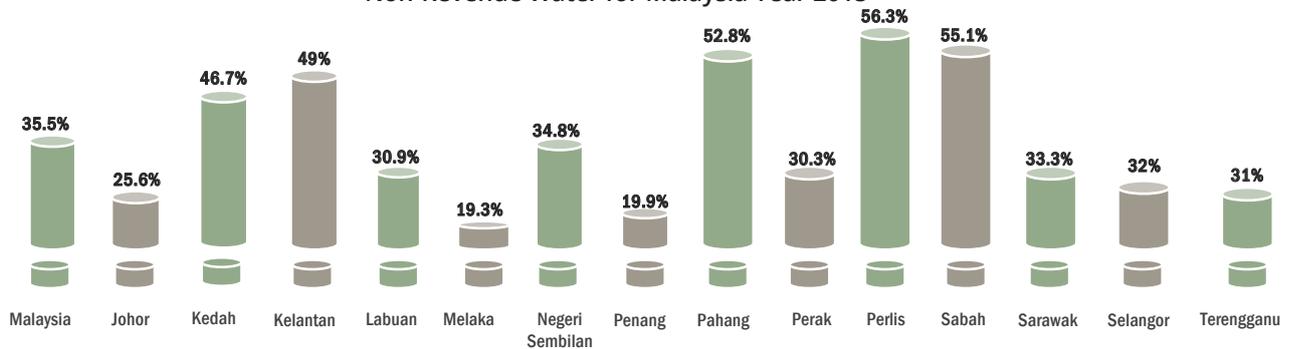t or metering inaccuracies). In 2015, NRW in Malaysia was at an average of 35.5%, and the main contributors to the higher NRW were physical losses due to old network of pipes and poor workmanship by contractors especially in new development areas, commercial failures and also lack of knowledge and expertise in NRW management. In comparison, NRW in Seoul was recorded at 4.3% only while the Revenue Water Ratio of Seoul was at 95.7% as of August 2016.

The need to manage NRW has become increasingly important to protect water resources. NRW management allows utilities to expand and improve their services and enhance financial performance.

In a water-constrained environment, NRW management often offers superior cost effectiveness compared to supply augmentation. At the same time, revenues from saved water improve service providers' outcome while lower water abstraction and increase city resilience.

Non-Revenue Water for Malaysia Year 2015

Malaysia	Johor	Kedah	Kelantan	Labuan	Melaka	Negeri Sembilan	Penang	Pahang	Perak	Perlis	Sabah	Sarawak	Selangor	Terengganu
35.5%	25.6%	46.7%	49%	30.9%	19.3%	34.8%	19.9%	52.8%	30.3%	56.3%	55.1%	33.3%	32%	31%

Source: National Green Technology Policy

Proposed Initiatives:

01
Introduce the systematic smart water management

Waterworks block management & smart water grid
• Divided the water supply network into large, medium and small blocks to facilitate leakage identification and consumption analysis.

Lead Agency:
• National Water Services Commission

Supporting Agencies:
• State Water Departments
• Public Works Department
• Department of Water Sabah
• Ministry of Utilities Sarawak

02
Replace the water supply pipes with infrastructure equipped with sensor technology and applications

• Replace old water pipelines with durable dust free stainless steel pipes and ductile irons pipes.
• Transform the new piping infrastructure by adding a sensor for better water management including leakage identification.

Lead Agency:
• National Water Services Commission

Supporting Agencies:
• State Water Departments
• Public Works Department
• Department of Water Sabah
• Ministry of Utilities Sarawak

03
Monitor leakage by using scientific supply management

• Install flowmeters and flow monitoring systems for water pipes, water supply areas, blocks, pumping stations, and reservoirs to manage water inflows and outflows accurately.
• Water consumption tracking.
• Leakage detection and control system

Lead Agency:
• National Water Services Commission

Supporting Agencies:
• State Water Departments
• Public Works Department
• Department of Water Sabah
• Ministry of Utilities Sarawak

International Exemplification
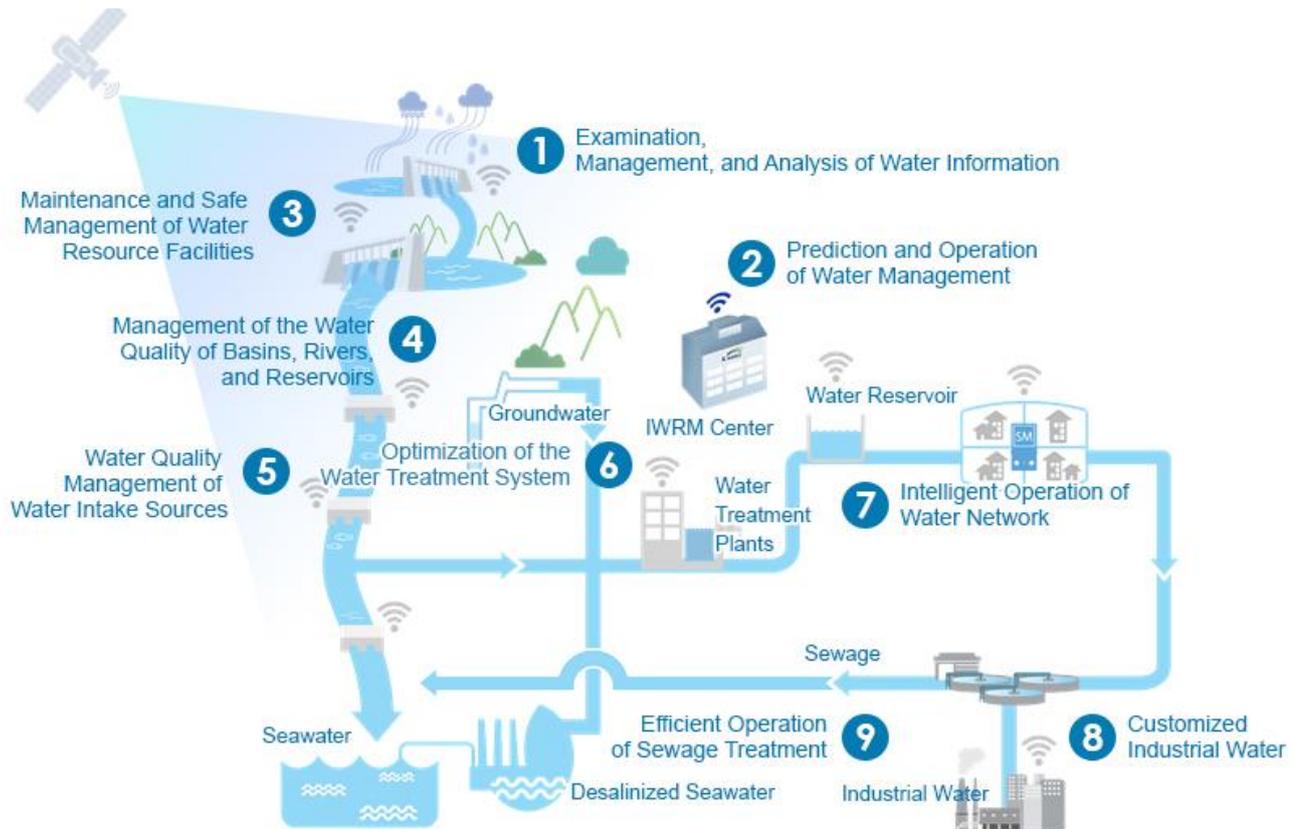
South Korea:

Smart water devices
- Real time smart metering facility
- Two-way communication device for surveillance and control
- Smart digital infrastructure facility in pipeline

Smart Water Solutions
- Water purification process monitoring/control system
- Integrated piping system on network operation
- Energy/risk management system

Smart Water Services
- Provide big data
- Two-way data sharing
- Reflects needs of consumers
- Leakage detection system

LOCAL REFERENCE

Green Technology Master Plan Malaysia 2017 – 2030
Non-Revenue Water Action Plan
1. Holistic NRW management
2. Management concept of "preventive compared to reactive"
3. Sustainable funding
4. Effective mechanism for monitoring of NRW management
5. Development of effective organisation structure
6. Human capacity building in managing NRW
7. Improvement of research, development and innovation in managing NRW
8. Public education and awareness programme on NRW management

National Physical Plan 3
- Implement integrated water cycle management
- Reduce water demand

Strategy 7:	Increase energy efficiency and promote renewable energy sources

Non-renewable energy comes from sources that will run out or will not replenish. Most of non-renewable energy sources are fossil fuels: coal, petroleum and natural gas. According to Malaysia Energy Statistics Handbook (2017), 90% of total energy sources is produced by non-renewable energy and 10% produced by renewable energy sources. Furthermore, from 2011 to 2015, the consumption of energy in Malaysia had gradually increased by 4.5% annually. The demand for energy is anticipated to increase further with continuous population growth, commercial and industrial activities.

Over reliance on non-renewable energy resources and high energy consumption are the main issues that need to be addressed, by focussing on energy efficiency and promoting renewable energy.

Renewable Energy installed capacity by sources in Malaysia, 2014

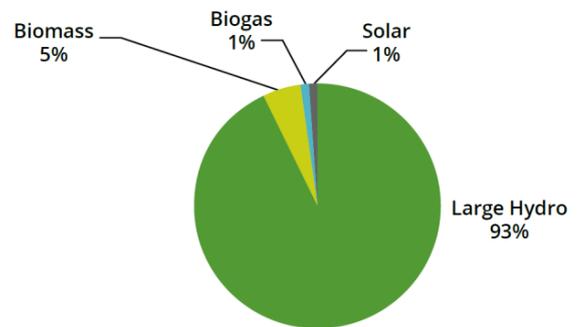The government has developed a National Renewable Energy Policy and Action Plan to promote the growth of renewable energy by targeting 10% contribution by the year 2015. Other than renewable energy, the government is also focussing on energy efficiency by establishing a National Energy Efficiency Action Plan.

Proposed Initiatives:

01
Make government and commercial buildings comply with the building energy efficiency requirement

02
Implement the smart grid system to enhance energy efficiency and reliability

03
Build up the renewable energy capacity

New building
- Strengthen the regulations on the requirement for renewable energy initiatives on new development during planning approval process.
- Introduce a dynamic electricity pricing and remote energy metering service.
- Enforce the building energy automation systems for energy consumption tracking.

Existing building
- Enforce the use of solar panel and rainwater harvesting on existing government buildings through retrofitting.
- Encourage existing commercial buildings to embed the renewable energy initiatives such as installing a solar panel and rainwater harvesting system.
- Encourage the building energy automation systems for energy consumption tracking.

Lead Agency:
- Local Authority

Supporting Agencies:
- Ministry of Housing and Local Government
- GreenTech Malaysia
- Tenaga Nasional Berhad

- Improve the advanced metering infrastructure and ICT integration.
- Increase the usage of smart meter.
- Enhance the power system reliability: the ability of the system to deliver expected service through both planned and unplanned events.
- Introduce a real-time centralised control & monitoring of electric network using integrated and intelligent power distribution automation system.
- Improve demand side management, interruptible option load and thermal energy storage.
- Enforce a cloud-based energy monitoring system.

Lead Agencies:
- Energy Commission
- Tenaga Nasional Berhad

Supporting Agencies:
- Sarawak Energy Berhad
- Sabah Electricity Sdn Bhd

- Promote large-scale solar plants to drive the growth in renewable energy power generation.
- Develop WtE infrastructure to produce renewable energy sources.
- Increase energy awareness programmes for the people to reduce energy consumption.

Lead Agencies:
- Energy Commission
- Ministry of Housing and Local Government

Supporting Agencies:
- Ministry of Energy, Science, Technology, Environment and Climate Change
- Sustainable Energy Development Authority Malaysia
- Tenaga Nasional Berhad
- Sarawak Energy Berhad
- Sabah Electricity Sdn Bhd

International Exemplification
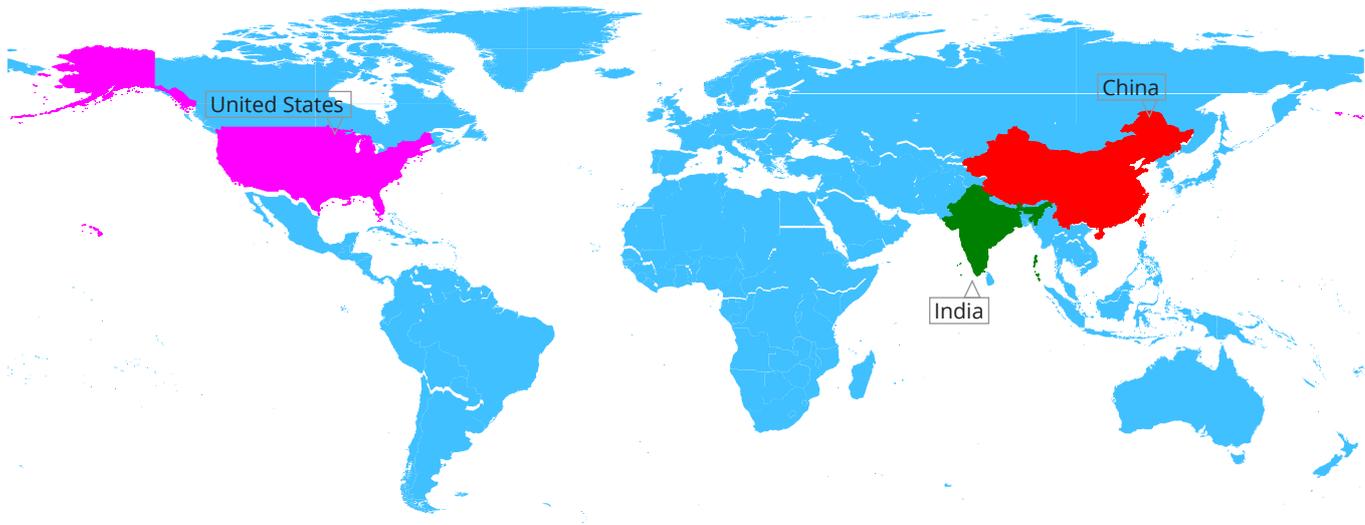
Smart grid adoption:
- Toronto, Ontario, Canada - Ontario was the first province in Canada to introduce what is referred to as "time-of-use pricing". The system is said to have 100% smart meter deployment
- Texas, U.S. - The electricity market in the state of Texas has been deregulated, and the state has close to a 100% saturation of smart meters along with an automated system to give customers their energy usage data through smart grid technology and web portals
- Scandinavia - At 100% penetration, citizens of Sweden and Finland are seeing the benefits of the smart grid, including in-home smart technologies

China:
- Accounting for over 40% of the total global clean energy mix by 2022
- Deployed a number of technologies designed to clean the air
- China has surpassed its 2020 solar panel target, and the country is expected to exceed its wind target in 2019
- Global market leader in hydropower, bioenergy for electricity and heat, and electric vehicles
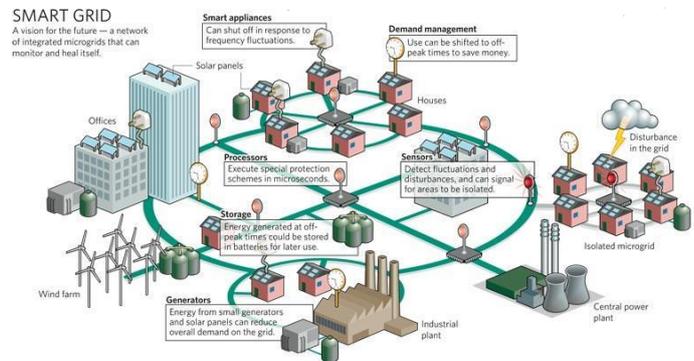
India:
- Solar and wind represent 90% of India's capacity growth
- Improved grid integration and addressed the financial issues of its utilities

United States:
- Second-largest growth market for renewables
- Federal tax incentives and state-level policies for distributed solar panels

LOCAL REFERENCE

National Renewable Energy Policy and Action Plan
- To increase renewable energy contribution in the national power generation mix
- To facilitate the growth of the renewable energy industry
- To ensure reasonable renewable energy generation costs
- To conserve the environment for future generation
- To enhance awareness on the role and importance of renewable energy

National Energy Efficiency Action Plan
- Thrust 1: establish an overall long-term national plan for energy efficiency
- Thrust 2: strengthen implementation capacity to promote energy efficiency
- Thrust 3: create adequate and sustainable funding mechanism for energy efficiency
- Thrust 4: implement energy efficiency programmes
- Thrust 5: enable commercial finance institutions to support energy efficiency

National Urbanisation Policy 2
- Efficient and sustainable energy consumption
- Increase engagement in green building accreditation schemes and low-carbon cities
- Reduce carbon intensity through energy consumption and water
- Use of renewable energy sources

National Physical Plan 3
- Creating a low carbon city and development
- Realising the use of sustainable energy sources
- Implementing the integrated water cycle management

National Green Technology Policy
- Seek to attain energy independence and promote efficient utilisation
- Application of green technology in power generation and in the energy supply side management, including co-generation by the industrial and commercial sectors
- Application of green technology in all energy utilisation sectors and in demand side management programmes

Strategy 8:	Encourage the development of low carbon city concept to be adopted at local level

Low-carbon city development has become a central part of the Malaysian government's strategy to meet its GHG commitments. The country, currently ranked second in terms of emissions per capita in Southeast Asia, has committed to reduce the emissions intensity of its gross domestic product GDP by 40 % from 2005 levels by 2020.

Many Malaysian cities have created ambitious, low-carbon visions in order to meet national targets. However, many cities are yet to have a credible GHG inventory or a comprehensive blueprint to help them systematically implement and monitor low-carbon actions. Without such a framework, it is nearly impossible to establish baseline measurements, set goals, or measure progress.

* To reduce CO_2 emission in all human activities in cities
* To ensure development is based on low carbon concept
* To assist in mitigating climate change and protecting the environment

Diamond Recognition

* Subang Jaya Municipal Council (Reduced CO_2 by 15.16% on energy waste and water)
* Hang Tuah Jaya Municipal Council (Reduced CO_2 by 9.03% on energy and trees)
* University of Technology, Malaysia (Reduced CO_2 by 7.84% on energy and waste)
* University of Malaya (Reduced CO_2 by 1.82% on Energy and Waste

LCCF Provisional Certificate

* Klang Municipal Council
* Shah Alam City Council
* Ipoh City Council
* Seberang Perai Municipal Council

Proposed Initiatives:

01

Promote and enhance low carbon city and societal initiatives at every level

* Policy support for the promotion of integrated low carbon urban development, which will enable cities to implement and adopt integrated low carbon urban development plans and programmes.
* Awareness and institutional capacity development, which will expedite appraisal, approval and the implementation of strategic urban development, and ensure cities are aware of and planning and implementing low carbon technology applications.
* Low carbon technology investments in cities, where there is an increase in investment in low carbon technologies with more low carbon projects implemented.

Lead Agencies:
* Ministry of Energy, Science, Technology, Environment and Climate Change
* Local authorities

LOCAL REFERENCE

Low Carbon City Framework
* Create awareness, encourage and promote the concept of green cities in Malaysia, thereby helping to reduce carbon emission in cities and townships
* Guide cities in making choices and decisions towards green solutions for their cities and townships
* Allow cities and townships to measure their current and baseline carbon emissions
* Allow cities and townships to define their carbon strategies and subsequently measure the performance of their actions

Smart People

Policies	Policy 3:	Policy 7:	Policy 13:
	Quality of human capital shall be enhanced to meet future demands of industry and overall environment in smart city	Gender equality and social inclusion of vulnerable groups, shall be given emphasis in smart city development	Community empowerment shall be enhanced in smart city planning and governance

Smart People

Strategies	Initiatives		Indicator
Strategy 1: Improve moral education in schools	1. Enhancing programmes to improve sense of responsibility towards public properties 2. Creating real life experiences 3. Establish reward scheme for schools that implement moral education programme 4. Family engagement to promote moral education		1. Crime Index 2. Number of successful programmes held in schools 3. Number of active Community-Based Rehabilitation (CBR) 4. Number of active Senior Citizens Activity Centre 5. Number of NGOs involved in moral awareness programmes, moral education 6. Reduction of moral issues based on school counselling data 7. Increase of income percentage 8. Percentage of senior secondary students studied one or more STEM-related elective subjects 9. Number of Innovation studios in Primary and High Schools 10. Number of patents per 1000 habitants per year 11. Number of public events and activities, organised by community 12. The participation rate of youth in education and training, formally and informally within a year, by gender
Strategy 2: Enhance public awareness in practising good moral and civic	1. Emphasize the use of digital awareness boards / advertisement in public areas 2. Introduce Smart Self-Care Programmes/ Application 3. Promote the existing initiatives on moral education through digital technology		
Strategy 3: Increase skilled and talented human capital at every level	1. Review curriculum in subjects such as STEM, innovation, ICT and emphasis on TVET in the education system 2. Strengthening industry-academia collaboration in digital workforce/ innovation 3. Establish employee experience and training programmes in every workplace 4. Enhancing job skills training centres for specific talent 5. Enhancing higher education programmes in advance technology 6. Enhancing digital human workforce		

Policies	Policy 3: Quality of human capital shall be enhanced to meet future demands of industry and overall environment in smart city	Policy 7: Social inclusion, especially gender equality shall be given emphasis in smart city development	Policy 13: Community empowerment shall be enhanced in smart city planning and governance

Smart People

Strategies	Initiatives			Indicator
Strategy 4: Enhance public participation and community empowerment			1. Increase public participation in every decision making process at local level 2. Enhance the use of digital platform to create a two-way interaction between the community and local authority 3. Strengthen organisational structure at community level	13. Level of public satisfaction 14. Identify whether existing legal or regulatory frameworks encourage, enforce and monitor gender equality and non-discrimination against gender 15. Rates of seats held by women in state parliament and local governments 16. Rate of women in management positions 17. Gender Gap Index 18. Number of gender sensitisation and vulnerable group workshop per project (physical and non-physical) 19. Increase level of adaptability, digital usage (before and after initiatives) 20. Rate of youth and adult in ICT skills
Strategy 5: Improve gender sensitisation and inclusivity of vulnerable groups		1. Establish gender sensitisation and vulnerable groups workshop in every decision making process 2. Establish and exclusive digital application for women's safety 3. Integrate the existing Disabled Information Management System (SMOKU) with other agencies in enhancing public awareness		
Strategy 6: Increase the public willingness to adapt with emerging technologies	1. Establish the introduction of digital education at primary school 2. Establish digital technological learning programme for the elderly 3. Lifelong learning programmes for the public 4. Enhance the use of user-friendly digital information boards in public areas			

▌Smart People

Strategy 1:	**Improve moral education in schools**

Moral values require conscious knowledge, guided by positive effect that is carried out in righteous action. Moral intelligence involves a combination of knowledge, desire and willpower. It involves the way people think, feel and act. The knowledge of right and wrong alone may not change our feelings, skills or will to act.

Many studies have proven that low moral intelligence often lead to social problems such as drug abuse, vandalism and others. It is more alarming if social problems involve children. Based on the children crime rate statistics in 2018, drugs and vandalism on property are the two most common crimes.

Moral education is something that needs to be nurtured in the community starting from childhood. Therefore improving moral education at school level should be emphasised and given priority.

Statistics of children involved in crime in Malaysia, 2016

Source: Open data portal Malaysia, Ministry of Home Affairs and Department of Social Welfare, 2018
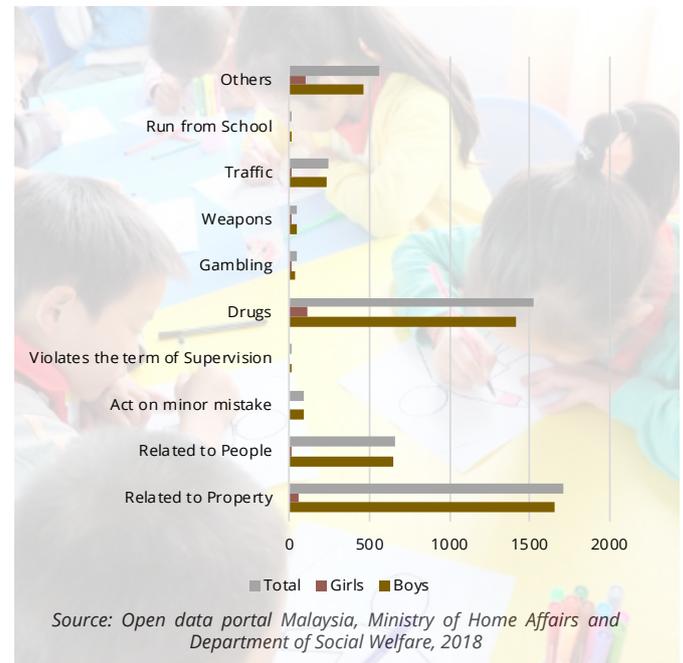
Proposed Initiatives:

01
Enhancing programmes to improve sense of responsibility towards public properties

- Maintenance of public toilet cleanliness.
- Preventing public littering.
- Preventing inappropriate advertisement and graffiti.
- Appreciating street furniture, utilities and landscape.
- Nurturing open spaces and parks.

Lead Agency:
- Ministry of Education

Supporting Agencies:
- Parent-Teacher Association
- Corporate Bodies
- Non-Governmental Organisation
- Local authorities

02
Creating real life experiences

- Visiting welfare centre (elderly, orphanages, animal shelters).
- Using public transport.
- School gardening.
- Recycle and waste separation.
- Rain harvesting.
- Energy saving.

Lead Agency:
- Ministry of Education

Supporting Agencies:
- Parent-Teacher Association
- Corporate Bodies
- Non-Governmental Organisation
- Local authorities
- Transport Operator

03
Establish reward scheme for schools that implement moral education programmes

04
Family engagement to promote moral education

Reward systems are widely used to motivate students to perform better in school. Therefore, by establishing reward schemes for schools that implement moral education programmes, we may be able to encourage and motivate students and teachers to practise good moral values and instill civic conciousness in their daily lives. Example of rewards are as follows:

- Smart and Green School
- Leadership Reward
- Innovative School

Lead Agency:
- Ministry of Education

Supporting Agencies:
- Non-Governmental Organisation
- Local authorities

Providing access to parents and families
- Streamlined communication of school related information.
- Informational meetings and policies.

Home Visiting
- Allows teachers to meet families to discuss educational issues and behaviour.

Comprehensive services and centres
- One-stop centre for family engagement that covers various aspects such as the students' behaviour, education, mental health, community services and family support.

Two Generation Strategies
- Exclusively for underserved groups by providing services and support for both parents and children (eg: increase quality and access to early childhood care and education, maximise opportunities for treatment of the whole family in mental health).

Lead Agency:
- Ministry of Education

Supporting Agency:
- Parent-Teacher Association

International Exemplification
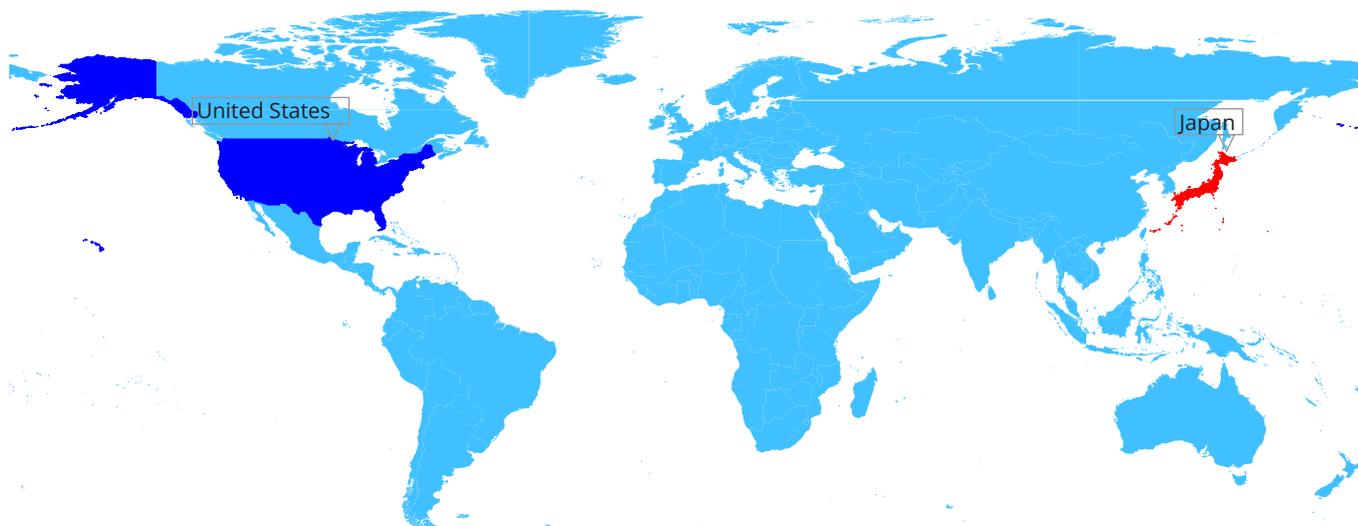
United States:
- Caring School Community (CSC)
  - ◊ A programme promoting core values, pro-social behaviour and a schoolwide feeling of community
- First Step to Success
  - ◊ A programme designed to help children who are at risk for developing aggressive or antisocial behavioural patterns
- Social Skills Training
- Positive Action
- Too Good for Drugs and Violence

Japan:
- Story telling
  - ◊ The Ogre Who Cried
  - ◊ Mukai Chiaki (Biography)
- School activities
  - ◊ Special activities include assemblies, cleaning and individual or group responsibilities

LOCAL REFERENCE

Eleventh Malaysia Plan
- Promoting social integration and ethics to foster a united and moral society
- Intensifying stakeholder engagement to build a shared sense of responsibility

National Social Policy
- Lifelong learning and empowering people
- Strengthening and developing social support systems and social services

National Community Welfare Policy
- Developing human potential to the maximum level and increasing the resilience of society to face the current community challenges
- Build and cultivate the spirit of mutual assistance, help to strengthen the *Ikram* culture

Malaysia Education Blueprint 2013-2025
- Develop values-driven Malaysians
- Transform teaching into the profession of choice

Strategy 2:   Enhance public awareness in practising good moral and civic

Issues such as vandalism of public properties, public littering and others can be associated with low moral and poor civic consciousness in society.

Public awareness on the importance of public property, clean environment and public participation will help to reduce social issues and create a caring society with first class mentality.

Therefore, it is important to enhance social awareness in practising good moral and civic in their daily lives.

Proposed Initiatives:

01
Emphasise the use of digital awareness boards / advertisement in public areas

Digital awareness boards/ advertisements in every public areas such as public parks, bus stations, train stations, malls, and etc. The main topics should be encouraging and advising in terms of building smart citizen especially on how to adopt smart living (recycling, energy consumption, moral ethics and good values).

Lead Agencies:
- Ministry of Communications and Multimedia
- Local authorities
- Transport Operator

Supporting Agencies:
- Ministry of Education
- Ministry of Women, Family and Community Development
- Ministry of Youth and Sports
- Residents Association
- Department of Unity and National Integration
- Non-Governmental Organisations

02
Introduce Smart Self-Care Programmes/ Application

It is crucial to address the mental wellbeing and health of citizens. Through the Malaysian Smart Self Care apps, citizen are able to assess and improve their mental wellbeing as well as receive necessary support. Some of the existing applications such as Gratitude Journal, Happify, Shine Text and Talkspace can be a reference to create a new version that is suitable for Malaysian behavioural patterns.

Lead Agencies:
- Ministry of Health
- Ministry of Education

Supporting Agencies:
- Application Inventor
- Service Provider

03
Promote the existing initiatives on moral education through digital technology

Moral education can be linked strongly with the vulnerable groups especially through the awareness of the people towards the concern of vulnerable groups. There are a number of existing initiatives involving vulnerable groups (E.g. elderly and disabled) which can be promoted through digital technology such as integrated website, application, mass media and awareness boards. Those programmes include:

- Senior Citizens Activity Centre
- CBR
- Job Coach Services Programmes
- Disability Equality Training (DET)

Lead Agencies:
- Ministry of Women, Family and Community Development
- Department of Social Welfare

Supporting Agencies:
- Ministry of Youth and Sports
- Ministry of Communications and Multimedia
- Local authorities
- Non-Governmental Organisations
- Transport Operators

International Exemplification

Sweden

United States
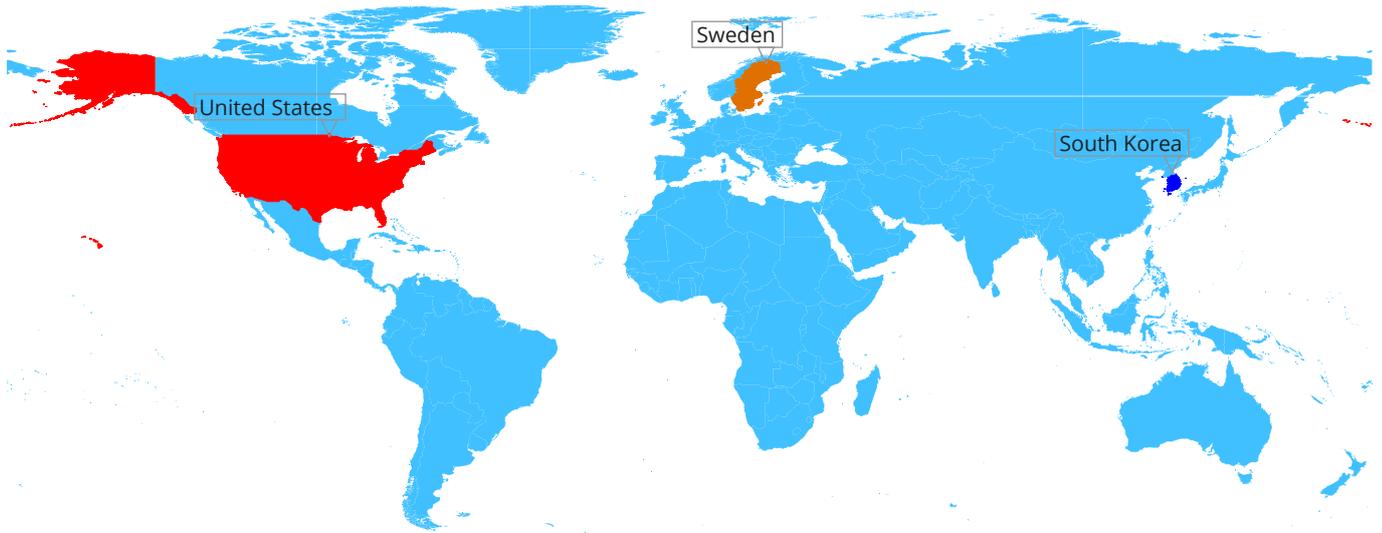
South Korea

United States:
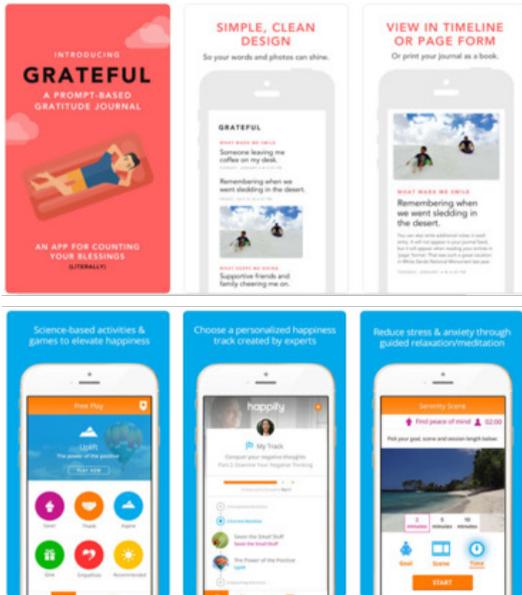
Example self care applications

Sweden:

South Korea:

Example of digital awareness and advertisement boards
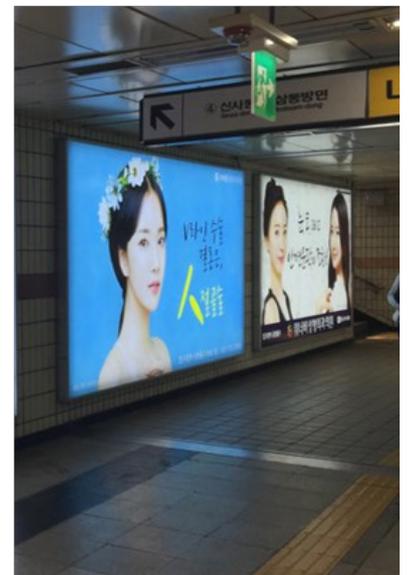
LOCAL REFERENCE

Eleventh Malaysia Plan
- Promoting social integration and ethics to foster a united and moral society
- Intensifying stakeholder engagement to build a shared sense of responsibility

National Social Policy
- Lifelong learning and empowering people
- Strengthening and developing social support systems and social services
- Ensuring basic needs of individuals, families and communities are fulfilled
- Generating multisector synergy

National Community Welfare Policy
- Developing human potential to the maximum level and increasing the resilience of society to face the current community challenges
- Creating a variety of facilities to enhance the level of capability for personal and individual progress
- Build and cultivate the spirit of mutual assistance, help to strengthen the *Ikram* culture

Strategy 3:	Increase skilled and talented human capital at every level

The percentage of skilled and talented human capital in Malaysia is relatively low at 27% compared to advanced countries such as Finland (100%) and Germany (80%). Another main concern for Malaysia is the lack of talent in computer manufacturing industry, digital industry and information technology sector.

There are quite a few existing and ongoing programmes that have been introduced under TalentCorp such as Upskilling, MyApec, YouthConnect, Knowmads, Returning Expert Programmes, Career Comeback Programmes and ResidencePass Talent. Therefore, this strategy aims to enhance and emphasise the existing initiatives with additional support targeting to increase talented human capital in Malaysia.

Percentage of workers based on skill level in Malaysia, 2016

13%
27%
60%

■ Highly Skilled Worker   ■ Semi Skilled Worker   □ Poor Skilled Worker

Source: https://www.talentcorp.com.my, 2018
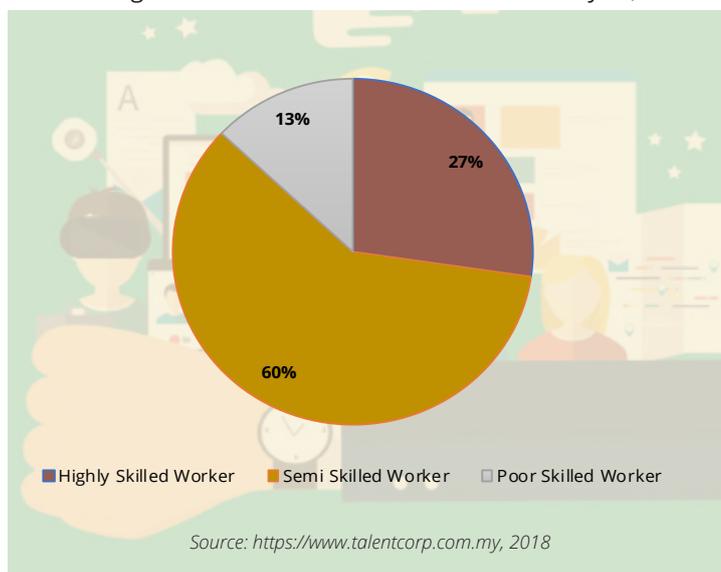
Proposed Initiatives:

01
Review curriculum in subjects such as STEM, innovation, ICT and emphasis on TVET in the education system

The curriculum in these areas need to be revised continuously to keep pace with the dynamic requirements and demands of the future and industries. Teaching and learning should incorporate more innovative approaches to develop 21st century skills such as collaborative skills, digital literacy, critical thinking as well as problem-solving skills. Hence, integration of theory and practical industrial applications into education curriculum is deemed necessary.

Lead Agency:
• Ministry of Education

Supporting Agencies:
• Malaysian Global Innovation and Creativity Centre
• TalentCorp
• Ministry of Human Resources
• Majlis Amanah Rakyat
• Malaysia Digital Economy Corporation

02
Strengthening industry-academia collaboration in digital workforce/ innovation

The modern development model in Malaysia assigns a great deal of importance to R&D and innovation as a main ingredient of productivity and economic success. Lack of skilled human capital has somehow degraded the current activities. Therefore, strengthening the industry-academia collaboration may be able to encourage more people to embark in this sector.

Lead Agency:
• Ministry of Education

Supporting Agencies:
• Malaysian Global Innovation and Creativity Centre
• TalentCorp
• Universities
• Majlis Amanah Rakyat

03
Establish employee experience and training programmes in every workplace

Semi-skilled workers dominate up to 60% of total workforce in Malaysia. The proposed training programmes will be a combination of experiences, on-site training, presentation, networking and publication. Accreditation and certification of workers based on their experience and talent will also act as an encouragement factor in increasing talented human capital.

Lead Agency:
• TalentCorp

Supporting Agencies:
• Ministry of Human Resources
• Private Sectors

04
Enhancing job skills training centres for specific talent

Enhancing job skills training institutes/centres to provide comprehensive training and certification to individuals and corporate bodies for increased competency in specific talent based on industry demand. The programmes shall be incorporated with scholarships and bond by industries to secure jobs as well as encourage more people to participate.

Lead Agency:
• Malaysian Global Innovation and Creativity Centre

Supporting Agencies:
• TalentCorp
• Ministry of Human Resources
• Universities and Institutions

05
Enhancing higher education programmes in advance technology

The need for advancement of technology is expected to rise tremendously with the adaptation of smart city initiatives especially in major city centres. Therefore, by enhancing specific advanced technology programmes in public/private institutions may be able to cater to the future needs of smart cities such as new innovations for smart solutions (Smart Bin, Smart Waste Technology, Smart Apps, and etc).

Lead Agency:
• Ministry of Education

Supporting Agencies:
• Malaysian Global Innovation and Creativity Centre
• TalentCorp
• Universities and Institutions
• Malaysia Digital Economy Corporation

06
Enhancing digital human workforce

Digital workforce or a digital worker is a software which automates patterns of how humans use computers in rules-based tasks. A digital worker is a team member that is trained to carry out the process just like any employee, only faster and without mistakes. Combining them with machine learning and other AI technologies allows organisations to automate more complex tasks and free up people to do more strategic work.

Lead Agency:
• Malaysian Global Innovation and Creativity Centre

Supporting Agencies:
• TalentCorp
• Universities and Institutions
• Malaysian Investment Development Authority

International Exemplification
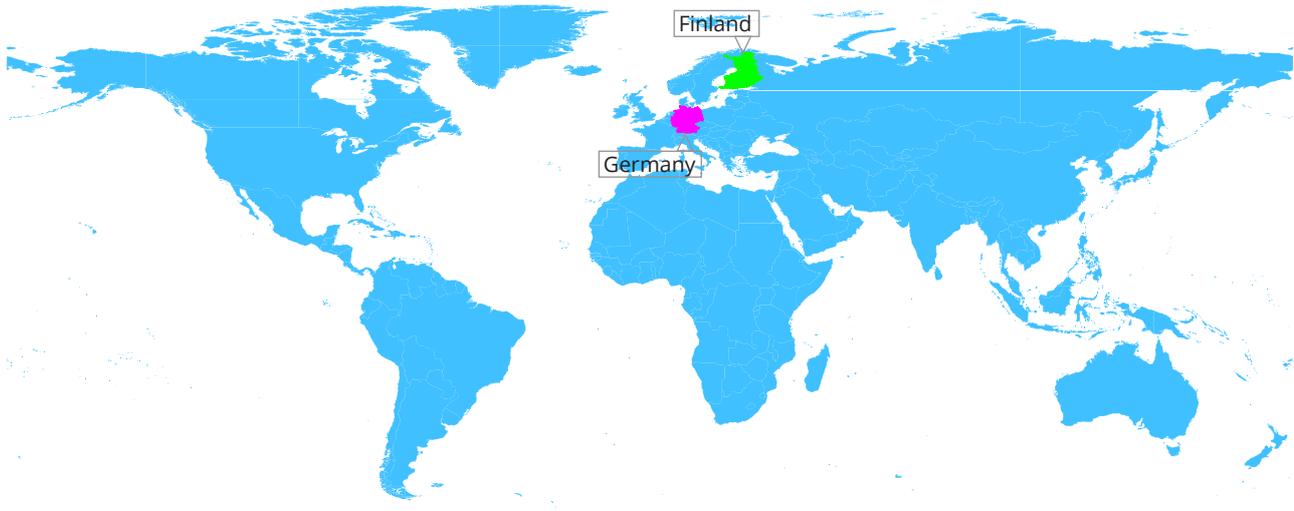
Finland:
- Emphasising individual learning paths (competence-based qualification system which accredits prior studies and recognises informal learning)
- Subsidising leave system as an incentive to business to help finance worker training costs
- Upskilling as a matter of survival due to rapid structural change towards technology-based sectors.

Government Programmes:
- New learning environments and digital materials for comprehensive schools
- Vocational upper secondary education reform
- Accelerated transition to working life
- Improved access to art and culture
- Closer cooperation between higher education institutions and business life to bring innovations to the market
- Shift from the youth guarantee towards a community guarantee

Germany:
- Meeting today's and tomorrow's skills needs
  ◊ Matching supply to current demand for skills
  ◊ Helping workers and enterprises adjust to change
  ◊ Building and sustaining competencies for future labour market needs
- A holistic approach
  ◊ Continuous and seamless pathways of learning
  ◊ Development of core skills
  ◊ Development of higher-level skills
  ◊ Portability of skills
  ◊ Employability
- A life cycle perspective
  ◊ Children, young people and older workers
- Convergence across policies
  ◊ Connecting basic education to technical training and etc
  ◊ Ensuring continuous communication between employers and training providers
  ◊ Integrating skills development policies with others

LOCAL REFERENCE

Eleventh Malaysia Plan
- Transforming TVET to meet industry demand
- Strengthening lifelong learning for skills enhancement
- Improving the quality of education for better student outcomes and institutional excellence

Vision 2020 Perspectives
- Creating scientific and progressive societies, having a high and forward-looking force, which is not only a technology user but also contributes to scientific civilisation and future technology

Malaysia Education Blueprint 2013-2025
- Provide equal access to quality education of an international standard
- Ensure every child is proficient in Bahasa Malaysia and English language and is encouraged to learn an additional language
- Ensure high-performing school leaders in every school
- Leverage ICT to scale up quality learning across Malaysia

TalentCorp
- Upskilling, MyAPEC Youth Connect, Knowmads, Returning Expert Programmes, Career Comeback Programmes, Residence Pass-Talent

Strategy 4:	Enhance public participation and community empowerment

Public participation can be any process that directly engages the public in decision-making and gives full consideration to public input in making that decision. Conducting meaningful public participation involves seeking public input at the specific points in the decision process and on the specific issues where such input has a real potential to help shape the decision or action.

In Malaysia, public participation and community empowerment is being strengthened through the National Community Policy.

Benefits of public participation include:

1. Agencies will make better and more easily implementable decisions that reflect public interests and values and are better understood by the public.

2. Communities develop long-term capacity to solve and manage challenging social issues, often overcoming longstanding differences and misunderstandings.

Proposed Initiatives:

01
Increase public participation programmes in every decision making process at local level

02
Enhance the use of digital platform to create a two-way interaction between the community and local authority

03
Strengthen organisational structure at community level

Successful public participation requires:
1. Clear purpose and goals
2. Clear structure and process
3. Actual opportunity for influence
4. Commitment to the process
5. Inclusive and effective representation
6. Participative capacity among staff and participants
7. Sufficient resources to conduct the process
8. A climate of integrity
9. A belief in the value of public input
10. Complete transparency

Lead Agency:
• Local authorities

Supporting Agency:
• Residents Association

The enhancement of the current established digital platforms should focus more on two-way communication, reliability and response time. The platforms will be able to help promote a shared purpose, to interact, and encourage collaboration and idea-sharing.

These initiatives also include:
1. Activation of the previous incentives programmes for smart phones especially for underserved groups
2. Enhancement of private sectors involvement such as communication providers, banking and etc

Lead Agency:
• Local authorities

Supporting Agencies:
• Ministry of Communications and Multimedia
• Apps Inventor
• Service Provider

Smaller organisational structures can communicate more easily with the people at all levels. By sheer volume, larger organisations face challenges in communicating consistent and accurate information. Independent organisational structure at community level which is also supported by other agencies will be able to reduce the dependency on local authority in various aspects and therefore, issues raised will be solved directly and quick.

Lead Agency:
• Local authorities

Supporting Agencies:
• Local Government Department
• District and Local Authority
• Residents Association

International Exemplification
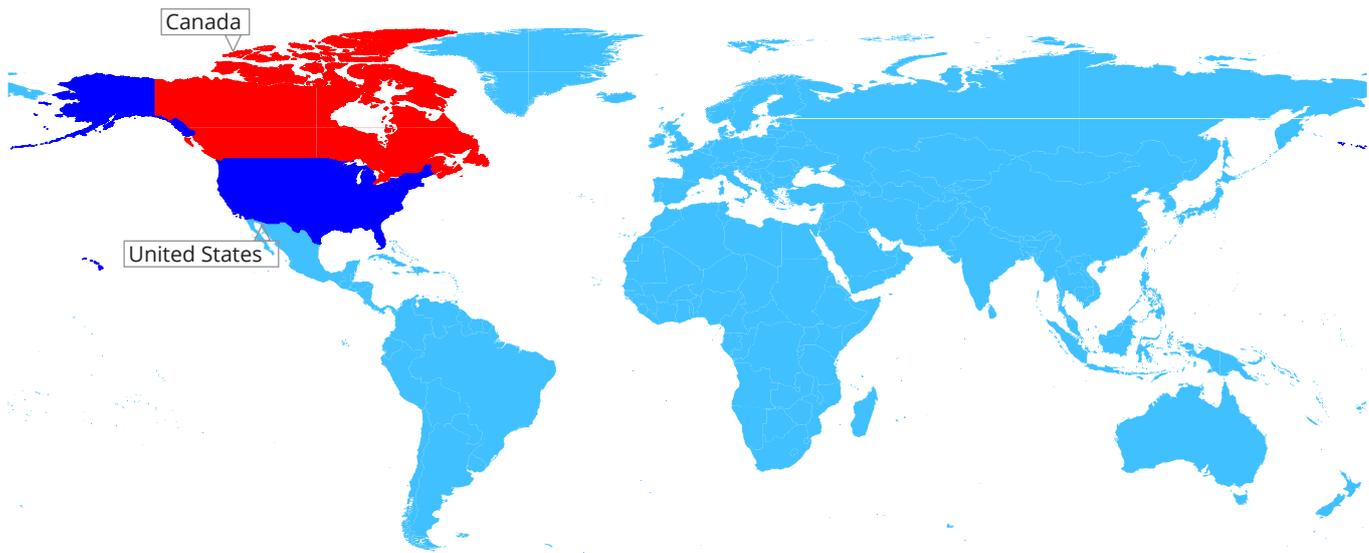
United States:
- Basic Principles
  - ◊ Adapted to the context, informative and proactive, adaptive and communicative, inclusive and equitable, educative, cooperative and imputable
- Operating Principles
  - ◊ Initiated early and sustained, well planned and focused on negotiable issues, supportive to participants, tiered and optimised, open and transparent, context-oriented, credible and rigorous

Canada:
- Accountability
  - ◊ Demonstrating that results and outcomes are consistent with inclusiveness
  - ◊ Reaching and hearing the voices of those interested or affected
- Transparency
  - ◊ Ensuring decision processes and procedures, and constraints are understood, known and followed
- Commitment
  - ◊ Leading and resourcing appropriately for effective engagement
- Responsiveness
  - ◊ Being accessible to address stakeholder concerns

LOCAL REFERENCE

National Physical Plan 3
- Implement collaboration and smart partnership in community development

Eleventh Malaysia Plan
- Empowering communities for a productive and prosperous society
- Capitalising on local authorities for quality services at the local level
- Enhancing service delivery with citizens at the centre

National Urbanisation Policy
- Community involvement is encouraged in urban planning and governance
- The use of innovative technology in the planning, development and management of urban services

National Community Policy
- Empower local communities to be actively involved in the maintenance and management of public property and common property as well as inclusive society development to achieve sustainable living

Strategy 5:	Improve gender sensitisation and inclusivity of vulnerable groups

Gender is a socially learned behaviour, based on social expectation from men and women. It varies across the world. Gender sensitisation is the process in which people of all genders are taught to respect everyone irrespective of gender while acknowledging the differences.

As of Malaysia, gender sensitisation is not a major issue especially in terms of general bias and discrimination. However, there is still a need to focus on the gender equality in decision making for all aspects of smart city development such as the difference in infrastructure and facility needs for both gender, daily activities as well as safety requirements.

The MGGI examined the gap between men and women in four fundamental categories: economic participation & opportunity, educational attainment, health, and political empowerment.

Average score for Malaysia was 0.692 in 2016 (indicates gender gap was 69.2). The score of 1.00 (100%) is defined as no gap between men and women

Source: Department of Statistics, 2016

Proposed Initiatives:

01
Establish gender sensitisation and vulnerable groups workshop in every decision making process

The gender and vulnerable groups workshop is proposed to sensitise stakeholders and decision makers on gender equality in terms of city development and management especially the differences in needs and requirements. The workshop intends to collect as much information and opinion from both genders as well as vulnerable groups to achieve equitable solutions.

Lead Agency:
• Ministry of Women, Family and Community Development

Supporting Agencies:
• Local authorities
• State governments
• Residents Association
• Non-Government Associations

02
Establish an exclusive digital application for women's safety

Women safety has become the utmost priority of the Malaysian government. More so looking at the increasing rate of crime involving women. There are various safety apps present on play store designed for the protection and security of women. Therefore, enhancement and encouragement of using these digital platforms to increase individual security should be emphasised in a smart city. Establishing a Malaysian context safety apps should be prioritised to reduce the crime risk in women.

Lead Agency:
• Ministry of Women, Family and Community Development

Supporting Agencies:
• Ministry of Communications and Multimedia
• Apps Inventor
• Service Provider

03
Integrate the existing SMOKU system with other agencies in enhancing public awareness

SMOKU is an existing system developed for all activities and management of the disabled groups. However, the system is limited to only managing the disabled enrolment and job search. It is beneficial for the existing system to be incorporated with other agencies so as to promote public awareness on the subject as well as to provide more comprehensive platform for the disabled to get access.

Lead Agency:
• Department of Social Welfare

Supporting Agencies:
• Ministry of Communications and Multimedia
• Non-Government Associations

International Exemplification
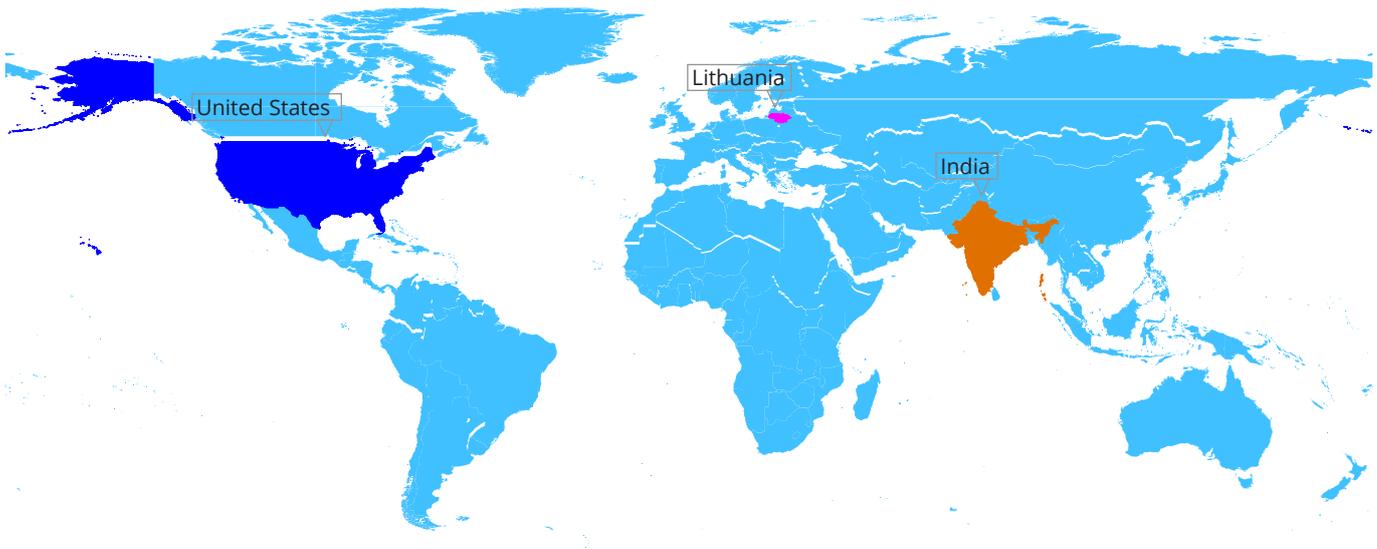
United States:
- Workshop on gender, health and development
  - ◊ To examine the difference between sex and gender
  - ◊ To discuss the gender approach and its particular relevance to the areas of health and human development
  - ◊ To acquire skills and methodologies to enable participants to ensure that their work in health and development is grounded in a gender approach

Lithuania:
- Gender equality training
  - ◊ Identify gender inequalities in their field of activity
  - ◊ Define gender-equality objectives
  - ◊ Take account of gender when planning and implementing policies
  - ◊ Monitor progress
  - ◊ Evaluate programmes from a gender perspective

India:
- Women safety apps
  - ◊ Safetipin
  - ◊ Raksha – Women Safety Alert
  - ◊ Himmat
  - ◊ Women Safety
  - ◊ Smart 24x7
  - ◊ Shake2Safety
  - ◊ bSafe

LOCAL REFERENCE

Eleventh Malaysia Plan
- Empowering communities for a productive and prosperous society
- Enhancing the role of women in development
- Upholding the needs and interests of children
- Enhancing the living environment for elderly
- Empowering persons with disabilities

Disabled People Policy
- Giving recognition and acceptance of the principle that disabled persons have equal rights and opportunities for full participation in society
- Ensure PWD enjoys the right, opportunity and access equally under national law
- Eliminates discrimination against a person due to his inability
- Educate and raise public awareness about the rights of the disabled

National Women Policy
- Mainstreaming gender perspectives on policy formulation and legislation, planning, implementation and evaluation of programmes, projects and budget preparation for development
- Conduct research on gender aspects to generate innovative and creative approaches in policy formulation and planning as well as programmes implementation

National Policy for Older Persons
- To enhance the respect and self-worth of the elderly in the family, society and nation
- To develop the potential of the elderly so that they remain active and productive in national development and to create opportunities for them to continue to live independently
- To encourage the establishment and the provision of specific facilities to ensure the care and protection of the elderly

Strategy 6: **Increase the public willingness to adapt with emerging technologies**

Technology is changing at such a rapid pace that some of us are finding it hard to blend in. The challenge presented by the "digital divide"; the social and economic inequalities which come about as a result of who has access to communication technology, and how they use it needs to be addressed.

Therefore, if a city is to be "smart", it is believed that achieving equality for all levels of communities in the domestic sphere is a good place to start. In terms of changing mindset and willingness to accept the changes, a bottom-up approach is typically much more innovative and inclusive as a starting point. This approach turns citizens from end-users to begin-users as well as to give initial exposure to the people of what will happen to their city in the future.

Proposed Initiatives:

01

Establish the introduction of digital education at primary school

The exposure towards digital technologies at younger age may be able to produce confident, creative, connected and actively involved lifelong learners. Besides, it will also increase the level of readiness for future technological changes. The digital education should be considered in curriculum reform, skills development, teacher and learner education as well as learner outcomes.

Lead Agency:
• Ministry of Education

Supporting Agencies:
• Ministry of Communications and Multimedia
• National Innovation Agency Malaysia
• Malaysia Digital Economy Corporation

02

Establish digital technological learning programmes for elderly

When it comes to vulnerable groups such as senior citizens, disabled, and underserved groups, digital inclusion can be a tricky business. The importance of connecting digital literacy training to specific outcomes that are essential to the wellbeing of older adults is the bottom line. Seniors learn best when they learn with a purpose. Therefore, the learning programmes should be introduced gradually according to the relevancy of the technology usage to them.

Lead Agencies:
• Ministry of Women, Family and Community Development
• Department of Social Welfare

Supporting Agencies:
• Ministry of Communications and Multimedia
• Non-Governmental Organisation

03

Lifelong learning programmes for the public

Promote continuous upgrading of skills for the members of society. While there are existing national initiatives for skills enhancement of the workforce, coverage of the programme should encompass education on basic navigation of digital applications as citizens in general will have active roles in smart cities' activities and decisions and these applications will heavily alter the conventional lifestyle.

Lead Agency:
• Local authorities

Supporting Agencies:
• Ministry of Women, Family and Community Development
• Non-Governmental Organisation

04

Enhance the use of user-friendly digital information boards in public areas

Technology in public areas is revolutionising the way people experience the city. As cities grow bigger, clear communication becomes crucial. Therefore, enhancement of digital information boards in every public areas such as public parks, bus stations, train stations, and malls will be able to bring people closer to technology.

Lead Agencies:
• Ministry of Communications and Multimedia
• Local authorities
• Transport Operator

Supporting Agencies:
• Ministry of Education
• Ministry of Women, Family and Community Development
• Ministry of Youth and Sports
• Residents Association
• Department of Unity and National Integration
• Non-Government Associations

International Exemplification
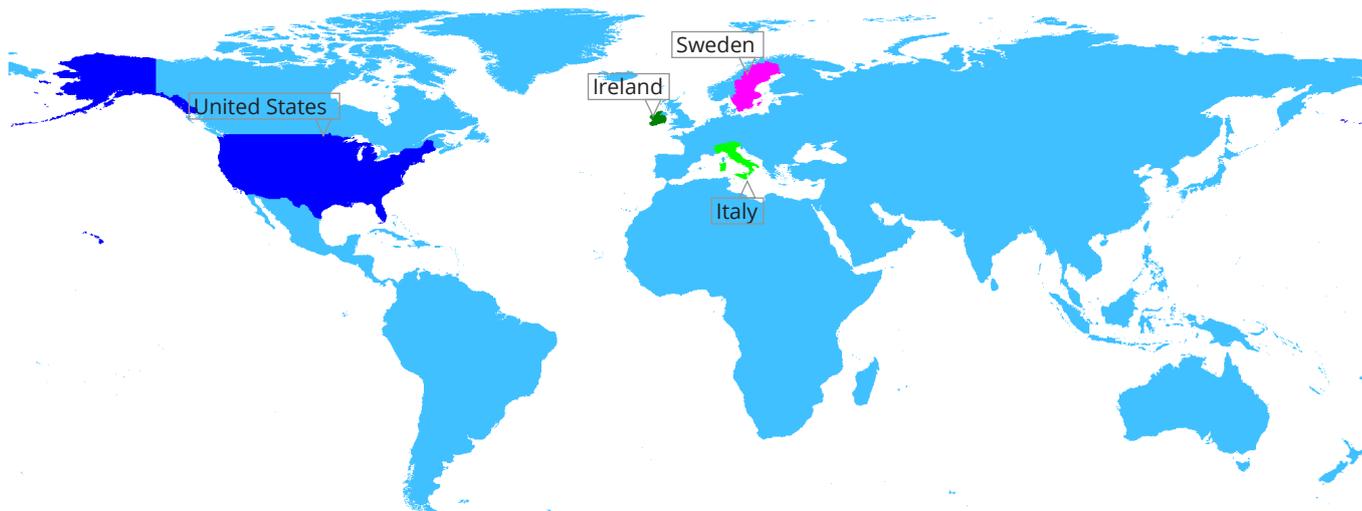
United States:
- SeniorNet – Education and Empowerment
    - ◊ To provide older adults (the underserved) education for and access to computer technologies to enhance their lives and enable them to share their knowledge and wisdom.

Ireland:
- Digital Learning Framework for Primary Schools
    - ◊ To provide clarity for teachers in terms of how they can effectively embed digital technologies into their practice. It will also guide school leaders and education providers in creating a shared vision for how technology can best meet the needs of all learners.

Italy:
- ICT and lifelong learning for senior citizens
    - ◊ The online learning initiatives were organized in the context of an experimental five-year education programmes introducing a large number of over-60s to the basics of ICT.

Sweden:
- Early Digital Education : Learning to programme at primary school
    - ◊ Aside from basic digital education such as computing, a new curriculum that includes programmes that is added into primary school syllabus, which is to prepare the new generation for the future.

LOCAL REFERENCE

Eleventh Malaysia Plan
- Strengthening lifelong learning for skills enhancement
- Improving the quality of education for better student outcomes and institutional excellence

Vision 2020 Perspectives
- Creating scientific and progressive societies, having a high and forward-looking force, which is not only a technology user but also contributes to scientific civilization and future technology

Malaysia Education Blueprint 2013-2025
- Provide equal access to quality education of an international standard
- Ensure high-performing school leaders in every school
- Leverage ICT to scale up quality learning across Malaysia

National Policy for Older Persons
- To enhance the respect and self-worth of the elderly in the family, society and nation
- To develop the potential of the elderly so that they remain active and productive in national development and to create opportunities for them to continue to live independently
- To encourage the establishment and the provision of specific facilities to ensure the care and protection of the elderly

Smart Government

Policies	Policy 4: Open data and open government practices shall be promoted	Policy 10: E-Government shall be strengthened in the development of smart city	Policy 13: Community empowerment shall be enhanced in smart city planning and governance

Smart Government

Strategies	Initiatives			Indicator
Strategy 1: Promote information disclosure and open data from government	1. Publish annual meeting minutes, financial statements and budgets on respective government websites 2. Live broadcast and post videos of non-sensitive government meetings on government entities' websites		3. Develop and publish standard operating procedures for information requests 4. Share datasets on existing open data portal 5. Utilise electronic procurement architecture	1. Website publication of the following documents by government entities: • Annual meeting minutes • Financial statement • Budget 2. Percentage of government entities' procurement conducted online 3. Percentage of inventoried open datasets that are published by government entity 4. Number of transactions in e-government services per year 5. Percentage of users satisfied with e-government services provided per year 6. Government to government (G2G) data sharing platforms used by government entity 7. Percentage of datasets shared by government entity on G2G data sharing platform 8. Number of downloads per shared G2G dataset
Strategy 2: Increase the scope of e-government services		1. Identify key services to be brought online 2. Utilise digital documents		
Strategy 3: Increase the quality of e-government services		1. Rationalise overlapping e-government applications and services 2. Establish customer satisfaction assessment in e-government services 3. Publish delivery time of e-government services		
Strategy 4: Elevate the use of data sharing platform across government agencies	1. Assess the suitability of different types of data sharing platforms with existing government ICT architecture			

Smart Government

Strategy 1: **Promote information disclosure and open data from government**

Government entities (federal ministries and agencies, state government departments and agencies, and local authorities) have been documenting and storing information since the introduction of e-government and with heightened public expectation of transparency. However, relevant information and data at various levels of government are inadequately shared with the public.

The promotion of information disclosure and open data at all levels of government is instrumental in smart city development as government accountability, informed citizenry and business community enhance public decision-making and trust. Recommended initiatives to drive this strategy are as follows:

Proposed Initiatives:

01
Publish annual meeting minutes, financial statements and budgets on respective government websites

Government entities must publish their annual financial statements and budgets on their websites in a timely and interactive manner. Many government entities have already undertaken this initiative, but the practice should be done consistently among all government entities in Malaysia. Additionally, the most recent or past years' financial statements and budgets for some government entities are unavailable. Therefore, government entities must step up this effort to disclose annual financial statements and budgets on their websites.

Lead Agencies:
- Ministries and agencies
- State governments
- Local authorities

02
Live broadcast and post videos of non-sensitive government meetings on local government websites

With the popularity and widespread use of social media and video sharing platforms, government entities should live broadcast and post videos of non-sensitive meetings on their websites. This allows members of the public to be informed of government decisions and priorities. Additionally, the technology to live broadcast meetings is not expensive. Camera phone recordings are sufficient for this purpose.

Lead Agencies:
- Ministries and agencies
- State governments
- Local authorities

Supporting Agencies:
- Ministry of Communications and Multimedia
- The Malaysian Administrative Modernisation and Management Planning Unit

03
Develop and publish standard operating procedures for information requests

Government entities possess internal and detailed information that some members of the public or businesses may wish to access such as crime statistics and detailed local council meeting minutes. While government entities reserve the right to grant or refuse information requests and are bound by certain laws, they must develop and publish standard operating procedures on how such requests are handled. This ensures that government entities follow a defined and reasonable process. At the same time, the public and businesses will be confident that the conduct of government entities are fair and not arbitrary.

Lead Agencies:
- Ministries and agencies
- State governments
- Local authorities

Supporting Agency:
- Attorney-General's Chambers

04

Share datasets on existing open data portal

Sharing datasets on various measures that are deemed public good should be practised by all levels of government. Government entities have datasets capturing very detailed and technical information. Utilisation of datasets by the public, businesses and other government entities can provide insights on and solutions for various issues. It must be noted that open data can be applied on a public good (free) basis or commercialised for cost recovery to prepare certain detailed and technical datasets.

The open data portal, data.gov.my has been running for years. However, the practice of sharing public datasets by all levels of government can be increased further.

Efforts must also be taken to ameliorate fears of sharing data on the part of government entities. Oftentimes government entities share limited data as they do not want to bear the responsibility for the liability associated with the open data.

Lead Agencies:
• Ministries and agencies
• State governments
• Local authorities

Supporting Agencies:
• Ministry of Communications and Multimedia
• The Malaysian Administrative Modernisation and Management Planning Unit

05

Utilise electronic procurement architecture

Government entities must utilise electronic procurement (e-procurement) architecture as often as possible. The benefits of e-procurement are well documented, from reduced transaction costs, to higher procurement savings and enhanced transparency.

E-procurement architecture is irregular among government entities. Federal government ministries use the *ePerolehan* system. Some local authorities use the state's e-procurement system. Other local authorities use their own internal e-procurement system. Government entities should demonstrate and use e-procurement as their primary method of procuring goods and services.

Lead Agencies:
• Ministry of Finance
• State government
• Local authorities

Supporting Agency:
• E-procurement platform developers

International Exemplification
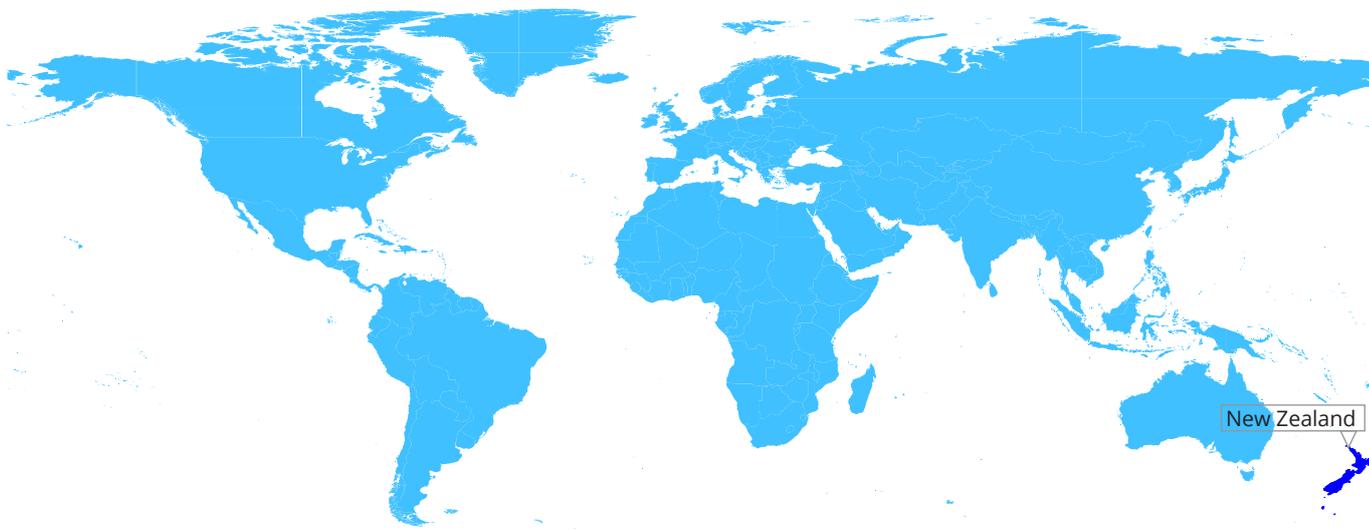
New Zealand:
- Strong history of open and transparent government that is internationally recognised (number 1 on the Corruption Perception Index 2017 or least corrupt country). One of the pillars of open and transparent government is open government data and information.

- Some initiatives that has been done:
  ◊ localcouncils.govt.nz contains financial, basic organisational information, election, dog control, sensus and other data and resources about each council
  ◊ Declaration on Open and Transparent Government commits government departments to actively release high value public data for re-use, and encourages and invites other government agencies to do so
  ◊ Digital NZ launched which enables users to find and query data from across New Zealand's cultural, education, and government sectors and create new digital experiences

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LOCAL REFERENCE

Eleventh Malaysia Plan Mid-Term Review
- Enabling open government (initiative under Pillar 1, Strategy B2)
- Improving accountability of local authorities (initiative under Pillar 1, Strategy D3)
- Strengthening procurement framework (initiative under Pillar 1, Strategy C2)

Strategy 2: **Increase the scope of e-government services**

E-government services are widespread at different levels of government in Malaysia. According to Malaysian Administrative Modernisation and Management Planning Unit (MAMPU), 87.5% of government services were available online as of 2018. However, the number of e-government services varies by government agencies and local authorities. As people increasingly carry out daily and business activities online, the scope of online government services should increase as well.

Note that expanding the scope of e-government services does not only mean increasing the number of e-government services, but increasing the proportion of government services online over the total government services. Offering a large scope of e-government services offers the public and businesses convenience and efficiency that are features of a smart city. Proposed initiatives are as follows:

Proposed Initiatives:

01

Identify key services to be brought online

All government services cannot be brought online in a single moment. Transitioning government services has to be planned and phased. Core and high volume services should be brought online first. This requires mapping and prioritisation from government entities. For example, local authorities identify online business licensing as a priority service since one of its key functions is regulation of businesses in its jurisdiction. Feedback from the public is also necessary to validate the initial assessment by the relevant government entities. Higher management should then execute these plans and follow up periodically.

Lead Agencies:
• Ministries and agencies
• Local authorities
• State governments

Supporting Agencies:
• Ministry of Communication and Multimedia
• The Malaysian Administrative Modernisation and Management Planning Unit

02

Utilise digital documents

The main issue of not digitalising government services is the need to check for official documentation from the public. However, government agencies and local authorities, with robust procedures in place, can utilise digital documents (scanned copies of documents, computer generated documents, digital signatures, emails, etc.) to help facilitate identification and authentication process. This will help increase the number of e-government services.

Lead Agencies:
• Ministries and agencies
• Local authorities
• State governments
• Ministry of Communications and Multimedia

Supporting Agencies:
• The Malaysian Administrative Modernisation and Management Planning Unit
• Cybersecurity Malaysia
• Department of Personal Data Protection

International Exemplification
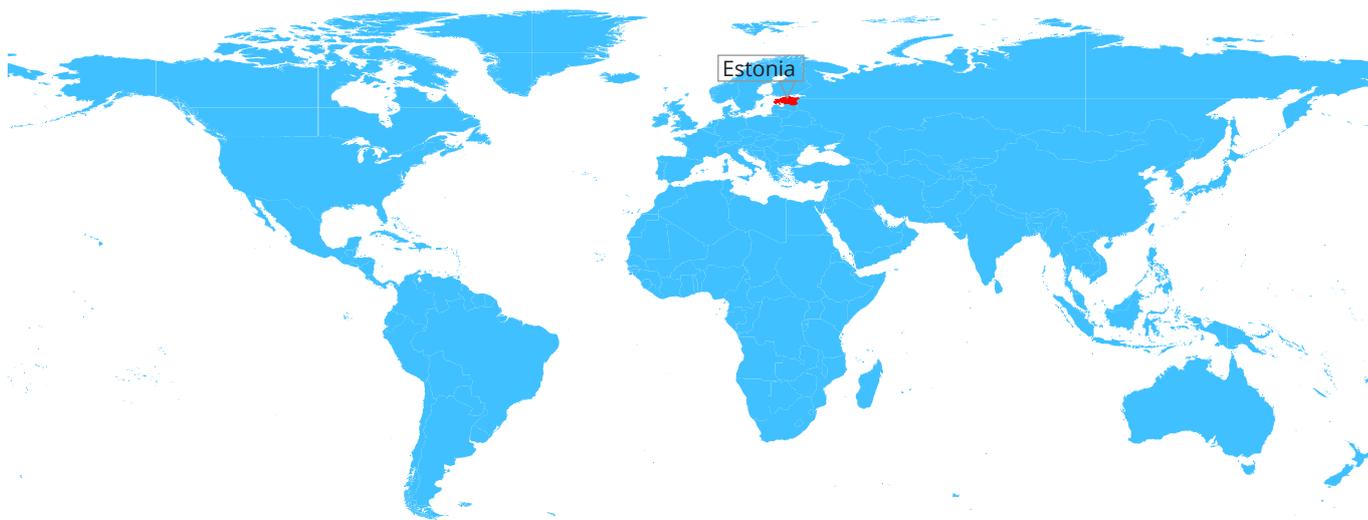
Estonia:
- 99% of the public services are available online 24/7. E-services are only impossible for marriages, divorces and real-estate transactions.
- Some e-government services offered:
    ◊ State Portal, eesti.ee, is a one-stop-shop for hundreds of e-services offered by various government institutions
    ◊ Online town hall meeting
    ◊ Geographic information services
    ◊ E-business register
    ◊ E-tax system

LOCAL REFERENCE

Eleventh Malaysia Plan Mid-Term Review
- Expanding digitalisation agenda (initiative under Pillar 1, Strategy D2)

Strategy 3:   **Increase the quality of e-government services**

As the scope of e-government services increases, the quality of these services has to increase as well. High quality e-government services will ensure the public makes use of the services offered.

High quality e-government services entail delivering convenience and efficiency to users, anticipating their needs and enhancing customer experience. The following initiatives seek to increase the quality of e-government services.

Proposed Initiatives:

01
Rationalise overlapping e-government applications and services

Relevant government ministries, agencies, state and local authorities should identify and rationalise e-government services that perform similar functions. Multiple applications or systems that perform the same function that are deployed by different agencies cause redundancy in operations and confusion among the public.

Lead Agencies:
• Ministries and agencies
• Local authorities
• State governments
• Ministry of Communications and Multimedia
• The Malaysian Administrative Modernisation and Management Planning Unit

02
Establish customer satisfaction assessment in e-government services

Government agencies and local authorities must establish a customer satisfaction assessment to gauge the user experience after using e-government services. This can be star rating or qualitative options assessment. Many government entities already have this in place, but should be expanded to include as many agencies and authorities as possible.

Lead Agencies:
• Ministries and agencies
• Local authorities
• State governments
• Ministry of Communications and Multimedia
• The Malaysian Administrative Modernisation and Management Planning Unit

03
Publish delivery time of e-government services

The time taken for processing or delivering e-government services should be published by relevant government agencies and authorities. Stipulation of delivery time gives certainty to customers and ensures accountability of the relevant government agency or authority. Client charters on government websites state committed delivery time for government services. But an initiative can be taken where delivery time be displayed to customers before or after they use e-government services.

Lead Agencies:
• Ministries and agencies
• Local authorities
• State governments
• Ministry of Communications and Multimedia
• The Malaysian Administrative Modernisation and Management Planning Unit

International Exemplification
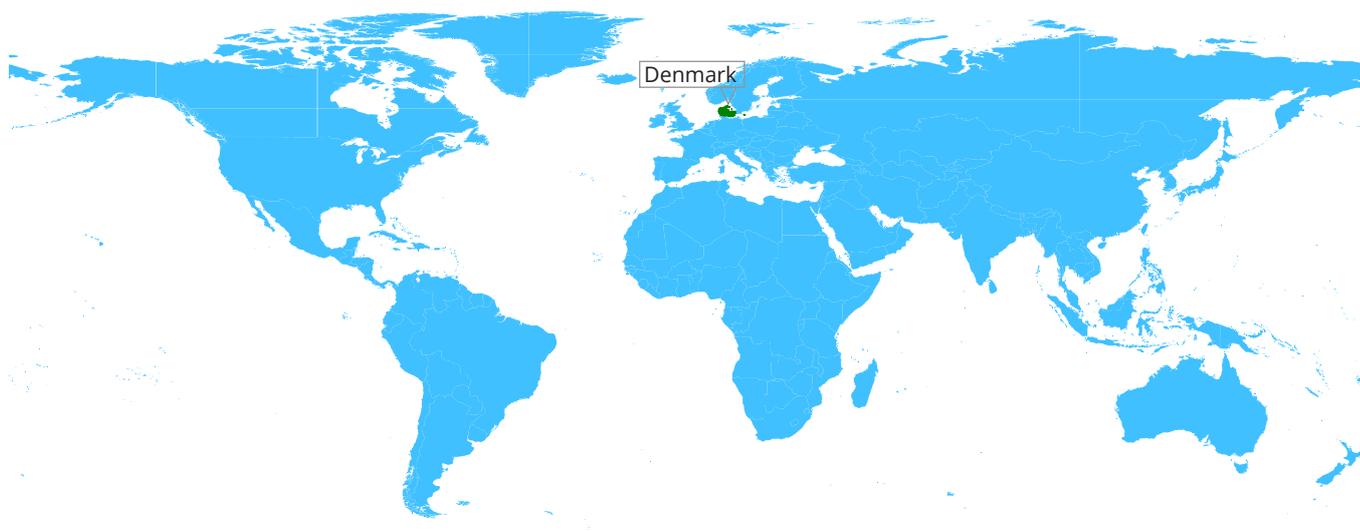
Denmark

- Denmark has the world's best in e-government initiatives according to the 2018 United Nations E-Government Survey. One key approach was to create a user-friendly and simple digital sector under Denmark's Digital Strategy 2016 – 2020.
- Key initiatives undertaken:
  - ◊ Data will be collected about user experience and use of the solutions so that solutions can constantly be improved
  - ◊ Work on selected user journeys, for example divorces or business start-ups, will secure easier and more straightforward self-service processes
  - ◊ A number of common public-sector support programmes will be gathered together so that it is easier for citizens and businesses to get help or to be guided to the right authority

LOCAL REFERENCE

Eleventh Malaysia Plan Mid-Term Review
- Expanding digitalisation agenda (initiative under Pillar 1, Strategy D2)

Strategy 4: **Elevate the use of data sharing platform across government agencies**

Data is the currency of the digital age as it contains patterns and preference of human and non-human activities. Government that utilises data gain insights on past performance and future trends on domains such as citizen mobility and public amenity utilisation. However, most government data are kept in silos. Data sources include data from various devices, comprising sensors and actuators for example on traffic, weather, and water levels, data provided by citizens which include wearables, complaints, service requests, mobile apps, digital kiosks, live chats, call centres, social media and in-person, as well as transactional data required for providing various smart services. Silo-ing of data disrupts smooth government operations as agencies may rely on data from other agencies to carry out their functions. Therefore, there is a need to increase the use of data sharing platform across government agencies. A proposed initiative is illustrated below:

Proposed Initiatives:

01

Assess the suitability of different types of data sharing platforms with existing government ICT architecture

Every government entity should assess the compatibility of their data repository with common government data sharing platforms, such as Malaysian Governmental Central Data Exchange (MyGDX). Should the two systems interoperate and share data seamlessly, then the practice of data sharing will increase. Efforts must be taken by relevant government agencies and authorities to reconcile data systems that are not readily interoperable.

**Lead Agencies:**
- Ministries and agencies
- Local authorities
- State governments
- Ministry of Communications and Multimedia
- The Malaysian Administrative Modernisation and Management Planning Unit

International Exemplification

Estonia

Estonia
- Initiated X-Road, an interoperable government data exchange platform that is highly regarded. X-Road transmits large data sets and perform searches across several databases of different organisations and information systems simultaneously
- Key statistics of the X-Road:
  - ◊ 800 years of working time saved
  - ◊ 900 organisations and entreprises in Estonia use X-Road daily
  - ◊ 500 millions queries annually by X-Road

LOCAL REFERENCE

Eleventh Malaysia Plan Mid-Term Review
- Expanding digitalisation agenda (initiative under Pillar 1, Strategy D2)

Smart Mobility

Policies	Policy 1: Primary infrastructure shall be upgraded	Policy 2: Shared digital infrastructure and internet connectivity shall be enhanced	Policy 4: Open data and open government practices shall be promoted	Policy 8: Sustainable and smart environment practices shall be encouraged	Policy 9: Public transport system shall be physically and digitally integrated	Policy 14: Public Private Partnerships (PPPs) shall be emphasised

Smart Mobility

Strategies	Initiatives					Indicator
Strategy 1: Establish intelligent transport management	1. AI and IoT sensors for data collection, traffic management and pollution tracking 2. Smart traffic lights 3. Centralised traffic command and control centre					1. Percentage of road intersections using adaptive traffic control or prioritisation measures 2. Ratio of travel time during the peak periods to travel time at free flow periods 3. Percentage of major streets monitored by ICT 4. Reduction in travel time (minutes) 5. Percentage of urban public transport stops or stations for which traveler information is dynamically available to the public in real time 6. Public transport satisfaction percentage 7. Percentage of transactions made using cashless modes 8. Public transport modal share 9. Number of shared vehicles per 100,000 inhabitants 10. Number of shared bicycles per 100,000 inhabitants
Strategy 2: Enhance data sharing and digital mobility platform		1. Install Information display panel at all public bus stops 2. Integrate existing mobility applications into all-in-one mobile application 3. Facilitate public transport operators' plans in introducing new integrated electronic payment systems for public transport fare collection				
Strategy 3: Establish demand-based ride sharing services				1. On-demand car sharing from and to rail stations 2. Bike sharing, with dedicated bicycle lanes 3. On-demand ride sharing van / shuttle service via PPP		

Policies	Policy 1: Primary infrastructure shall be upgraded	Policy 2: Shared digital infrastructure and internet connectivity shall be enhanced	Policy 4: Open data and open government practices shall be promoted	Policy 8: Sustainable and smart environment practices shall be encouraged	Policy 9: Public transport system shall be physically and digitally integrated	Policy 14: Public Private Partnerships (PPPs) shall be emphasised

Smart Mobility

Strategies	Initiatives						Indicator
Strategy 4: Utilise AI and sensor-based predictive maintenance of public transport fleet and infrastructure	1. Installation of IoT sensors on public transport fleet and infrastructure for predictive maintenance						11. Length of bicycle paths and lanes per 100,000 population 12. Number of van sharing MoU made via PPP 13. Percentage of public transport fleet equipped with sensors for predictive maintenance 14. Percentage of reduction in breakdowns and downtime 15. Percentage of increase in number of parking lot/ spaces at LRT/ MRT/ KTMB stations 16. Percentage of public buses electrified 17. Percentage of government fleet vehicles electrified 18. Number of charging stations per square kilometer 19. Percentage of reduction in carbon emission 20. Percentage of taxis and e-hailing vehicles electrified 21. Green vehicle adoption rate 22. Number of MoUs made on R&D via PPP
Strategy 5: Enhance dynamic smart parking infrastructure	1. Smart parking application with real-time parking vacancy information 2. Smart parking meters 3. Multi-layer / stacked parking facilities at public transport hubs						
Strategy 6: Establish electric vehicle revolution				1. Replacing government fleet vehicles with electric vehicles 2. City-wide electric bus fleets 3. Incentivising taxi and ride-hailing drivers and private owners who use green vehicles			
Strategy 7: Enhance collaboration with academia on R&D and commercialisation on EVs and next-generation automobile	1. Proactively engagement with academia and private sectors on the testing and regulatory framework for autonomous vehicles 2. Engage with academia and private sectors on long-term transit planning that allows for future innovations 3. Facilitate trials of autonomous vehicles in dedicated testing beds						

Smart Mobility

Strategy 1: **Establish intelligent transport management**

Many cities worldwide have embarked on the sensor-based traffic management by utilising IoT and AI which have numerous benefits and functions. The data captured from these sensors will be transmitted to the cloud-enabled central traffic command and control centre that will be able to monitor and record travel time information. In addition, these IoT sensors can also be fitted to street lights to monitor carbon emission levels by tracking the specific sources of pollution. The relevant authorities will then be able to act on this information by imposing strict penalties for vehicles emitting unusually high carbon dioxide.

Smart Traffic Lights are also beneficial for efficient transport management which also make use of IoT sensors and AI analytics. A centralised traffic command and control centre is a pre-requisite for the overall integration of data and coordination between various agencies for preventive and reactive traffic measures.
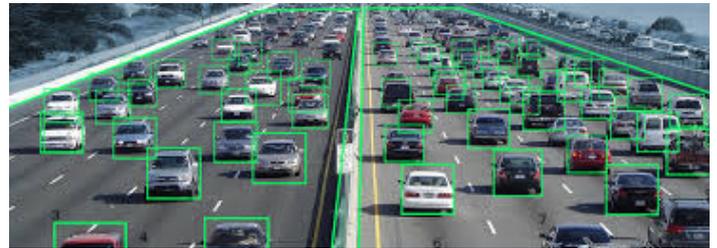
Thessaloniki Mobility Project, Greece

Bandung Smart City Command Centre, Indonesia
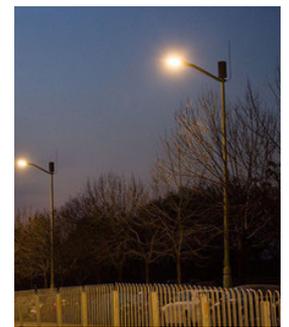
Proposed Initiatives:

01

AI and IoT Sensors for data collection, traffic management and pollution tracking

These IoT sensors can be installed on road public transport vehicles such as taxis and buses as well as on street lights to collect actual travel time data and detect pollution

Lead Agency:
• Ministry of Works

Supporting Agencies:
• Ministry of Transport
• Local Authorities
• Public Works Department
• Private agencies

02

Smart Traffic Lights

Installation of new, or retrofitting to existing, traffic lights with sensors and controls for AI-based dynamic optimisation of vehicle flow and traffic flow

Lead Agency:
• Ministry of Works

Supporting Agencies:
• Ministry of Transport
• Local authorities
• Public Works Department
• Private agencies

03

Centralised Traffic Command and Control Centre

Established at the national level with direct purview from the federal ministry, to integrate the data captured and facilitate coordination between the local authorities and relevant agencies.

Lead Agency:
• Ministry of Works

Supporting Agencies:
• Ministry of Transport
• Local authorities
• Emergency Response Units

International Exemplification
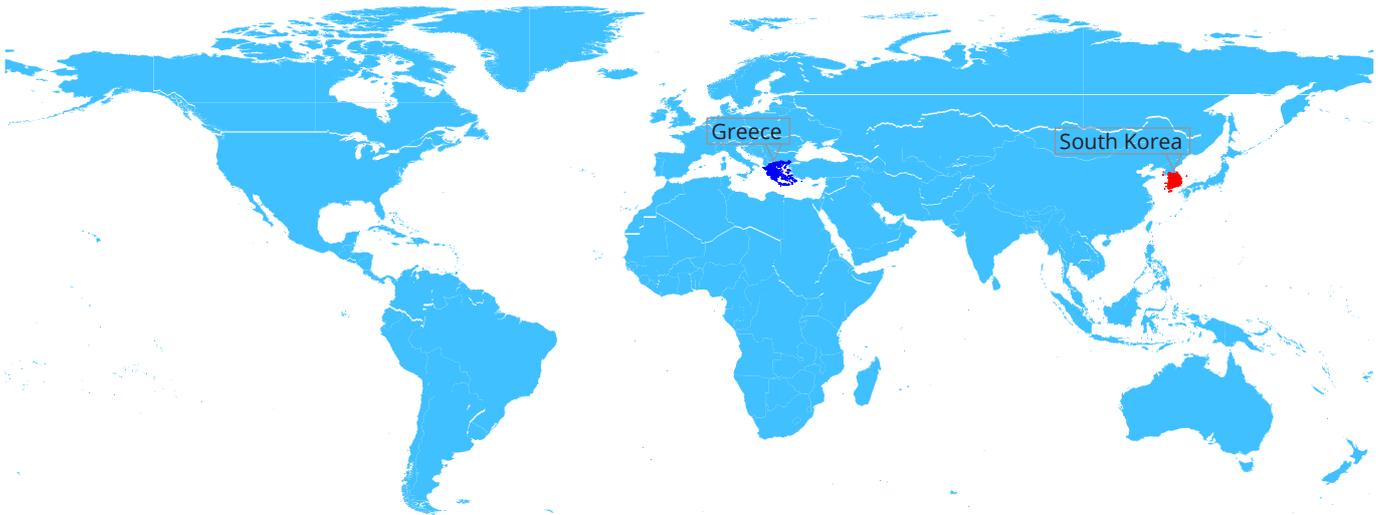
Greece:
- Thessaloniki Mobility Project – a traffic control centre manages incidents with real-time info, dynamically estimates traffic for the rest of the day, assesses and confirms estimated travel time and dynamically manage traffic lights.

South Korea:
- Cutting-edge traffic signal control system. During peak hours, time based control (TBC) is implemented where all signal indications are operated as regular signals. During non-peak hours, traffic response control (TRC) is implemented where detectors at left turn lanes detect the flow of traffic and flexibly manages signal indications by sometimes skipping left turn when there are no cars that need to turn left. Also, if urgent situations where fire trucks or emergency vehicles need to pass through occur, operator intervention control is implemented by using detectors at left turn lanes to allow the continuous flow of emergency vehicles.

LOCAL REFERENCE

Cyberjaya Smart and Low Carbon City
- Install more smart traffic management system to control congestion during peak hours
- Install smart apps (eg: GPS, real time info, real time tracking device) in all public transports

Cyberview and Intelsec Sdn Bhd
- Funded the installation of smart traffic management system project in collaboration with Majlis Perbandaran Sepang and MDEC
- Mounted above the traffic lights are LTE-equipped controllers that run video cameras with analytic capabilities
- The cameras analyse the traffic situation and intelligently direct traffic at the intersection to reduce waiting time at traffic lights
- Travel time was previously around 30 minutes and after implementation it was reduced to between 10 to 15 minutes

TrafficSens
- Developed by TrafficSens Systems (M) Sdn Bhd
- Integration with KLCH's existing automated traffic management system in 62 locations throughout Kuala Lumpur's city centre
- The system has a software that acquires and learns the traffic flow where it is deployed and adjusts the traffic flow accordingly. It can be likened to having a traffic policeman permanently stationed at each traffic light
- Through the TrafficSens intelligent learning system, the "stationary cop" would also be constantly communicating with other policemen to direct oncoming traffic
- The TrafficSens system is independent as it has an early warning system that is hooked up to the traffic management centre via 3G mobile network. If there is a faulty light in the array of TrafficSens system, it will despatch a warning via SMS to the command centre

Smart Selangor Blueprint
- Smart transportation information system
- The system will leverage IoT on the Smart Selangor Bus via a common Search Active Device Protocol (SADP), connecting to GPS and sensors on the bus. Other features will include a congestion heat map for citizens to plan their routes and movement

International Exemplification
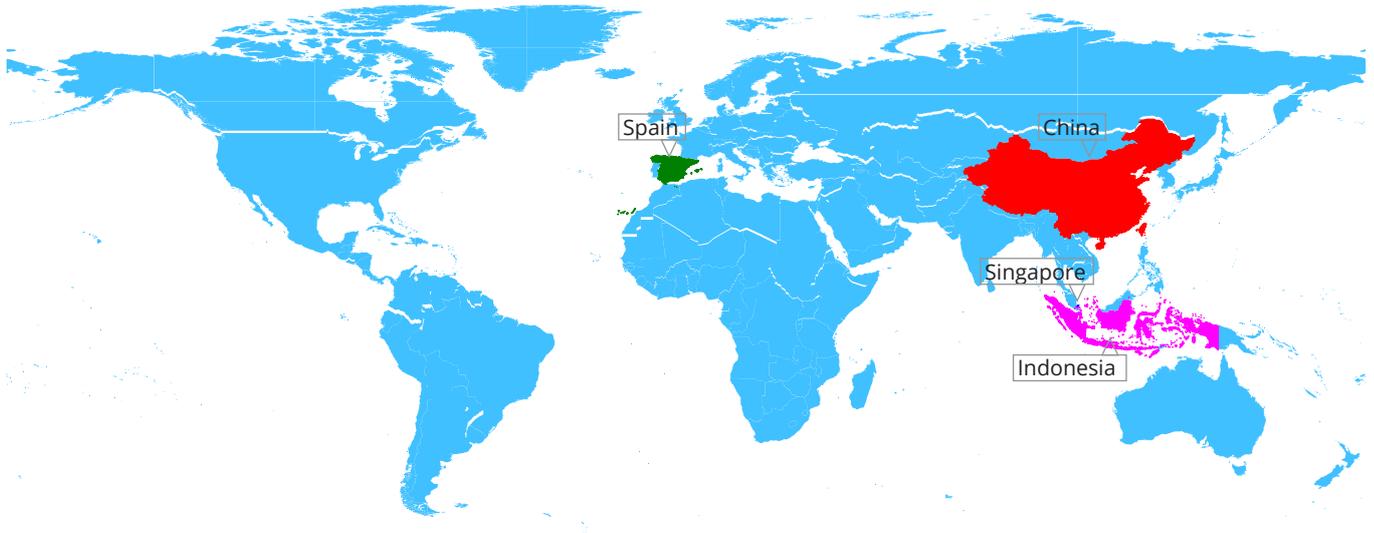
Indonesia:
- The Bandung Command Centre – a multi-million dollar spaceship-like room located a short walk from the mayor's office for data capturing, monitoring and integration with all the local authorities and emergency response units

China:
- Beijing has reduced deadly airborne pollutants by roughly 20% in less than a year by using air quality sensors to track specific sources of pollution and regulate traffic and construction accordingly

Spain:
- Zaragoza Traffic Monitoring System – Traffic data from 150 urban sensors is audited daily and goes directly to the Traffic Management Centre of Zaragoza City Council and is displayed on a web interface for management purposes

Singapore:
- More than 1,000 sensors have been deployed in busy areas such as traffic junctions, bus stops and taxi queues to monitor and regulate traffic flow

LOCAL REFERENCE

Integrated Transport Information System (ITIS)
- The system began operation on 2005 with the cooperation of KLCH, Malaysian Highway Authority, Malaysian Public Works Department (PWD) and the Ministry of Transport Malaysia (MOT)
- The system is used for traffic monitoring, accident, construction and other situations that happen on the roads and highways in Kuala Lumpur and Klang Valley
- The main ITIS headquarters and traffic operation centre is located at Bukit Jalil Highway near Technology Park Malaysia in Bukit Jalil
- The ITIS is a system made up of two core components, which are Advance Traffic Management System (ATMS) and Advance Travellers Information System (ATIS)

'Malaysia City Brain' initiative by Alibaba Cloud
- Collaboration with Malaysian Digital Economy Corporation (MDEC) and KLCH
- The initiative seeks to support Malaysia's digital transformation with cloud technology and AI
- The first phase of the programmes will roll out the Malaysia City Brain to improve mobility in the KL city though traffic management by optimising the flow of vehicles and traffic signals by calculating time taken to reach intersections
- The system will also have the ability to generate summaries of data including traffic volume and speed in certain lanes, which can then be used to facilitate tasks such as incident detection
- City Brain can connect with various urban management systems such as emergency dispatch, ambulance call, traffic command as well as traffic light control
- By integrating and analysing the real time data, City Brain can optimise traffic flow by identifying the quickest route for emergency vehicles to arrive at the scene in the shortest time frame. This increases the chances of survival by 50%

Strategy 2:   Enhance data sharing and digital mobility platform

To encourage the public to use public transport instead of relying on private vehicles, a reliable bus schedule is necessary. To enable access to this real-time information, a data sharing business model needs to be established to integrate the data from both the public and private transport operators. For public buses, an information display panel needs to be installed at all public bus stops.

Public transport users often do not have clear visibility on their journey due to scarce schedule information. With the data sharing model in place, the bus schedule info can be integrated with the schedule info of other public transport modes so that the users can plan their trips well ahead. Thus, to improve the rail ridership, a digital mobility platform needs to be developed that can allow seamless end-to-end trip planning, booking, ticketing and payment services across all available modes of transportation.

The digital payment options should not contain any surcharges. In addition to the travel information, the users should also be able to access facilities information as the availability of "Park n Ride" facilities, PWD facilities, prayer rooms etc.
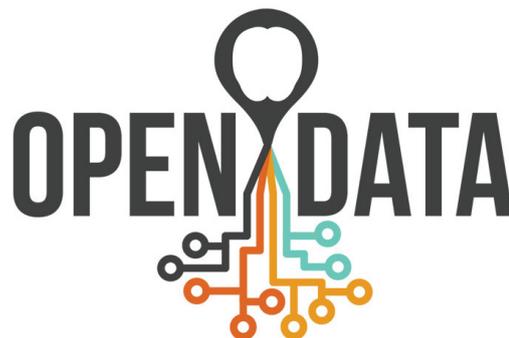
The 'Whim" Journey Planner Smartphone App rolled out in Helsinki, Finland

Proposed Initiatives:

01
Install information display panel at all public bus stops

All public bus stops shall be equipped with information display panels. These display panels will show real-time schedule information.

Lead Agency:
• Ministry of Transport

Supporting Agencies:
• Local authorities
• Public Transport Operators

02
Integrate existing mobility applications into all-in-one mobile application

Collection and dissemination of real-time information about price, arrival and departure times, and transportation options. The data collected from this digital platform can be used to identify the hotspots and better manage the public transport fleets.

Lead Agency:
• Ministry of Transport

Supporting Agencies:
• Local authorities
• Public Transport Operators

03
Facilitate public transport operators' plans in introducing new integrated electronic payment systems for public transport fare collection

Public transport operators should introduce e-wallet system with no additional charges. The e-wallet could bring additional rewards and discount vouchers for users.

Lead Agency:
• Ministry of Transport

Supporting Agencies:
• Local authorities
• Public Transport Operators
• Touch n Go
• Private players

International Exemplification
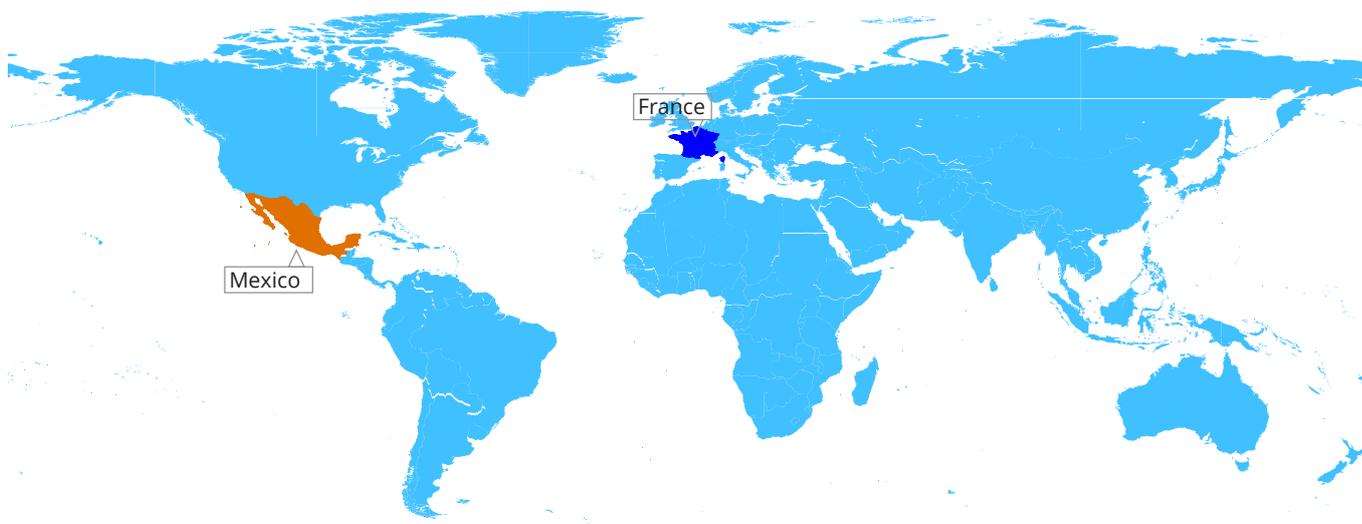
Mexico:

- Mexico city had no route map of the microbuses (peseros) that transport millions of people every day, but an app created a competitive game that engaged thousands of riders in compiling data on their routes.

France:

- France has been at the forefront of open data in Europe where online access to legal information was implemented in 1999. Civic groups like Wikimedia France, Open Street Map France, Libertic or Regards Citoyens had been lobbying for open data for many years before public administrations took action. Amongst public administrations, some cities pioneered the change: Rennes, then Paris thanks to the decision taken by the municipal council on June 8, 2010 relative to the publication of public data and the "Paris Data" portal made public in 2011.

LOCAL REFERENCE

Smart Selangor Blueprint
- Waze Connected Citizens Programmes (CCP)
- Waze will work closely with seven (7) participating municipalities on this pilot initiative where a middleware will be developed allowing road condition and maintenance to be monitored
- The platform will provide the selected municipalities access to its database in order for them to extract and capture data on road conditions in Selangor
- Data captured will cover traffic flow, road closures, accidents, and vehicle travel speeds and time taken to clear high-traffic areas to assist users in making informed travel decisions

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International Exemplification
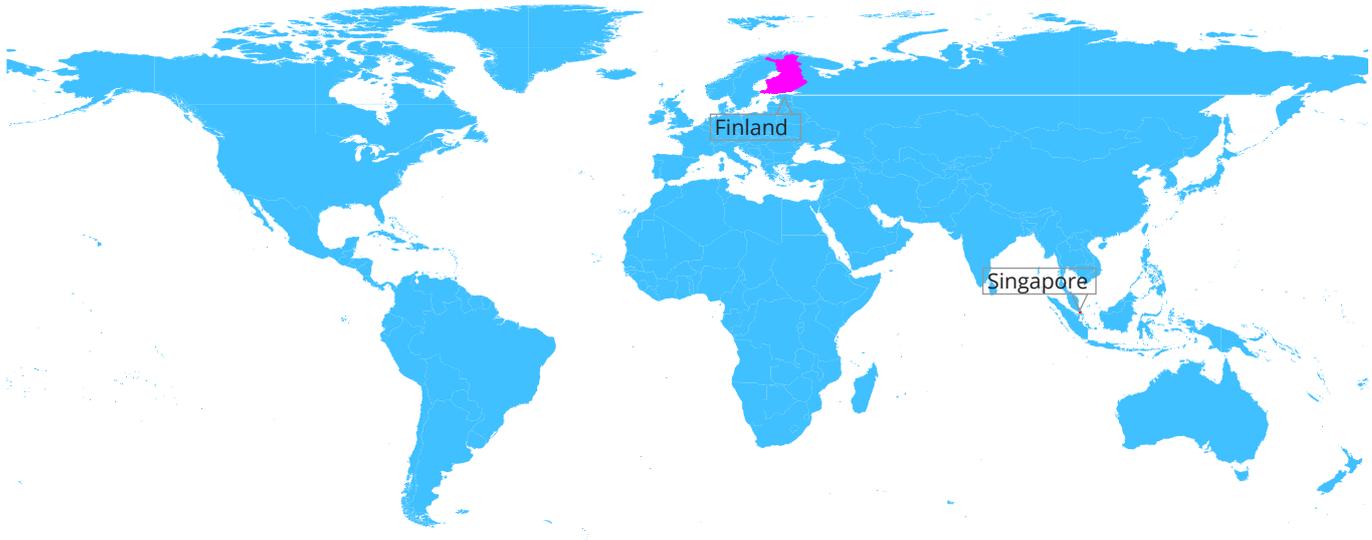
Finland:
- Helsinki has pioneered the Whim smartphone app, which allows users to enter a destination, find the fastest route there by any combination of transportation modes, and pay for the trip in one transaction.

Singapore:
- Singapore's Land and Transport Authority (LTA) used anonymised data from commuter fare cards to identify hotspots and better track and manage bus fleets, making adjustments that have reduced the number of bus services with crowding issues by 92%.

LOCAL REFERENCE

Cyberjaya Smart and Low Carbon City
- Invoke aggressive promotion and advertisement on the usage of public transport to increase more ridership

MyBAS by Land Public Transport Agency (APAD)
- MyBAS is a Stage Bus Services Transformation (SBST) programmes designed to help sustain the vital service to ensure connectivity, while providing scheduled trips for commuters to get to work, school and central commercial areas
- Under the SBST programmes, APAD aims to roll out the myBAS service in key cities namely Kangar, Seremban, Ipoh and Kuala Terengganu
- IoT and AI technologies deployed in myBAS not only could predict travel time, but also ensure public safety
- With the help of biometric technology, the myBAS service is able to provide the real time analytics and video streaming via surveillance camera for relevant authorities and law enforcement agencies to deter any potential crime

Ministry of Transport
- Introduction of fixed monthly travel passes for public transport users by Q1 2019 to address the affordability issue, particularly for the newly launched Sungai Buloh-Kajang MRT Line

Strategy 3:	Established demand-based ride sharing services

The Malaysian government has introduced several initiatives such as feeder buses, pedestrian walkways and cycle lanes to address the last mile connectivity. However, further initiatives need to be taken to address this issue.

One of the ways is via a vehicle sharing programme. This includes on-demand car sharing, bike sharing and van sharing services via public-private partnership. This can be a round-trip (station-based), one-way (free-floating), peer-to-peer, or fractional, supplementing the existing public transit routes. Algorithms use historical demand to determine routes, vehicle size, and trip frequency. This may include options to reserve seats.

The public transit should be well integrated with biking and walking, emphasising the pedestrian environment.

A private-operated van sharing service in Washington D.C

Proposed Initiatives:

01

On-demand car sharing from and to rail stations

Car-pooling concept with fixed routes and fixed trips based on demand. This will greatly benefit commuters from areas which are not currently being served by feeder buses.

Lead Agency:
Ministry of Transport

Supporting Agencies:
• Car sharing service providers
• MRTCorp
• Prasarana

02

Bike sharing, with dedicated bicycle lanes

Bicycle rental with dedicated parking zones in the LRT/MRT stations. To curb vandalism, the rental payment should be made via credit card.

Lead Agency:
• Local authorities

Supporting Agency:
• Bike sharing service providers

03

On-demand ride sharing van / shuttle service via PPP

This could be a cheaper option compared to normal car sharing. This option can bridge the first-mile/last-mile segment when public transport does not take a commuter door-to-door.

Lead Agency:
• Ministry of Transport

Supporting Agencies:
• Private service providers
• MRTCorp
• Prasarana

International Exemplification
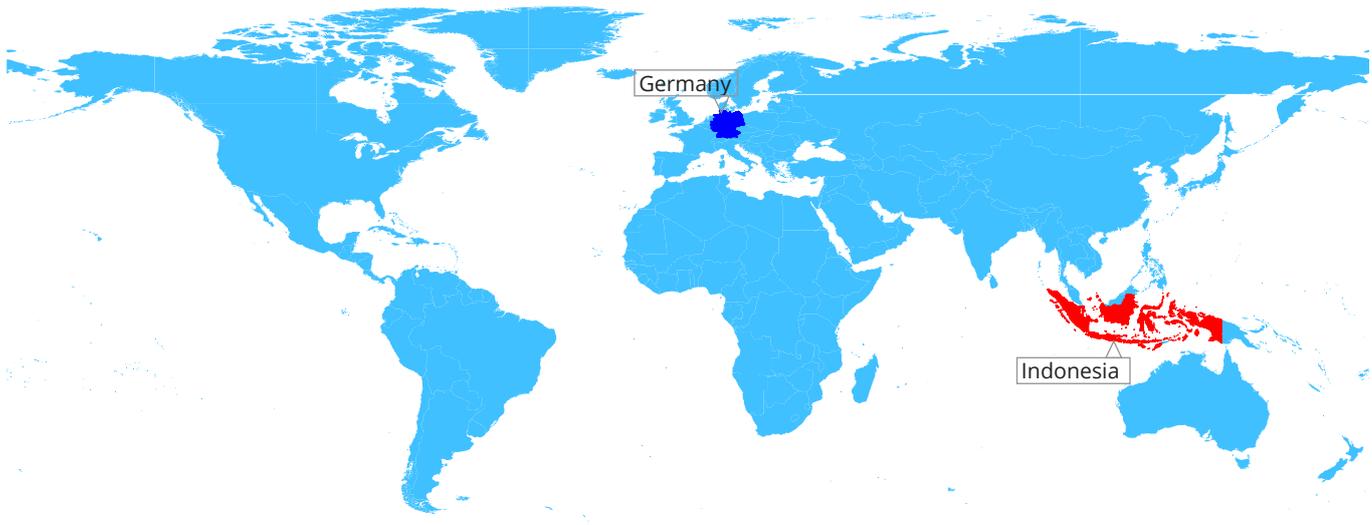
Germany:
- To complement the city's existing transit network, Berlin's public transportation provider is piloting an on-demand ride-sharing van service through a PPP. ViaVan and Mercedes-Benz has announced new partnership with Berliner Verkehrsbetriebe (BVG) to launch the largest public sector deployment of on-demand shuttle service with a fleet of up to 300 vehicles.

Indonesia
- Grab and MRT Jakarta signed a memorandum of understanding for development of Jakarta MRT ticket payment service and first mile-last mile transportation for MRT passengers. In the cooperation, Grab - a leading platform in providing on-demand transportation and mobile payment services in Southeast Asia — also teams up with OVO, one of the leading payment platforms in Indonesia.

LOCAL REFERENCE

Cyberjaya Smart and Low Carbon city
- Increase, improve and promote the usage of existing smart car sharing scheme under GoCar as well as promote the cars run by electricity
- Introduce EV scooter sharing service/scheme
- Creating a bike-friendly Cyberjaya
- Enhance existing bike sharing programmes with Obike and encourage more users to ride bicycles by improving access to rental bike locations (e.g: integrate bike stations with bus stops/Transit-oriented Development (TOD)
- Review, improve and expand the current bike routes and ensure their functionality and connectivity
- Construct "Cyberjaya Green Parkway" with quality facilities/amenities (e.g: rental bicycles), improvement on the landscape and creating nodes of activities

Strategy 4:	Utilise Artificial intelligence (AI) and sensor-based predictive maintenance of public transport fleet and infrastructure

IoT sensors and AI can be utilised to monitor the condition and potential failure points of public transport fleets and related infrastructure such as rails, roads and bridges so that predictive maintenance can be performed before breakdowns and disruptions occur.

Sensor and data analytics using AI and the automation of these two are the technological advancement needed to take Malaysia's smart cities to the next level. While sensors themselves only collect the raw data, the real benefit comes from analysing that data, often in real time, to allow engineers to take faster, more appropriate responses.

International Exemplification

Finland

South Korea

Proposed Initiatives:

01
Installation of IoT sensors on public transport fleet and infrastructure for predictive maintenance

- Capturing raw data on maintenance and condition of the fleet and infrastructure to identify root causes of failures
- Going from reactive to predictive maintenance by developing predictive maintenance programmes focussing on monitoring the condition of parts at all times

Lead Agency:
- Ministry of Transport

Supporting Agencies:
- Prasarana
- MRTCorp
- Land Public Transport Commission
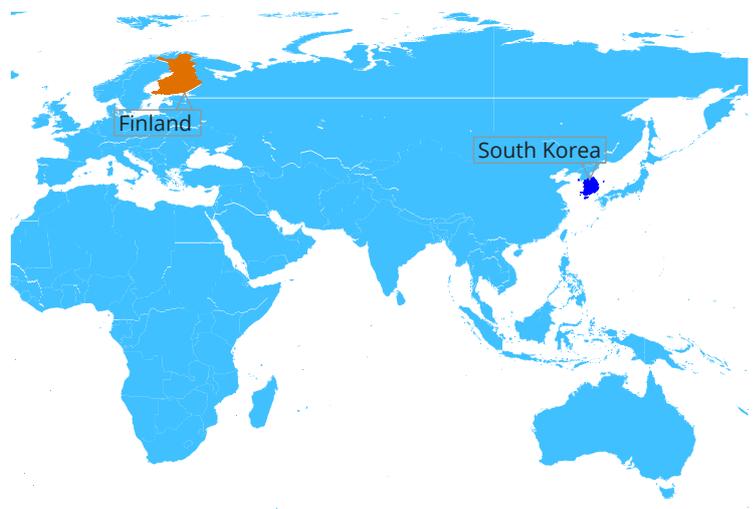
South Korea:
- Sensors attached to on-site facilities to inform the citizens on any repairs, defects, maintenance etc. to avoid inconveniences

Finland:
- Finnish Railway VR Group uses SAS Analytics and IoT to keep its fleet of 1,500 trains on the rails and provide punctual travel service and improve customer satisfaction
- In recent years, VR Group began fitting sensors on various systems and subsystems to monitor symptoms of wear and other failures
- VR Group developed a predictive maintenance programmes that focusses on monitoring the condition of parts at all times. In this programmes, mathematical models predict when parts are likely to fail so that they can be replaced before they cause unplanned downtime
- By looking at sensor data, SAS Analytics provides VR Group a real-time overview of its fleet
- The railway company's goal is to change its maintenance approach, so eventually everything will be based on real-time monitoring
- SAS Analytics also helps VR Group identify the root causes of failures, which can increase savings and improve the reliability of the trains
- Additionally, effective insight into IoT enables the railway company to minimise stock levels of spare parts and materials, keeping only what it needs on hand

LOCAL REFERENCE

Smart Selangor Blueprint
- Waze Connected Citizens Programmes (CCP)
- Waze will work closely with seven (7) participating municipalities on this pilot initiative where a middleware will be developed allowing road conditions and maintenance to be monitored
- The platform will provide the selected municipalities access to its database in order for them to extract and capture data on road conditions in Selangor
- Data captured will cover traffic flow, road closures, accidents, and vehicle travel speeds as well as time taken to clear high-traffic areas to assist users in making informed travel decisions

Strategy 5: **Enhance dynamic smart parking infrastructure**

Despite the provision of park and ride facilities, some of the major train stations in Malaysia have insufficient parking spaces to cater to the demand from users who use their private vehicles to get to the public transport hubs. This can be seen at Bandar Tun Hussein Onn MRT Station and Pandan Jaya LRT station where parking spots are often fully occupied by early morning due to high traveller demand.

To improve user convenience, a dynamic smart parking system involving the installation of IoT-based system for consolidation of parking availability across multiple locations, publishing of live status of individual spaces, and provision of parking reservations can be introduced. A dynamic smart parking system can also be integrated with payment systems to implement dynamic pricing.

Multi-layer / stacked parking is also another option to maximise the existing parking spaces.

Open Space parking at Bandar Tun Hussein Onn MRT Station

Stacked parking as seen in New York City

Proposed Initiatives:

01

Smart parking application with real-time parking vacancy information

Integration of all existing parking apps into a single comprehensive app with real time information and integrated payment option

Lead Agency:
• Local authorities

Supporting Agency:
• Private players

02

Smart parking meters

Allows drivers to connect directly to physical parking meter via Bluetooth and prompts for payment via the app

Lead Agency:
• Local authorities

Supporting Agency:
• Private players

03

Multi-layer / stacked parking facilities at public transport hubs

A private-driven initiative with lesser capital expenditure (CAPEX) required compared to traditional Park n Ride facilities

Lead Agencies:
• Prasarana
• MRTCorp
• Keretapi Tanah Melayu Bhd

Supporting Agency:
• Local authorities

International Exemplification
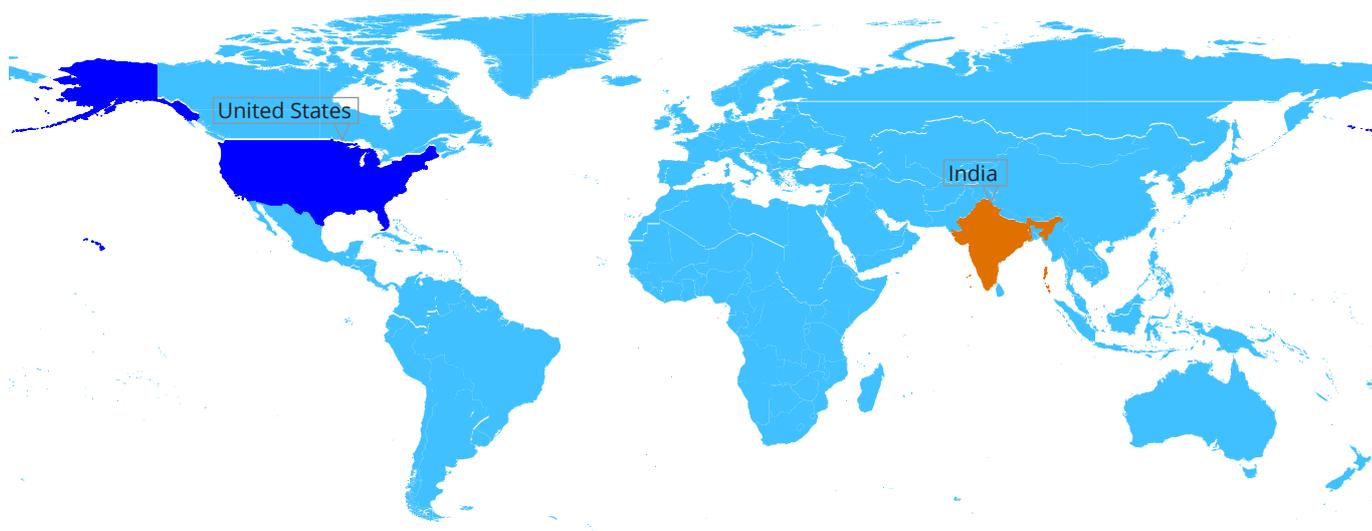
United States:
- Multi-layer stacked parking operated by private companies at busy areas which could potentially quadruple the amount of parking spaces available.

India:
- Digital smart parking system integrated with sensors and cameras installed at dedicated parking bays.

LOCAL REFERENCE

Majlis Perbandaran Sepang
- Flexi Parking Majlis Perbandaran Sepang app to provide a hassle-free, one-stop centre for citizens' parking needs
- Flexi Parking is a quick 3-step payment process where citizens can select their vehicle, duration and location of parking via a GPS location guide
- The app will have a built-in reminder to alert users on expiry time, prompting them to either renew their parking fees or remove their vehicle
- Apart from enhancing convenience levels of users, this initiative also has a positive environmental impact where paper coupons are no longer needed, thereby reducing waste generated

Strategy 6: **Establish electric vehicle revolution**

It is strongly believed that EVs are the future of mobility and a strong catalyst towards reducing air pollution generated from the transport sector. However, to encourage mass usage of electric vehicles, the government should take the first step towards spearheading this movement.

One of the ways, as seen from other countries, is to replace the existing government fleet with EVs. This will enable the government to lead by example and expedite the progress towards positioning Malaysia as the regional automotive hub for EVs as envisioned in the National Automotive Policy 2014.

Electrification of public buses could be the next phase of the EV Revolution for Malaysia. However, the business models ("to buy" or "to lease") need to be studied. The local taxi industry also needs to be encouraged to promote green vehicle usage.

The electric vehicle fleet of New York Police Department (NYPD), often considered the greenest police fleet in the world

Proposed Initiatives:

01

Replacing government fleet of vehicles with electric vehicles

As a leadership by example, it is proposed that the Royal Malaysia Police could be the first pilot programme towards the EV Revolution in Malaysia

Lead Agency:
• Ministry of Home Affairs

Supporting Agency:
• Royal Malaysia Police

02

City-wide electric bus fleets

Apart from reducing environmental footprint, electric buses have a unique appeal that could encourage people to use them more.

However, the technology and infrastructure required to support the electric bus fleet needs to be worked out.

Lead Agency:
• Ministry of Transport

Supporting Agencies:
• GreenTech
• Tenaga National Berhad
• Transport operators
• Local authorities

03

Incentivizing taxi and ride-hailing drivers and private owners who uses green vehicles

Special incentives such as cash rebates, tax waivers, toll discounts, road tax subsidy etc. are needed to encourage private sectors to embrace EVs. Most importantly, a policy needs to be formulated for the e-taxi and e-ride hailing

Lead Agencies:
• Ministry of Transport
• Ministry of Finance

Supporting Agencies:
• GreenTech
• Taxi association
• E-hailing operators

International Exemplification

China

China's electric bus sales and share of total bus sales
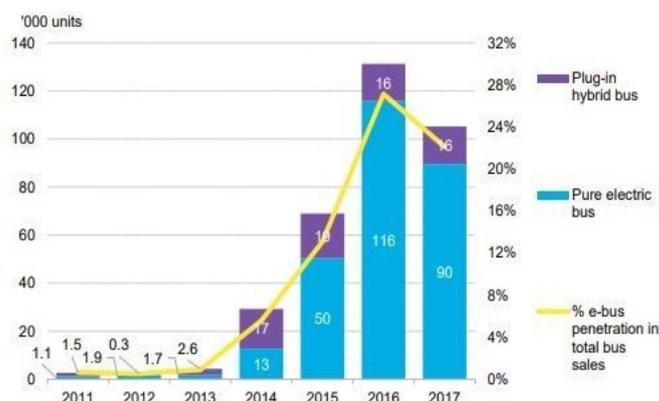
Source: Bloomberg New Energy Finance, Ofweek.
Note: total e-bus sales in China in 2015 were reported at roughly 107,000 units, however, an estimated 43% of the total – 38,000 units – were fraudulent and never made it to the road. We have excluded them from the chart.

China:
- In just 8 years, Shenzhen became the first city to electrify 100% of its public buses (16,359 to be exact). According to Bloomberg, 99% of the world's fully electric buses are in China. For every 1,000 EV buses, according to the report, the global demand for fuel drops by about 500 barrels a day. Shenzhen devoted part of its $490 million investment into building out a robust charging infrastructure-more than 500 charging stations, Clean Technical reports, with some 8,000 outlets. That's enough to charge half the fleet at a time

LOCAL REFERENCE

Putrajaya Electric Buses
- All city buses in Putrajaya will go fully electric by 2021
- A total of 150 new electric buses will be available in Putrajaya by 2025 to realise the vision of making the federal administrative capital a 'green city'
- The deal was sealed with a memorandum of understanding (MOU) between green energy transportation solution provider, GETS Global Bhd and Putrajaya Leisures and Services Group Sdn Bhd (Pulse Group)
- Each electric bus costs RM1.5 million and they will be assembled in Taiping, Perak

Terengganu Electric Buses
- Kuala Terengganu launched its first electric bus service in early 2018, marking the beginning of the state's public transport transformation plan
- For a start, four electric buses and six stage buses would be introduced to serve seven trunk routes and one feeder route covering a distance of 235.9km
- Users only need to pay a minimum fare of between 90 sen and RM2.50 depending on the distance. The fare, considered the lowest to date, is expected to attract those staying along the routes and indirectly help solve the illegal taxis problem

Cyberjaya Smart and Low Carbon City
- Convert conventional public transport vehicles to green vehicles (e.g electric bus, hybrid taxi) by 2025
- Improve visibility of EV charging stations for private vehicles along prominent roads
- Provide EV charging station facilities for buses at terminal hub and Park and Ride

Selangor Green Technology Action Plan 2015 – 2018
- Selangor will introduce electric buses for its Selangor Smart Bus services in 2018
- Since the launch of the service on July 1, 2015 until Aug 31, 2017, the state has provided 100 buses to cover 30 routes in various local municipalities. The cost involved was RM42,536,000 and the service recorded a total of 10,734,359 ridership
- About 72% of the budget is borne by the state while the remaining 28% is borne by the local municipalities

International Exemplification
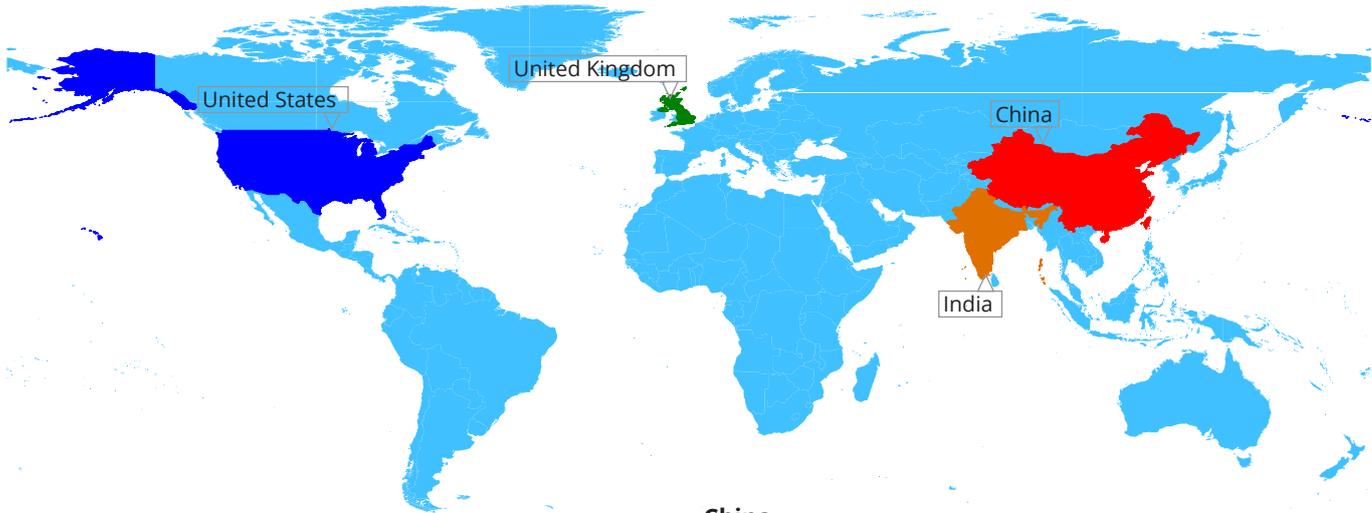
United States:
- In 2011, President Obama pledged that the federal government would convert 100 % of its fleet of government vehicles to alternative fuel vehicles by 2015

United Kingdom:
- London's iconic black cab was electrified and used by ride-hailing app Uber and Gett. Gett becomes the first ride-hailing app to offer TX Electric taxis in London. Recognising the impact that carbon emissions have, the black cab app is now encouraging electric vehicles onto the roads with the new Gett electric class. This means customers have the option to take carbon neutral rides through the usual taxi, XL and WAV options, make air quality donations through Gett Green, and ride emission-free with the Gett Electric option

China
- China has mandated that at least 30% of government vehicles purchased in the next two years will have to be fueled by alternative energy sources. The plan for "new-energy vehicles," includes electric cars, plug-in hybrids and hydrogen electric fuel cell vehicles

India:
- E-taxi policy – Road Transport and Highways Minister has announced that the Ministry is working on a policy to encourage the use of commercial electric vehicles for city transport that will remove all necessary permits otherwise needed to run commercial vehicles, including taxis. According to him, it has the potential to transform the electric mobility sector and that he has proposed various subsidies for electric vehicles and is already in talks with the Ministry of Finance to get the necessary exemptions. All this is part of India's target of moving to 100% electric mobility by 2030

LOCAL REFERENCE

National Physical Plan 3 (NPP3)
- Developing Low Carbon Mobility
- Providing Urban Public Transport Master Plan
- Stimulate the use of low-carbon private vehicles in urban area
- Complete accessibility and facilities for pedestrians and cyclists

Selangor Green Technology Action Plan 2015 – 2018
- Electric vehicle charger network installation in Selangor

Majlis Perbandaran Petaling Jaya
- Complimentary Parking Programmes for hybrid and electric cars to promote the usage of electric and hybrid cars and reduce carbon dioxide emission
- All hybrid and electric car owners will be able to park for free up to a maximum of 12 months on street parking, provided that proof of purchase is evident and originates within the city

National Automotive Policy 2014 (NAP 2014)
- NAP 2014 was announced in 2014 with the main objective of making Malaysia a regional automotive hub of EVs
- In general, EVs are any vehicle that complies with a set of fuel efficiency standards (1/100km) and carbon emission requirements (g/km). This includes vehicles with any powertrain, such as internal combustion engines (ICE), fuel efficient vehicles, hybrid electric vehicles (HEV), plug-in hybrid electric vehicles (PHEV) and full electric vehicles (EV)
- Under the NAP policy, EVs are given tax incentives provided that the terms and conditions are met by the manufacturer

Strategy 7:	Enhance collaboration with academia on R&D and commercialisation on EVs and next-generation automobile

Technology is continuously evolving, it is crucial for a smart city to continuously engage with the relevant institutions on R&D and commercialisation activities to devise ways to solve mobility challenges with next-generation technology innovations. Some potential examples of next-gen mobility tech includes:

1. Shared and autonomous driving. Availability of a shared car fleet capable of sensing the environment and navigating without human input.

2. AV remote control centres. Installation of a command post or retrofit of an existing command centre that allows for remote operation of autonomous vehicles on the road.

3. Drone transportation. Availability of autonomous door-to-door transport using an unmanned aerial-only vehicle.

4. Self-driving trucks. Availability of trucks for the transport of goods with the capability of sensing the environment and navigating without human input through use of technology such as GPS, radar, and light detection and ranging (LIDAR).

Proposed Initiatives:

01
Proactive engagement with academia and private sectors on the testing and regulatory framework for autonomous vehicles

Development of autonomous vehicle strategy and framework.

Lead Agency:
• Ministry of Transport

Supporting Agencies:
• Academia
• Private sector

02
Engage with academia and private sectors on long-term transit planning that allows for future innovations

Experimental and innovative solutions towards public transport solutions.

Lead Agency:
• Ministry of Transport

Supporting Agencies:
• Academia
• Private sectors

03
Facilitate trials of autonomous vehicles in dedicated test beds

Commercialisation of autonomous vehicles in Malaysia.

Lead Agency:
• Ministry of Transport

Supporting Agencies:
• Academia
• Private sectors

Smart Digital Infrastucture

Policies	Policy 1: Primary infrastructure shall be upgraded	Policy 2: Shared digital infrastructure and internet connectivity shall be enhanced	Policy 5: Cybersecurity shall be strengthened in smart city context

Smart Digital Infrastructure

Strategies	Initiatives		Indicator
Strategy 1: Enhance internet speed and connectivity	1. Strengthening the laws on cable-related theft and vandalism 2. Incentives from government to private sectors to enhance digital infrastructure 3. Sharing infrastructure policy among telcos and across industries 4. Central policy for "right of way" 5. Setting nation-wide minimum internet speed 6. Encourage fiber optic installation for new development 7. Improve accountability of property developers in terms of communication infrastructure provision		1. Ranking in affordability drivers index 2. Average 4G download connection speed 3. Percentage of population covered by at least 3G mobile network 4. Mobile-broadband penetration rate per 100 inhabitants 5. 4G network availability 6. Building with internet / network coverage probability more than 95% per floor 7. Percentage of households with internet access 8. Fixed-broadband penetration rate per 100 inhabitants 9. System Average Interruption Duration Index (SAIDI) for Electricity 10. Investment in telecommunication 11. Ranking of E-participation Index (EPI) 12. Ranking in Global Cybersecurity Index 13. ICT use
Strategy 2: Enhance indoor and outdoor network coverage	1. Compliance to MSQoS standards on Quality of Service (QoS) 2. New development to include and enhance in building coverage (IBC) 3. Facilitate service provider in developing communication infrastructure		
Strategy 3: Strengthen policies related to cybersecurity and personal data		1. Review and improve existing policies related to cybersecurity and personal data	

Smart Digital Infrastructure

Strategy 1: **Enhance internet speed and connectivity**

Internet speed is a fundamental enabler for a smart city. High speed internet allows for the usage of modern technologies especially those associated with infrastructure such as IoT, AI, smart grid, smart water, smart energy, urban observatory and others. Stable internet connectivity will further ensure the smooth conduct of business and commercial activities happening in a city and aid during emergency response situation.

To enhance the internet speed and connectivity, government shall play a pivotal role in regulating and driving the development of infrastructure. This can be achieved by setting regulations and policies at various areas such as to enforce the sharing in telecommunication infrastructure, setting minimum internet speed, providing incentives, and other policy enforcement. Below are the key potential initiatives to be considered:

Proposed Initiatives:

01
Strengthening the laws on cable-related theft and vandalism

Enhancement of existing regulations and enforcement pertaining to cable theft and vandalism.

Lead Agencies:
- Ministry of Home Affairs
- Royal Malaysia Police

Supporting Agencies:
- Ministry of Communications and Multimedia
- Malaysian Communications and Multimedia Commission

02
Providing incentives from government to private sector to enhance digital infrastructure

Government to provide incentives for the private sector to reduce gaps and improve the internet signals in Malaysia.

Lead Agency:
- State government

Supporting Agencies:
- Malaysian Communications and Multimedia Commission

03
Sharing infrastructure policy among telcos and across industries

Enforcement of the existing policies and initiatives on sharing infrastructure amongst telcos and across industries.

Lead Agencies:
- Ministry of Communications and Multimedia
- State government
- Telcos

04

Establish central policy for "right of way"

Central policy/ mandate for "right of way" (permits, authority) to standardise policies, procedures, fees among states and agencies, aiming to reduce involvement of state-backed companies and deal with local authority directly.

Lead Agencies:
- Ministry of Housing and Local Government
- Ministry of Works
- Local Government Department
- State governments
- Local authorities

05

Setting nationwide minimum internet speed

Minimum speed criteria for different development categories (e.g: residential, industrial, institutional, R&D etc) which need to be complied by the developers / telcos. If telcos does not meet the MSQoS, the telcos could be issued with compounds.

Lead Agencies:
- Ministry of Communications and Multimedia
- Malaysian Communications and Multimedia Commission

06

Encourage fibre optic installation for new development

Promote the provision of high speed broadband through inclusion of fibre optic installation at pre-planning stage.

Lead Agencies:
- State governments
- Local authorities
- Malaysian Communications and Multimedia Commission

07

Improve accountability of property developers in terms of communications infrastructure provision

Development of guidelines / SOP to implement Communications Multimedia Act 1998, section 235 to ensure all the activities pertaining to communications infrastructure (e.g: excavations of underground fibre optic cables) are done properly.

Lead Agencies:
- Ministry of Communications and Multimedia
- Malaysian Communications and Multimedia Commission

International Exemplification
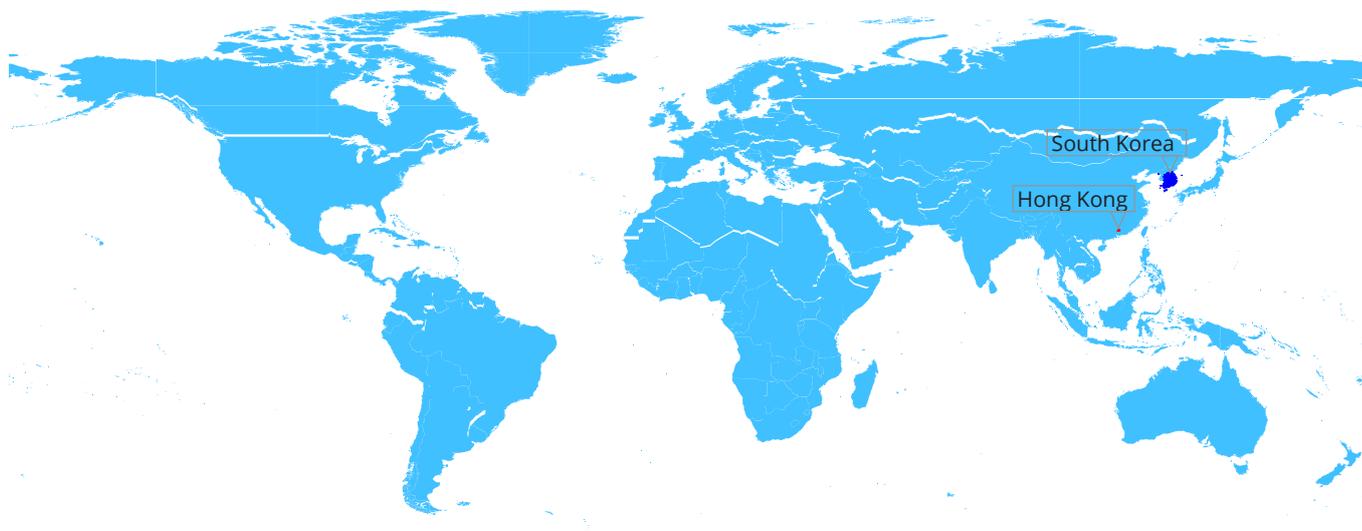
Hong Kong:

- Hong Kong has a robust telecommunications network. As of April 2017, Hong Kong has eight submarine cable landing stations connecting to ten regional and trans-Pacific submarine cable systems. Hong Kong is also connected to China via a number of overland cables
- Together with other submarine cable systems being constructed, the total capacity will approach 200 Tbps by the end of 2018. Hong Kong has a very high level of reliability of worldwide interconnectivity
- Hong Kong has launched the Wi-Fi connected city programmes with extensive coverage providing wi-fi access points at Mass Transit Railway (MTR) stations, Airport Express stations and trains, offices, major tourist attractions, shopping malls, coffee shops, restaurants, hospitals, public libraries, parks, etc. In 2014, the government collaborated with the industry to launch the common brand "Wi-Fi.HK" to promote wi-fi service offered to the public and private sector completely free, or free for a certain period of time in Hong Kong

South Korea

- The Korean Information Infrastructure (KII) plan covers different backbone building and R&D facilitation programmes. The Ministry of Communication and Information has also offered incentives in terms of direct subsidy such as financial supports, granting privileges tax holidays, and directly underwrite loans to the internet service providers (ISPs) for building their networks
- The government's emphasis on telecommunication backbone networks as the foundation of its national broadband strategy has resulted in significant development of broadband in major cities and rural areas
- Another main factor for the rapid development of broadband technology in South Korea is the fierce competition among ISPs. The competition in internet services industry has successfully brought down the prices, which greatly benefits the general public

LOCAL REFERENCE

National IoT Strategic Roadmap
- Create a conducive IoT Strategic Roadmap to foster the development, diffusion and adoption of IoT Technologies with the following strategies:
    ◊ To formulate an interoperability framework that harmonises the heterogeneity and complexity of standards and technologies
    ◊ To institute a centralised regulatory and certification body to address privacy, security, quality and standardisation concerns
    ◊ To establish strategic collaborations between multinational companies and local players

National Broadband Implementation Strategy / National Broadband Initiative (NBI)
- The National Broadband Implementation Strategy or better known as NBI puts in place a national strategy that will bring broadband to the whole nation

Strategy 2: Enhance indoor and outdoor mobile network coverage

In the 11MP, Malaysia aims to achieve 95% broadband coverage in populated areas by 2020 with 100Mbps accessible to all households in state capitals and high-impact growth areas. 20Mbps is targeted for at least 50% households in suburban and rural areas by 2020.

However, Malaysia is experiencing poor internet speed and connectivity due to lack of base stations in rural areas, rapid excavations for transportation development that could affect the underground fibre optic cables and slower bandwidth although the person might be subscribing to internet package with higher broadband speed. Despite this, it is crucial to set the aim higher to match with the international standard.

Mobile coverage measurement should be standardised to evaluate only the effective mobile coverage area and consider to issue compounds to telco that claims to have coverage in a particular area but in reality they have poor/no coverage. Other than that, online feedback platform such as introducing a mobile app is crucial to gauge mobile users' experience on mobile coverage in both outdoor and indoor.

Deploying more base stations in populated areas has always been a challenge for telcos and this could be overcome with policies and cooperation from the government. One suggestion is to develop a policy granting telcos access for setting up new base stations in both urban and rural areas.

Proposed Initiatives:

01
Ensure compliance with Mandatory Standard on Quality of Service (QoS)

02
Ensure new developments to include and enhance In Building Coverage (IBC)

03
Facilitate service provider in developing communications infrastructure

01

Regulator MCMC has embarked on nationwide network performance measurement based on 3 determinations and local authorities to enforce compliance with MSQoS as below:

For wireless broadband:
- Download throughput ≥ 650 kbps
- Required proportion of min throughput = 80% of measured time for time division duplex (TDD) and 65% of measured time for frequency division duplex (FDD)
- Network latency ≤ 250 ms for at least 70% of the time
- Packet loss ≤ 3%

For wired broadband:
- Throughput measured ≥ 70% of subscribed level for DSL and ≥ 90% of subscribed level for fibre
- Required proportion of min throughput = 90% of measured time for both DSL and fibre
- Network latency ≤ 85 ms for at least 95% of the time
- Packet loss ≤ 1%

For public cellular service (voice call MS):
- Min call setup successful rate (CSSR) ≥ 95%
- Dropped call rate (DCR) ≤ 3% (nationwide)

Lead Agencies:
- Ministry of Communications and Multimedia
- Malaysian Communications and Multimedia Commission

02

- Developer / building management to include IBC requirement at pre-planning stage to provide telecommunication equipment room (TER) and riser room.
- For existing building, developer / building management should facilitate Service Provider through easing the process of permit application, approval, access and rental.

Lead Agencies:
- Service providers
- Telcos

Supporting Agencies:
- Ministry of Housing and Local Government
- Malaysian Communications and Multimedia Commission

03

Development of policy to facilitate service providers to roll-out communications infrastructure to ease the process of permit application, approval, access and rental.

Lead Agency:
- Ministry of Communications and Multimedia

Supporting Agencies:
- State governments
- Local authorities

International Exemplification
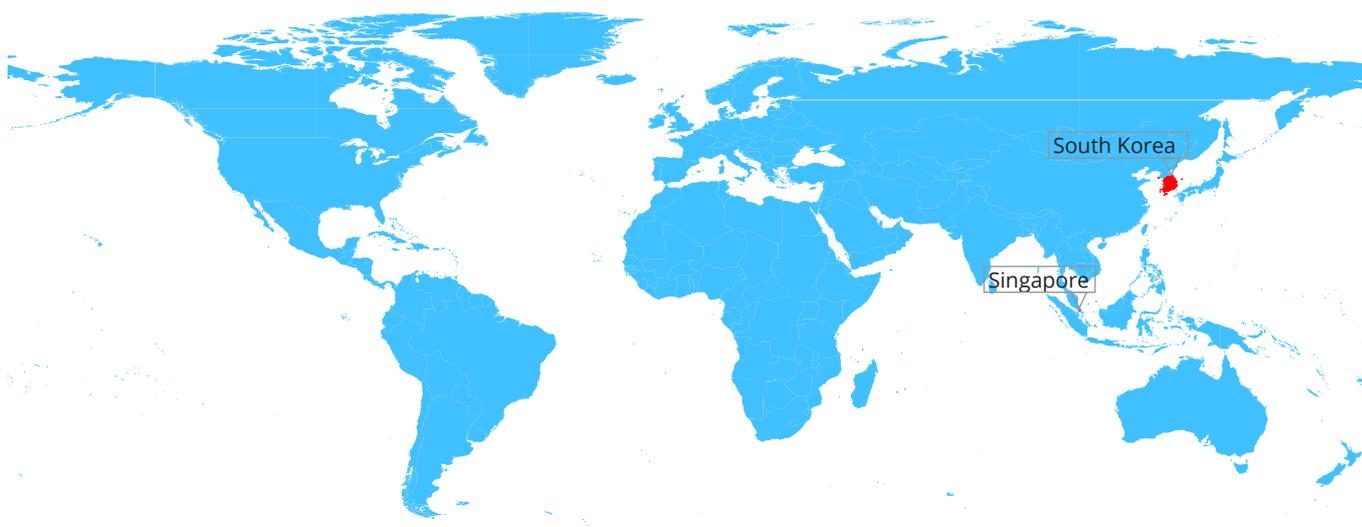
South Korea:
- South Korea's exceptional broadband success is due to several factors, such as competition, government involvement and geography that can be replicated in Malaysia. Competitive environment in South Korea enables consumers to choose among multiple providers for different types of technologies
- South Korean government has fostered the industry by starting small but strategic investments that evolve into much larger investments from the private sector. The efforts include the government being an anchor tenant of the fibre backbone throughout the country and encourage the formation of a strong competitor (Hanaro) to the first state-owned telephone company (KT Corporation)
- Strategic geography and demography of South Korea have also played a key role to its success. Almost half of the Koreans (47%) stay in high-rise residential buildings and 93% of all households are within 4km of a telephone exchange

Singapore:
- Singapore provides 3G and 4G services through its next-generation nationwide broadband network and mobile operators, which form the ICT backbone of the smart nation initiative. Singapore has maintained a high level of fixed and mobile ICT infrastructure development, hence citizens have ready access to advanced internet capabilities
- Singapore has also adopted the WHO guidelines on Electromagnetic Field (EMF) exposure for mobile base stations. As such, the government maintains EMF levels within exposure limits and provides protection to all citizens

LOCAL REFERENCE

Eleventh Malaysia Plan
- Expand broadband services coverage through the roll-out of the High Speed Broadband Initiative or HSBB2 and the Suburban Broadband Initiative

Malaysian Administrative Modernisation and Management Planning Unit (MAMPU)
- As the leader in developing ICT for the public service sector
- Optimise the use of ICT infrastructure through partnerships, getting better value for money and can provide better quality and consistent services

National Broadband Initiative by MCMC
- Target to achieve 50% household broadband penetration by the end of 2010
- Establish *Rakyat* Internet Centre *(Pusat Internet Rakyat)* and Mini Community Broadband Centres
- Expand current cellular coverage

Strategy 3: **Strengthen policies related to cybersecurity and personal data**

Every new technology and innovation brings new challenges and risks. As business and services would be conducted on the connected network (i.e. internet), cybersecurity threats are inevitable. This potential threat could have a direct impact on governments, businesses and citizens. From the perspective of businesses, the threat may involve a large number of personal and transactional data. Hence, adoption of resilient and vigilant cybersecurity strategies should be prioritised to safeguard information safety, credibility and network integrity. Existing policies related to cybersecurity and protection of personal data should be strengthened through the following initiative:

Proposed Initiative:

01
Review and improve existing policies related to cybersecurity and personal data

Relevant ministries and agencies should identify any new innovation in cyber crime and cybersecurity spaces and consider necessary regulatory measures in the existing policies. Given the dynamic of increasingly sophisticated cyber attacks, legal measures should have the capacity to address legal measures of an array of potential cyber threats.

Lead Agency:
•   Ministry of Communications and Multimedia

Supporting Agencies:
•   Department of Personal Data Protection
•   National Cybersecurity Agency
•   CyberSecurity Malaysia

International Exemplification
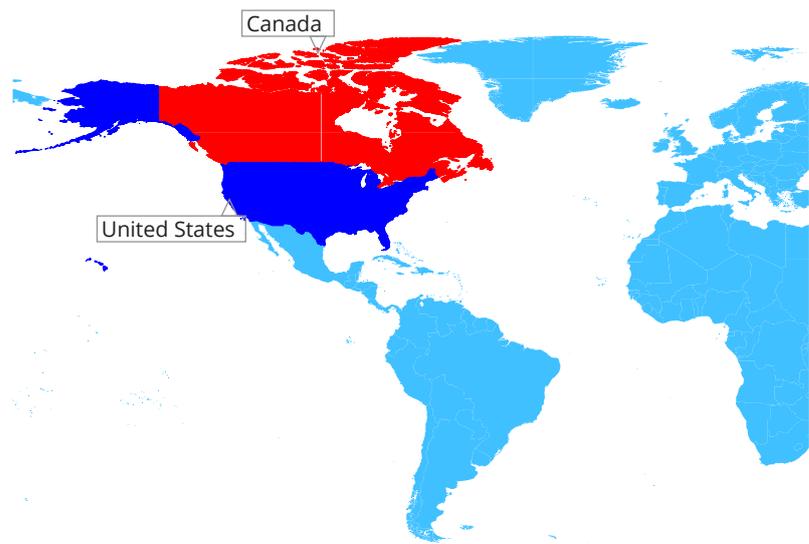
United States, Canada:
•   Top countries best prepared against cyber attacks - according to global cybersecurity Index by ABI Research and ITU.

LOCAL REFERENCE

National Industry 4.0 Policy Framework
•   Strategy R3: Improve data integrity, standards, sharing security to facilitate seamless integration of value chains and support intra-ministerial analysis to chart effective Industry 4.0 programmes

National Cyber Security Policy (NCSP)
•   Policy was formulated based on a National Cyber Security Framework that comprises legislation and regulatory, technology, public-private cooperation, institutional, and international aspects

The Malaysian Personal Data Protection Act 2010 (PDPA)
•   The Act primarily aims to regulate the collection, holding,processing and use of personal data in commercial transactions and also to prevent malicious use of personal information

Policy and Strategy Matrix

Strategy \ Policy	Infrastructure Upgrade (1)	Connected Digital Infrastructure (2)	Modernise Human Resource and Talent (3)	Open Data and Open Government (4)	Cybersecurity (5)	Smart City Standard (6)	Social Inclusion (7)	Sustainable Environment (8)	Digital Transport System (9)	E-Government (10)	Safety and Security (11)	Digital Economy (12)	Community Empowerment (13)	PPP (14)	Local Government Capabilities (15)	Healthy Life and Wellbeing (16)
Smart Economy																
Promote digitalisation in enterprise operations to accelerate productivity												●				
Create the right support for high value-added industries			●									●				
Provide incentives to encourage innovation												●				
Smart Living																
Enhance safety and security											●					
Promote housing quality													●			
Optimise emergency response											●					●
Enhance quality of healthcare services through digital technology																●
Encourage urban farming for better living													●			
Smart Environment																
Preserve green area and enhance the management of trees in public park								●								
Strengthen the integrated and sustainable solid waste management								●								
Improve air quality and its monitoring system								●								
Improve water quality and its monitoring system								●								
Enhance the disaster risk management by adopting advanced technology application								●								
Enhance the Non-Revenue Water Management								●								
Increase energy efficiency and promote renewable energy sources								●								
Encourage the development of low carbon city concept to be adopted at local level								●								

Strategy \ Policy	Infrastructure Upgrade (1)	Connected Digital Infrastructure (2)	Modernise Human Resource and Talent (3)	Open Data and Open Government (4)	Cybersecurity (5)	Smart City Standard (6)	Social Inclusion (7)	Sustainable Environment (8)	Digital Transport System (9)	E-Government (10)	Safety and Security (11)	Digital Economy (12)	Community Empowerment (13)	PPP (14)	Local Government Capabilities (15)	Healthy Life and Wellbeing (16)
Smart People																
Improve moral education in schools			●				●									
Enhance public awareness in practising good moral and civic			●				●									
Increase skilled and talented human capital at every level			●													
Enhance public participation and community empowerment													●			
Improve gender sensitisation and inclusivity of vulnerable groups							●									
Increase the public willingness to adapt to emerging technologies			●													
Smart Government																
Promote information disclosure and open data from government				●												
Increase the scope of e-government services										●			●			
Increase the quality of e-government services										●						
Elevate the use of data sharing platform across government agencies				●												

Strategy / Policy	Infrastructure Upgrade (1)	Connected Digital Infrastructure (2)	Modernize Human Resource and Talent (3)	Open Data and Open Government (4)	Cybersecurity (5)	Smart City Standard (6)	Social Inclusion (7)	Sustainable Environment (8)	Digital Transport System (9)	E-Government (10)	Safety and Security (11)	Digital Economy (12)	Community Empowerment (13)	PPP (14)	Local Government Capabilities (15)	Healthy Life and Wellbeing (16)
Smart Mobility																
Establish intelligent transport management	●	●		●				●	●					●		
Enhance data sharing and digital mobility platform		●		●				●	●							
Establish demand-based ride sharing services								●	●					●		
Utilise AI and sensor-based predictive maintenance of public transport fleet and infrastructure	●	●														
Enhance dynamic smart parking infrastructure	●	●		●				●								
Establish electric vehicle revolution								●	●					●		
Enhance collaboration with academia on R&D and commercialisation of EVs and next-gen automobile	●	●		●				●	●					●		
Smart Digital Infrastructure																
Enhance internet speed and connectivity	●	●														
Enhance indoor and outdoor network coverage	●	●														
Strengthen policies related to cyber security and personal data				●												

MySMART CITY INDICATOR

06

Indicators are used to measure the performance level of a city in addressing key urban challenges and to attain smart city status. A total of 92 indicators have been formulated based on focus group discussions with key stakeholders who are aware that some of these indicators could not be measured due to unavailability of baseline data. Nevertheless, these indicators are relevant to assess the performance or impact of the smart initiatives implemented. Therefore, it is crucial for the relevant implementing agencies to start collecting the data needed for the indicators for monitoring purposes.

Listed below are the indicators shortlisted for each of the 7 smart city components together with a brief description, baseline data as well as indicative threshold. The indicative threshold proposed in the table below are based on global and local best practices example but these need to be further refined depending on the individual cities which are implementing smart initiatives as cities differ in terms of their size, population density and urban challenges.

Smart Economy Indicators

INDICATOR	DESCRIPTION	LATEST SITUATION	INDICATIVE VALUE
Digitalisation			
Percentage of establishments with internet that utilise it for specific purposes, by sector	Business establishments normally use the internet to communicate, access financial services, obtain information from other businesses and the government, and to deliver products	Slightly over 70% business establishments with an internet connection send or receive e-mail, the most common activity *Source: Malaysia Economic Census 2016: Usage of ICT by Businesses and E-Commerce*	Percentage of establishments that use internet for other specific purposes will be decreased from 30% to 10% than the percentage of establishments that send or receive e-mail
High value-added jobs			
Number of employment in ICT sector	ICT sector is an area whereby technology intensity is high and has higher value-added than non-ICT sectors	1.09 million jobs in 2017 *Source: ICT Satellite Account, DOSM*	Creation of approximately 10,000 additional jobs attributed to ICT sector in 2018, based on historical performance in the last three years
Innovation			
GERD to GDP	Total expenditure (current and capital) on R&D carried out by all resident companies, research companies, universities and government laboratories	1.4% in 2016 *Source: 11MP Midterm Review*	2.0% in 2020 (11MP target)
Number of companies benefitted from collaboration through intermediaries	Intermediaries are set up to expedite and support the innovation processes	1,196 companies benefitted from collaboration, such as PlaTCOM Ventures, SIRIM-Fraunhofer programme and Steinbeis Malaysia Foundation *Source: 11MP Mid-Term Review*	Increase from 1,196 to 3,000 in the number of companies benefitted from collaboration by 2030

Smart Living Indicators

INDICATOR	DESCRIPTION	LATEST SITUATION	INDICATIVE VALUE
Safety and security			
Ratio of crime rate	• Ratio of crime in global index • Total number of population per year • Crime rate per state	Malaysia ranked 15th with crime index 65.56 in global index *Source: Crime and Safety Report by OSAC, 2017*	5% annual reduction in crime index (11MP) *Source: 11th Malaysia Plan*
Safe Cities Index (Global)	Safe cities index based on indicators covering digital security, health security, infrastructure security and personal security	31 / 60 *Source: The Economist Intelligence Unit*	Malaysia's target of top 10 positions in the overall index, in line with four East Asian safest cities which are Tokyo, Singapore, Osaka and Hong Kong
Increasing demand for healthcare services			
Percentage of clinic/hospital using ICT and integration through e-health	Percentage of hospitals and clinics using ICT technology	75% of public hospitals and >90% health and dental clinics were operating without Hospital Information System (HIS), Teleprimary Care – Oral Health Clinical Information System (TPC - OHCIS) *Source: Strategi Implementasi PSTM KKM 2016-2020 (Pelan Strategik Teknologi Maklumat Kementerian Kesihatan Malaysia)*	Establishment of ICT enabled environment in health facilities in 2020 *Source: Strategi Implementasi PSTM KKM 2016-2020*
Increase of the number of beds per population	Number of beds per population	Number of population over number of beds in 2018 is 1:493 *Source: Pelan Strategik KKM 2016-2020*	2.3 hospital beds per 1,000 population in 2020 *Source: 11th Malaysia Plan*
Reduce the gap in doctors to population ratio	Number of doctors per population	46,491 doctors (2016) *Source: Strategi implementasi PSTM KKM 2016-2020*	75,000 doctors in 2020 *Source: 11th Malaysia Plan*
Increase of doctors per population per year	Ratio of doctors per population per year	1: 632 (2016) *Source: Strategi implementasi PSTM KKM 2016-2020*	1:400 in 2020 *Source: 11th Malaysia Plan*

INDICATOR	DESCRIPTION	LATEST SITUATION	INDICATIVE VALUE
Low quality of life and housing quality			
Number of smart home implementation per year	Number of houses equipped with advanced technology such as lighting, heating, and electronic devices that can be controlled remotely by smartphone or computer	N/A	Increase in the number of smart homes in a city
Happiness index per community	The happiness ranking is part of the World Happiness Report. Country scores are based on a survey in which respondents evaluate the quality of their current lives on a scale of 0 to 10	Malaysia climbed up the rankings to be the 35th happiest country in 2017 with 6.08 points. Source: World Happiness Report	1 level rank escalation every 2 years
Lack of urban farming activity			
Number of urban farming activities by community	Urban farming activity is the practice of cultivating, processing and distributing food in or around urban areas, implemented by community	N/A	Increase in the number of urban farming activities by community in the city

Smart Environment Indicators

INDICATOR	DESCRIPTION	LATEST SITUATION	INDICATIVE VALUE
Loss of green area			
Percentage of relative tree canopy cover	• Relative Tree Canopy Cover • Achieve desired degree of tree cover, based on potential or goals set for entire municipality and for each neighbourhood or land use. • Tree cover data is produced by the Landsat satellite imagery by calculating the percentage of tree cover from the Land satellite imageries	17% of trees covered *Source: Kanniah K.D., Ho C.S., 2017, Urban Forest Cover Change And Sustainability Of Malaysian cities, Chemical Engineering Transactions, 56, 673-678*	40% of trees covered by 2025 (Tree cover is estimated as the vertically projected area of woody plants above 5 m height)
Percentage of land cover and land use			
Efficiency in solid waste management			
Recycling rate per year	The recycling rate is highly relevant for measuring progress towards a circular economy	88.8 % – landfills 10.5 % – recycling rate 0.7 % – renewable energy *Source: Solid Waste Management Lab, 2015*	By the year 2020 60% - landfills 30% - recycling rate 10% - waste treatment *Source: Green Technology Master Plan 2017 - 2030*
Percentage of waste diversion (recycle and recovery)	Waste diversion rate is one of the indicators in a successful recycling programme, it represents the amount of waste diverted from landfill for recycling		By the year 2025 35% - recycling rate *Source: Green Technology Master Plan 2017 - 2030*
Total hazardous waste generated tonnes per year	Hazardous waste involves a range of diverse issues from environmental and health effects; to minimisation, remediation or containment techniques; to policy and political implications; and financial considerations		
Air pollution			
Number of days recorded as 'Good' and 'Medium' measured by the API in the study area in a year	API per city	N/A	80% Good Day

INDICATOR	DESCRIPTION	LATEST SITUATION	INDICATIVE VALUE
Water pollution			
Reduction in the number of rivers in Class IV and Class V in a year	• Number of rivers in Class IV and Class V in a year. • Number of rivers in the state involved with the measurement in a year	River water quality class 3 (average) *Source: Department of Environment, 2016*	The water quality of all rivers in the city should achieve class 2(b)
Flash flood and landslide			
Number of initiatives for disaster risk management and implementation in a year	Number of initiatives for disaster risk management and their implementation in a year	N/A	Increase 2% annually from the previous year
Number of deaths by disaster per 100,000 people Number of missing persons by disaster per 100,000 people Number persons affected by disaster per 100,000 people	Number of deaths, missing persons and persons affected by disaster per year/ per city	404 flash flood cases (2016 – 2017) *Source: Water Resource Management and Hydrology Division, Department of Irrigation and Drainage, 2018* 700 landslide cases (2015) *Source: Haliza & Jabil, 2017*	Reduce the number of flash flood cases by 2% gradually per year Reduce the number of landslide cases by 2% gradually per year
High rate of non-revenue water			
Rate of national NRW reduction by 25% in 2025	• NRW level per city. • Amount of water consumed per household	35% (average) *Source: Ministry of Energy, Science, Technology, Environment and Climate Change, 2015*	25% by the year 2025
Renewable energy			
Percentage of electricity production from renewable sources Renewable energy share in the total final energy consumption	Renewable energy generation sources	*10% renewable energy* *Source: Green Technology Master Plan Malaysia 2017-2030*	25% renewable energy by the year 2025
Efficiency of buildings: GDP per unit of energy use	Carbon emission from building sector	N/A	
Energy intensity measured in terms of primary energy and GDP	Performance and statistical information on electricity supply industry	N/A	

Smart People Indicators

INDICATOR	DESCRIPTION	LATEST SITUATION	INDICATIVE VALUE
Moral intelligence			
Crime Index	Crime can be highly related to lack of moral intelligence which includes the act of abuse, rape, murder, robbery and stealing	2017 : 99,168 incidents of crime (Royal Malaysia Police, RMP)	5% annual reduction in crime index (11MP)
Number of successful programmes held in schools	School programmes focussing on moral education approach and daily behaviours	N/A	Increase in the number of impactful programmes in school
Number of active CBR	CBR is an existing initiative by Department of Social Welfare, focussing on community's concerns towards disabled groups	N/A	An addition of a minimum 1 active CBR per year
Number of active *Pusat Aktiviti Warga Emas*	Senior Citizens Activity Centre is an existing initiative by Department of Social Welfare, to reach out and provide developmental services to the elderly	N/A	An addition of a minimum 1 active activity centre per year
Number of NGOs involved in moral awareness programmes, moral education	NGOs involvement in any moral related programmes is widely encouraged in order to cover diverse communities	N/A	Increase in the number of NGOs involvement in moral education programmes
Reduction of moral issues based on school counselling data	Number of enquiries for counselling service can be one of the determinants of the increase of moral related issues	N/A	Reduction of moral issue cases at school level

INDICATOR	DESCRIPTION	LATEST SITUATION	INDICATIVE VALUE
Talented human capital			
Increase of income percentage	Average income increment of highly skilled workers in all sectors, defining the level of services and qualifications	Median income for professionals is RM 4,467 in 2017 (Institute for Labour Market Information and Analysis, ILMIA)	Annual increment percentage
Percentage of senior secondary students study one or more STEM-related elective subjects	• Senior secondary refers to students of Form 4 and Form 5 who take STEM-related subjects as their elective subjects. • Percentage over the total number of students per school	N/A	The increase in the percentage of total STEM-related subjects students per year
Number of Innovation studios in Primary and Secondary Schools	Innovation studios such as for Robotic Curriculum class, STEM-related elective subject, and etc	N/A	An addition of a minimum of 1 school with innovation studios in a city, per year
Number of patents per 1000 population per year	A patent is an exclusive right granted for an invention, which is a product or a process that provides a new way of doing something, or offers a new technical solution to a problem	Number of granted patents by Malaysians is 281 in 2016 (Intellectual Property Corporation of Malaysia)	Annual increase in the number of patents
Public interaction and community empowerment			
Number of public events and activities, organised by community	Public events refer to annual activities, community engagement, community annual meetings, and etc, per community organisation	N/A	The increase in the number / frequency of community activities per community organisation in a city
The participation rate of youth in education and training, formally and informally within a year, by gender	The rate of youth participation in education and training activities, per total of participants	N/A	1% of annual addition of youth participation in education and training activities, per city

INDICATOR	DESCRIPTION	LATEST SITUATION	INDICATIVE VALUE
Gender friendly environment and inclusivity of vulnerable groups			
Level of public satisfaction	Satisfaction level is determined by happiness index of a community group	Malaysia ranked 35th in an annual global happiness index	1 level ranking escalation in every 2 years
Whether existing legal or regulatory frameworks encourage, enforce and monitor gender equality and promote non-discrimination against gender	Encouragement and enforcement on gender equality in legal and regulatory spheres	• 11MP • Policy on 30% women in decision making position 2016 • National Women Policy	N/A
Rate of seats held by women in state parliament and local governments	Number of seats voted for women in state parliament and local governments in a city	19% of members of the state council appointed by state election	Number of female Members of Parliament (MPs) and State Assembly Representatives (ADUN) in Malaysia
Rate of women in management positions	Rate of management positions held by women, either voted or qualified	Women hold 26.3% of top management positions in 2016 (TalentCorp)	Annual increase in percentage of management positions held by women
Gender Gap Index	MGGI examines the gap between men and women in four fundamental categories: Economic Participation and Opportunity, Educational Attainment, Health and Survival and Political Empowerment	• Average score for Malaysia was 0.692 in 2016 (indicates gender gap was 69.2). • The score of 1.00 (100%) is defined as no gap between men and women • (Department of Statistic Malaysia, DOSM)	Annual increase in average gender gap score
Number of gender sensitisation and vulnerable group workshop per projects (physical and non-physical)	Gender sensitisation and vulnerable group workshop refers to an engagement workshop with the group in order to discuss their opinions and needs in decision making process for each project (physical or non-physical)	N/A	An addition of a minimum 1 workshop held per number of projects, in a year

INDICATOR	DESCRIPTION	LATEST SITUATION	INDICATIVE VALUE
Adaptability to emerging technologies			
Increase level of adaptability, digital usage (before and after initiatives)	Number of people adapted to digital usage in daily activities in a community	76.9% of internet users in Malaysia in 2016 (MCMC)	Increase percentage of people adapted to digital usage in daily activities, per community, per year
Rate of youth and adult with ICT skills	Defined by degree holders of ICT with high-skilled jobs	N/A	Increase percentage of youth with degree in ICT and high-skilled job, in a city

Smart Government Indicators

INDICATOR	DESCRIPTION	LATEST SITUATION	INDICATIVE VALUE
Information sharing from government			
Website publication of the following documents by government entities: • Annual meeting minutes • Financial statement • Budget	• Publication of yearly and updated annual meeting minutes, financial statements and budgets by a government entity on its website per year • Information to be obtained through assessment of website	Varies according to government entities. Example: Majlis Perbandaran Petaling Jaya (2015) published • Annual meeting minutes • Financial statement • Budget *Source: Petaling Jaya City Council, 15*	Increase number of document publicised in the website
Percentage of government entity's procurement conducted online	• Number of government entity's procurement activities conducted online over total number of government entity's procurement activities • Data to be obtained internally from each government entity	Varies according to government entities Example: Federal government conducted 1,317,254 ePerolehan transactions in 2017 *Source: ePerolehan, 2017*	Higher number of transactions is considered positive
Percentage of inventoried open datasets that are published by government entity	• Number of datasets published on open data portal over total number of datasets produced by a government entity • Data to be obtained internally from the government entity	• Varies according to government entities. • Example: All government entities combined, exceed the target of 7,000 datasets to be published on Data.gov.my by 2020 announced by MAMPU, endorsed by Chief Secretary to the government in 2017 • A total of 9,430 datasets was published *Source: data.gov.my, 2018; Open Data Institute, 2017*	Higher volume of transactions is considered positive
Number of transactions of e-government services per year	• The quality of an e-government service can be assessed from the volume of transactions • Data to be obtained internally from government entity	Varies according to government entities. Example: Pasir Gudang Municipal Council conducted 33,123 e-government transactions in 2017 *Source: Pasir Gudang Municipal Council, 2017*	Higher volume of transactions is considered positive

INDICATOR	DESCRIPTION	LATEST SITUATION	INDICATIVE VALUE
E-government			
Percentage of users satisfied with e-government services provided per year	• The quality of an e-government service can be assessed through user rating system • Alternatively, Provider Based Evaluation (ProBE) developed by MDEC and MAMPU that assesses quality of the online service delivery system • Data to be obtained internally from government entity or quality monitoring agency like MAMPU	Varies according to government entities. Example: ProBE assessment (2016): 4-star and above: 20% government websites assessed 3-star and below: 80% government websites assessed *Source: Provider-based evaluation, ProBE, annual report, 2016*	3-star on ProBE assessment
Data sharing across government agencies			
Government to government (G2G) data sharing platforms used by government entity	• G2G data sharing platforms enhance the practice of data sharing in the government • Data to be obtained internally from government entity	Varies according to government entities. Example: MyGDX MyGDX is a data sharing platform that provides data brokerage services for government entities. Launched by MAMPU in January 2018 *Source: Malaysian Government Central Data Exchange (MyGDX)*	1 G2G data sharing platform used
Percentage of datasets shared by government entity on G2G data sharing platform	• Number of datasets published on G2G data sharing platform over total number of datasets produced by government entity • Data to be obtained from owner of shared data and data sharing platform provider	Varies according to government entities	Higher number of transactions is considered positive

INDICATOR	DESCRIPTION	LATEST SITUATION	INDICATIVE VALUE
Data sharing across government agencies			
Number of downloads per shared G2G dataset	• The usefulness of shared G2G dataset, captured by the number of downloads, ensures that government entities share high quality and utility datasets • Data to be obtained from owner of shared data and data sharing platform provider	Varies according to government entities	Higher number of download is considered positive

Smart Mobility Indicators

INDICATOR	DESCRIPTION	LATEST SITUATION	INDICATIVE VALUE
Traffic congestion			
Percentage of road intersections using adaptive traffic control or prioritisation measures	• Based on the International Telecommunication Union (ITU), which refers to adaptive traffic control or prioritisation measures such as embedded road sensors that change traffic signals based on actual vehicles flow or other similar sensors that provide the same function. But the definition should only include signal-controlled intersections • Number of intersections with adaptive traffic control / total number of signal controlled intersections	TrafficSens Systems (M) Sdn Bhd has provided smart traffic solutions at 62 locations throughout Kuala Lumpur city centre by integrating with HCKL's existing automated traffic management system Estimation : 10%	To be placed in the Top Quartile performance (top 25) Target: 75%
Ratio of travel time during the peak period to travel time at free flow period	• Based on ITU, also known as Travel Time Index (TTI). This indicator is a measure of congestion on each trip and each mile of travel. A value of 1.30 indicates that a 20-minute free-flow trip takes 26 minutes during the peak • Travel time during peak period (min) / Travel time during free flow periods (min)	No official data available on Travel Time Index for Malaysia Example: Travelling from Kajang to Mutiara Damansara (40 KM): During free flow period = 40 min During peak period = 85 min TTI = 2.125	ITU defines the threshold as follows: TTI <= 1.5 is "Good"; TTI between 1.5 and 2.5 is "Potentially Acceptable"; and TTIs > 2.5 is "Less Desirable" TTI for US Cities (2016): Chicago : 1.38 Los Angeles : 1.71 New York : 1.31 Washington DC : 1.41 TTI Target for Malaysia: Less than 1.5

INDICATOR	DESCRIPTION	LATEST SITUATION	INDICATIVE VALUE
Percentage of major streets monitored by ICT	• Based on ITU, it refers to length of major streets monitored using in-road sensors or cameras (or both) to improve traffic congestion and traffic flow. Only includes arterial roads and highways, while residential streets are excluded. • Length of major streets monitored using ICT	• No current threshold available or reported in the ITU report or for any other cities worldwide • However, Singapore has deployed more than 1,000 sensors in its city's busy areas for traffic management Estimation: 10%	Seoul Urban Area: • Freeway Traffic Management System Roll-out: 187 KM • Total Road length in Seoul urban area (est.) : 605 KM • Coverage = 31% Target for Malaysia: 30%
Reduction in travel time (minutes)	(Travel time before Smart Mobility solutions – Travel time after Smart Mobility solutions) / Travel time before smart mobility solutions	The smart traffic management system project funded and implemented by Cyberview and Intelsec Sdn Bhd in collaboration with MP Sepang and MDEC has reduced travel time from 30 minutes to less than 15 minutes	Target for Malaysia: 50%
Percentage of urban public transport stops or stations for which traveller information is dynamically available to the public in real time	• Based on ITU, dynamic info refers to at least real-time info on arrival of next vehicle / train etc made available via screens, website, mobile apps etc. • No. of stops or stations with dynamic info / Total number of stops or stations	• All LRT and MRT stations display arrival info. Some irregularities can be observed for KTMB and monorail services • However, many bus stops especially those outside Klang Valley do not have information panel • Overall: 60% (est.)	Ultimately, the aim is for at least 90% of all public transport stops or stations to have real-time dynamic info available to the public either via information panel, website, mobile apps or other electronic means

Public transport ridership

Public transport satisfaction percentage	Number of public transport users who are satisfied with the quality and provision of the public transport. This can be done via annual surveys and opinion polls	APAD Survey (2017): Customer Satisfaction = 84%	Target for Malaysia: at least 90%

INDICATOR	DESCRIPTION	LATEST SITUATION	INDICATIVE VALUE
Percentage of transactions made using cashless modes	Number of cashless transactions / Total number of transactions	• In the Greater KL region, there is already widespread usage of travel cards. • However, outside Klang Valley, most of the transactions especially for buses are still cash-based	Target for Malaysia: 100%
Public transport modal share	Number of journeys made using public transport / Total number of journeys	Malaysia's public transport modal is around 20%	• Singapore's public transport modal share is 66% • APAD and Prasarana have set a target to increase the public transport modal share to 40%.

First and last mile connectivity

INDICATOR	DESCRIPTION	LATEST SITUATION	INDICATIVE VALUE
Number of shared vehicles per 100,000 inhabitants	Based on ITU, shared vehicles are defined as vehicles available for short term rentals (often by the hour) through a commercial business, public agency or with a cooperative. No of shared vehicles / One 100,000th population	No official data available.	• Singapore (source: One Motoring): Number of car sharing vehicles : 400 Population : 5.6 million Number of shared vehicles per 100,000 inhabitants = 7 cars • Target for Malaysia: 10 shared vehicles per 100,000 inhabitants
Number of shared bicycles per 100,000 inhabitants	• Based on ITU, many cities globally are now implementing a variety of bicycle sharing services either run by local community groups or non-profit organisations, the municipality, or in cooperation with private operators. • Number of shared bicycles available / One 100,000th population	Klang Valley: Total number of shared bicycles (Obike) : 20,000 Population : 7.3 million Number of Shared bicycles per 100,000 inhabitants = 274	• Singapore: Total number of shared bicycles = 50,000 Population = 5.6 million Number of Shared bicycles per 100,000 inhabitants = 893 • Target for Malaysia: At least 500 shared bicycles per 100,000 inhabitants

INDICATOR	DESCRIPTION	LATEST SITUATION	INDICATIVE VALUE
Length of bicycle paths and lanes per 100,000 population	• Based on ITU, bicycle lanes are to be counted if they are separated from the road by defined road markings. Bicycle paths are to be counted if they are separate roadways or lanes separated from the road by physical barriers • Kilometre (km) of bicycle paths and lanes / One 100,000th of the city's population	KL: Bicycle network: 12 KM Population: 1.73 million Length of bicycle network per 100,000 population = 0.69 KM	• Taipei (2016): Bicycle network: 500 KM Population: 2.71 million Length of bicycle network per 100,000 population = 18.5 KM • Target for Malaysia: At least 10 KM per 100,000 inhabitants
Number of Van Sharing MoU made via PPP	Number of Memorandum of Understanding (MoU) signed with private van operators to address first and last mile connectivity issues at public transport stations / stops	So far in Malaysia, no MoUs have been officially signed by either Prasarana, KTMB or MRTCorp with any private van operators	• In Jakarta, Grab and MRT Jakarta signed an MoU for the development of Jakarta MRT ticket payment service and first mile-last mile transportation for MRT passengers • Target for Malaysia: At least 3 MoUs signed, one each with Prasarana, KTMB and MRTCorp
Percentage of public transport fleet equipped with sensors for predictive maintenance	Number of rails equipped with IoT sensors / Total number of rails	No official information on the usage of IoT sensors on Malaysia's rail fleet (LRT, MRT, KTM and Monorail)	• Finnish railway has equipped 100% of its 1,500 fleet with IoT sensors for SAS analytics as part of its predictive maintenance programme • Target for Malaysia: 50%
Percentage of reduction in breakdowns and downtime	Number of breakdowns after predictive maintenance programme as compared to historical performance	N/A	Target for Malaysia: 100%

INDICATOR	DESCRIPTION	LATEST SITUATION	INDICATIVE VALUE
Service quality and facility provision			
Percentage of increase in the number of parking lot/ spaces at LRT/ MRT/ KTMB stations	Additional parking lots provided via the multi-layered (stacked) parking initiative at selected public transport stations	N/A	Double the existing number of parking lots available
High carbon footprint			
Percentage of public buses electrified	Number of Electric buses / Total Number of buses	• National Green Technology Master Plan and the Electric Mobility Blueprint (EMB) envision Malaysia to have 2,000 electric vehicles on the road by 2030 • Malaysia currently has approximately 60,000 buses. This translates to EV bus adoption rate of 3.33%	• In just 8 years, Shenzhen became the first city to electrify 100% of its public buses (16,359 to be exact). • Target for Malaysia: 20%
Percentage of government fleet vehicles electrified	Number of EV-based Government Fleet / Total Government Fleet vehicles	Royal Malaysia Police has been traditionally using fuel-based vehicles, primarily from local brand, for its fleet. Estimate: less than 1%	• China has mandated that at least 30% of government vehicles purchased in the next two years will have to be fuelled by alternative energy sources. The USA, on the other hand, has been primarily using EVs for the government fleet and police vehicles. • Target for Malaysia: 30%

INDICATOR	DESCRIPTION	LATEST SITUATION	INDICATIVE VALUE
Number of charging stations per square kilometer	Number of Charging Stations / Total Area (sq km)	• National Green Technology Master Plan and the EMB envision Malaysia to have 125,000 charging stations by 2030. This translates to 0.4 charging stations per sq km • At present, there are less than 3,000 charging stations in the country (0.009)	• California Number of charging stations : 16,000 Area : 423,970 Sq Km Number of charging stations per square kilometer = 0.04 charging stations per sq km • Target for Malaysia: 0.4 charging stations per square kilometer
Percentage of reduction in carbon emission	Carbon emission levels after the implementation of smart sustainable solutions as compared to the historical data	Malaysia has the 2nd largest greenhouse gas emission per capita among ASEAN countries, although the Prime Minister has declared to reduce this by 40% by 2020	• Beijing has reduced deadly airborne pollutants by roughly 20% in less than a year by using air quality sensors to track specific sources of pollution and regulate traffic and construction accordingly. • Target for Malaysia: 20%
Percentage of taxis and e-hailing vehicles electrified	• Number of Electric Taxis / Total Number of Taxis • Number of EV-based e-hailing vehicles / Total e-hailing fleet	Malaysia has close to 100,000 taxis. While many of the taxi drivers shifted to gas-based vehicles, none has seemed to be using electric vehicles	For the first phase, Malaysia can target for 5% of the taxis to be electrified by 2025

INDICATOR	DESCRIPTION	LATEST SITUATION	INDICATIVE VALUE
Green vehicle adoption rate	• Based on ITU, it refers to the percentage of low-carbon emission passenger vehicles including hybrids, plug-in hybrid electric vehicles (PHEVs) and electric vehicles (EVs) • Number of green vehicles registered / total vehicle registration	• National Green Technology Master Plan and the EMB envision Malaysia to have 100,000 EV on the road by 2030 • According to MAA, vehicle registrations in Malaysia has hit 28.2 million units • Based on this statistics, the green vehicle penetration rate amounts to a paltry 0.4%	• The Edge Financial Group's base case scenario is for a penetration rate of 10% by 2030 while its bull case scenario is a penetration rate of 18% • Target for Malaysia: At least 10%
Number of MoUs made on R&D via PPP	• Number of MoU signed between public (government/academia/research institution) and private (research institution/industry players) on R&D activities for electric vehicles and next-generation automobiles such as autonomous vehicles	• Although there are various research institutions in Malaysia, the industry-academia collaboration has been low, especially in the field of automotive engineering. • Commercialisation activities on EVs and AV has been almost nil, although the Malaysian Government has envisioned the country to be the regional automotive hub for EEV in its National Automotive Policy 2014	At least 2 MoUs signed via PPP

Smart Digital Infrastructure Indicators

INDICATOR	DESCRIPTION	LATEST SITUATION	INDICATIVE VALUE
Internet speed and connectivity			
Ranking in Affordability Driver Index	Affordability Driver Index provides a composite score which takes into consideration Access Score and Infrastructure Score which basically measure the affordability of internet services as a % to the GDP of the country and also the readiness of internet services	Current score for Malaysia based on Alliance for Affordable Internet report, 2017 = 68.65, ranked 4th out of 58 selected countries	There is no threshold currently, but to be in the Top Quartile (top 25%), Malaysia needs to be ranked 15th or above out of the 58 countries measured
Average 4G download connection speed	Based on data available in OpenSignal report that lists down the global ranking for 88 selected countries	Current status in Malaysia based on OpenSignal report, 2018 = 14.83 Mbps, ranked 70th	OpenSignal set the benchmark as 50 Mbps but currently no country has crossed the threshold
Indoor and outdoor mobile network coverage			
Percentage of population covered by at least 3G mobile network	• Refers to the percentage of inhabitants that are within range of at least a 3G mobile-cellular signal, irrespective of whether or not they are subscribers. • This is calculated by dividing the number of inhabitants covered by at least a 3G mobile-cellular signal by the total population and multiple by 100. It excludes people covered only by GPRS, EDGE or CDMA 1xRTT, EV-DO	Current status in Malaysia based on MCMC's report, Population Coverage 2017: = 3G population coverage 93.6% = 4G population coverage 77.2%	11MP = to achieve 95% broadband (at least 3G) coverage in populated areas by 2020

INDICATOR	DESCRIPTION	LATEST SITUATION	INDICATIVE VALUE
ICT infrastructure and internet coverage			
Mobile-broadband penetration rate per 100 inhabitants	Based on data available in MCMC Pocket Statistics published every quarter	Current status in Malaysia based on MCMC Pocket Statistics , Q3 2018 = 110.6% mobile broadband penetration rate per 100 inhabitants	Average for developed countries according to ITU statistics, 2017 = 97%
4G network availability	Based on data available in OpenSignal report that lists down the global ranking for 88 selected countries	Current status in Malaysia based on OpenSignal report, 2018 = 74.88%, ranked 42th	OpenSignal always considered a 4G availability score of 90% to be truly exceptional on the countrywide level
Buildings with internet / network coverage probability more than 95% per floor	• To measure the in-building coverage of internet / network services • It is an aspirational indicator which is not being measured systematically by any agency or institution at the moment. However, the indicator is critical to measure the internet / network quality of a city. Hence, it is proposed to be included as of the indicators to be measured • Effort should be taken to identify a sustainable method to measure this indicator once the report is finalised	It is an aspirational indicator which is not being measured systematically by any agency or institution at the moment	75% of the buildings in a city
Percentage of households with internet access	Based on data available in MCMC Pocket Statistics published every quarter	Current status in Malaysia based on DOSM statistics, 2017 = 85.70%	Average for developed countries according to ITU statistics, 2017 = 84.4%
Fixed-broadband penetration rate per 100 inhabitants	Based on data available in MCMC Pocket Statistics published every quarter	Current status in Malaysia based on MCMC Pocket Statistics, Q3 2018 = 8.0% fixed broadband penetration rate per 100 inhabitants	Average for developed countries according to ITU statistics, 2017 = 31%

INDICATOR	DESCRIPTION	LATEST SITUATION	INDICATIVE VALUE
ICT infrastructure and internet coverage			
SAIDI for Electricity	• SAIDI is an index used by Energy Commission Malaysia to measure the reliability of the electricity supply in a certain state, territory or nation • This is done by calculating the average number of minutes of interruptions that each customer faces with the use of data such as time, duration per customer, extent and cause of supply disruption	Current average score in Peninsular Malaysia is 49.29 minutes / customer / year	Minimum score of 49.29 minutes / customer / year for selected cities in Malaysia
Investment in telecommunication	Based on the sub-index in IMD World Digital Competitiveness Ranking report	Current status in Malaysia based on IMD World Digital Competitiveness Ranking report, 2018 = ranked 5th out of the 63 selected countries	There is no threshold currently, but to be in the Top Quartile (top 25%), Malaysia needs to be ranked 15th or above out of the 63 countries measured

INDICATOR	DESCRIPTION	LATEST SITUATION	INDICATIVE VALUE
ICT infrastructure and internet coverage			
Ranking of E-Participation Index (EPI)	Based on IMD World Digital Competitiveness Ranking report. The EPI measures the use of online services to facilitate provision of information by government to citizens (e-information sharing), interaction with stakeholders (e-consultation), and engagement in decision-making processes (e-decision making)	Current status in Malaysia based on IMD World Digital Competitiveness Ranking report, 2018 = ranked 39th out of the 63 selected countries	There is no threshold currently, to be in the Top Quartile (top 25%), Malaysia needs to be ranked 16th or above out of the 63 countries measured
Cybersecurity			
Ranking in Global Cybersecurity Index	The Global Cybersecurity Index (GCI) is a composite index combining 25 indicators into one benchmark measure to monitor and compare the level of ITU Member States cybersecurity commitment with regard to the five pillars identified by the High-Level Experts Group and endorsed by the Global Cybersecurity Agenda (GCA)	Current score in Malaysia based on ITU report, 2017 = 0.893, ranked 3rd globally out of 193 countries	There is no threshold currently, but to be in the Top Quartile (top 25%), Malaysia needs to be ranked 48th or above out of 193 countries measured
ICT use	• Based on the sub-index in GII. The ICT use index is a composite index that weigh three ICT indicators (33% each): (1) percentage of individuals using the Internet; (2) Fixed (wired) broadband Internet subscriptions per 100 inhabitants; (3) Active mobile broadband subscriptions per 100 inhabitants • It is the second sub-index in ITU's ICT Development Index (IDI)	Malaysia scored 4.76 in 2016	4.15 (mean score of 123 countries in the GII 2016 report)

GOVERNANCE
ARRANGEMENT

07

Governance Arrangement

This chapter looks into governance arrangements for smart city development in Malaysia. More specifically, the current situation and recommendations on institutional frameworks on smart city development.

Institutional Framework

Current situation

Smart city development in Malaysia is driven by various public and private sector entities. For instance, some local authorities have planned, tested and implemented smart city initiatives. Private property developers have also modelled new townships with smart city elements in mind. The various entities may act on their own accord or in collaboration with others.

Even so, an ecosystem of key public and private sector entities have been identified as key players in smart city development in Malaysia. The variety of key players in the smart city space is due to:

1. Multidimensional nature of cities
2. Fragmentation of authorities and functions of government entities. Below is an illustration of the smart city development ecosystem in Malaysia. The illustration highlights some of the key drivers involved.

Smart City Ecosystem in Malaysia

The primary driver of smart city development will be the local authority as it has jurisdiction over and responsibility to administer the city.

A state government sets priorities for the local authority as it controls budget allocation.

MHLG plays a liaising and guiding role between local authorities and the federal government.

Ministry of Federal Territories (MOFT) oversees and sets directions for local authorities in the Federal Territories.

Component influencers (in mobility, ICT infrastructure, citizen living, etc.) support the local authority's effort to develop smart city. Influencers are vital in this ecosystem as they initiate and / or regulate a variety of activities that relate to smart city development. For instance, should a smart city possess 5G broadband, a local authority needs the buy-in from TM or private telecommunication companies to establish the necessary infrastructure and operate within the area.

Proposed Institutional Framework

Given the current situation where various entities are undertaking smart cities development on their own accord, a coordination body is proposed to provide more structure to smart city development in Malaysia. A coordination body works well within the current institutional framework as it respects the existing authority and jurisdiction and seeks to harness synergies among relevant government and non-government entities.

The proposed coordination body works to 1) promote the smart city agenda, 2) guide and liaise with, coordinate and guide local authorities and state governments on smart city development and 3) assist with capacity building (technical, funding and matching to solution providers).

To ensure a holistic approach in the coordination body's work, a smart city council made up of key stakeholders will provide directions and oversee the coordination body. The proposed institutional framework is described in the illustration below:

Proposed Smart City Institutional Framework

SMART CITY COUNCIL

MEMBERSHIP
- Prime Minister or Deputy Prime Minister
- Ministry of Housing and Local Government (MHLG)
- Ministry of Federal Territories (MOFT)
- Ministry of Communications and Multimedia (KKMM)
- Malaysia Economic Association (MEA)
- State local government committees chairpersons or ministers
- Ministry of Transport (MOT)
- Ministry of Works (KKR)
- Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC)
- Ministry of International Trade and Industry (MITI)

ROLE:
Generates ideas, solves issues, decides on policies and strategic directions regarding smart city development

PRIVATE SECTOR COMMITTEE

MEMBERSHIP:
Top management personnel of private telecommunication companies, solution providers (Telekom Malaysia, IBM, NEC, etc.)
ROLE:
Advise and give input on policy and strategic direction formulation

Oversees and gives direction to

Engaged with

SMART CITY COORDINATION BODY

ROLE:
Smart City Council Secretariat formulates policy and strategic direction recommendations, executes directions from council, promotes smart city agenda, guides and liaises with local authorities and state governments, provides capacity building assistance

Engages and coordinates with

LOCAL AUTHORITIES

ROLE:
Primary implementing body of smart initiatives and infrastructure in the city

STATE GOVERNMENT

ROLE:
Set state priorities on smart city development and control local authorities budgets

Oversees and gives direction to

The proposed institutional framework proposes that the Smart City Coordination Body to be placed under MHLG. The coordination body can be an existing unit or section in MHLG. The rationale is that MHLG is already playing a coordinating and guiding role for local governments in terms of local laws, plans and public service improvements. Therefore, a Smart City Coordination Body could be placed under MHLG which would allow the body to utilise the Ministry's track record and expertise in coordinating with disparate government and non-governmental entities.

Most importantly, the proposed coordination body will not intrude on the state and local governments' authority to manage and develop cities according to their priorities. The coordination body can engage, persuade and assist state and local governments to accelerate smart city development, but it cannot instruct or make decisions for state and local governments on matters relating to smart city development in the country.

A private sector committee comprising executives of telecommunication companies and solution providers, is also to be established. This committee ensures that the private sector perspective is included in the formulation of relevant policies and strategic directions as well as in identifying implementation challenges and opportunities. The Private Sector Committee and the Smart City Coordination Body shall maintain consistent engagement with one another.

The proposed Smart City Council is a high level decision-making body comprises the Prime Minister or Deputy Prime Minister, the Chief Minister or *Menteri Besar* of each state, and relevant ministers. The council's function is to deliberate and set smart city related policies and strategic directions from time to time. Proposed membership of the council is as follows:

1. Prime Minister / Deputy Prime Minister
2. Minister of Housing and Local Government
3. Minister of Federal Territories
4. Minister of Communications and Multimedia
5. Minister of Economic Affairs
6. Minister of Transportation
7. Minister of Works
8. Minister of Energy, Science, Technology, Environment and Climate Change
9. Minister of International Trade and Industry
10. Chief Minister or *Menteri Besar* of each state

The proposed council is assisted by, and sets directions for the Smart City Coordination Body. The Smart City Coordination Body will also serve as the secretariat for the Smart City Council.

The National Council for Local Government (NCLG) serves as the model for the Smart City Council. Just as how the NCLG seeks to bring local, state and federal governments on a common platform to deal with matters relating to local government, the proposed Smart City Council envisions participation of relevant public sector stakeholders to formulate appropriate policies and strategic direction to advance smart city development in the country.

The establishment of the Smart City Council with membership at the highest ministerial level provides high level visibility and emphasis to advance smart city development. While existing councils such as the National Physical Planning Council or the NCLG can be used to advance smart city development, the smart city agenda could be watered-down due to competing agendas that arise from existing councils.

Terms of Reference for Proposed Institutional Framework

While the proposed institutional framework in the preceding pages has identified details such as Smart City Council membership and government ministry where the Smart City Coordination Body could be put under, the following terms of reference should guide further deliberation and decision-making on the final institutional framework.

| Organisation	Smart City Council	Smart City Coordination Body
Objective	To provide leadership and strategic direction in the development of smart cities in Malaysia	To coordinate, facilitate and promote implementation of smart city initiatives among relevant stakeholders
Roles and responsibilities	1. Deliberate and make decisions on policies and strategic direction related to smart city development 2. Generate ideas and solve issues on smart city implementation	1. Formulate policy and strategic direction recommendations on smart city development 2. Secretariat to the Smart City Council 3. Support the work and carry out instructions of the Council 4. Liaise, coordinate and guide local authorities and state governments to implement smart city initiatives 5. Assist local authorities and state governments with capacity building 6. Review and monitor progress on smart city development 7. Report to and advise the Council upon matters relating to smart city development
Establishment and tenure	• Cabinet approval and discretion • Meetings to be hosted in secretariat	• Council approval and discretion • Existing unit or section in ministries and / or agencies, or creation of a new entity
Membership	Ministerial level officials whose office relates to smart city development and determined from time to time by the Chairperson: 1. Prime Minister or Deputy Prime Minister, as Chairperson 2. Minister of Housing and Local Government 3. Minister of Federal Territories 4. Minister of Communications and Multimedia 5. Minister of Economic Affairs 6. Minister of Transport 7. Minister of Works 8. Minister of Energy, Science, Technology, Environment and Climate Change 9. Minister of International Trade and Industry 10. Chief minister or *Menteri Besar* of each state	Senior and working-level officials from ministries and / or agencies determined by the Council. One senior official shall be appointed as the Chairperson of the Smart City Coordination Body as determined by the Council
Meetings and procedures	1. The Council shall meet once in every four months in a year and shall, in addition, meet as and when a meeting is convened by the Chairperson 2. Meeting minutes shall be kept 3. The Council shall determine its own procedures	1. The Chairperson of the Coordination Body, with approval of the Council, shall determine its own procedures 2. Meeting minutes shall be kept 3. The Coordination Body shall report to the Council at least once a year

COMMUNICATION ACTION PLAN

08

Implementation Roadmap

The Malaysian Smart City Framework will serve as guidance for cities, states and local authorities embarking on the smart city agenda. Though the framework is developed at the national level, the implementation needs to be driven from the local or city level. Thus, the implementation roadmap below describes the action plan required to roll out the Malaysian Smart City Framework. The roadmap is divided into three (3) phases which are:

Phase 1 (Foundation Stage) from 2019 to 2020 (2 years)

Phase 2 (Development Stage) from 2021 to 2022 (2 years)

Phase 3 (Advanced Development and Monitoring Stage) from 2023 to 2025 (3 years)

Foundation Stage
PHASE 1
1
2019-2020
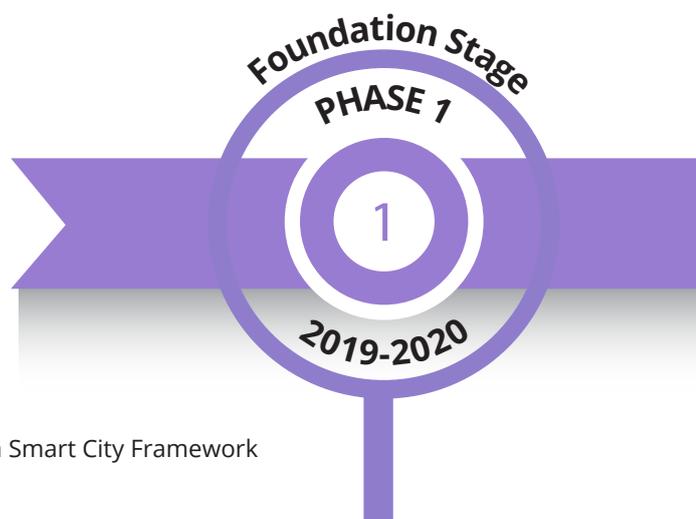
The projected action plan for Phase 1 (Foundation Stage) of the Malaysia Smart City Framework implementation is as follows:

#	Activities	Lead Agencies
	Programmes	
1	Conduct awareness programmes on Smart City Framework at Federal, State and Local PBT levels, focussing on the following items: 1. The need for Smart City in Malaysia (rationales and benefits case) 2. Framework for Smart City development (criteria, components, strategies and indicators) 3. The importance of Smart City initiatives; and 4. The way forward to implement Smart City at state or local level	• MHLG • PLANMalaysia • State Government • Local Authority
2	Engagement with local authorities to identify key urban challenges and opportunities for further improvement in quality of life and urban management in a city	• PLANMalaysia • Local Authority
3	Conduct maturity assessment with the local authorities to gauge their readiness level and aspirations	• PLANMalaysia • Local Authority
4	Shortlist and commence implementation of priority smart initiatives identified to address key urban challenges	• State Government • Local Authority • Technology partners • Solution providers
5	Develop a "Smart City Dashboard" which can be used as a guide and reference for the government and local authorities to understand the concepts and components of a smart city as well as to highlight the implementation progress of the smart city initiatives	• MHLG • PLANMalaysia
6	Establish Malaysia Accreditation on Smart City based on ISO 37122	• Department of Standards Malaysia • PLANMalaysia
	Policies	
7	Enforce the existing policies related to smart city development (eg: solid waste management, pollution, Mandatory Standard on Access Pricing (MSAP) etc.)	• Relevant agencies
8	Identification of lead and supporting agencies for the proposed policies in the Malaysia Smart City Framework and conduct engagement sessions with the relevant agencies	• Smart City Council
9	Segregating the relevant policies into "critical/enabling" policies and "secondary/supporting" policies	• Smart City Council

#	Activities	Lead Agencies
10	Formulate and implement new Enabling/Critical policies for smart city (e.g Internet connectivity, open data, e-government, human capital, cybersecurity etc.)	• Relevant agencies
Governance		
11	Bring the proposal to set up Smart City Council to the Cabinet	• MHLG
12	Setting up Smart City Council and Secretariat	• TBC upon Cabinet decision
13	Develop and refine terms of reference for Smart City Council and Coordination Body	• TBC upon Cabinet decision
ICT and Digital Infrastructure		
14	Obtain Cabinet approval to designate Communication Infrastructure as a public utility to facilitate infra deployment at lower cost	• KKMM
15	Assess Technological Gaps and Digital Readiness of local authority and public sectors	• KKMM
16	Incentivise building owners/managers to upgrade their passive infra to allow operators to supply fibre optic	• KKMM
17	Engage with telco and utility providers to discuss possibility/viability of "sharing infrastructure" between them	• Telco and utility providers
18	Identify potential site locations that require upgrading/retrofitting with Digital Infrastructure (e.g IoT sensors, fibre cables etc)	• Local authority

The projected action plan for Phase 2 (Development Stage), which will be carried out over 2 years from 2021 to 2022, of the Malaysia Smart City Framework implementation is as follows:

#	Activities	Lead Agencies
	Programmes	
1	Capacity building exercise with local authorities to enhance technological and infrastructure readiness to support smart city development	• Smart City Council • PLANMalaysia
2	Assess the funding requirement and mechanism for implementation of the smart city initiatives	• Smart City Council
3	Identify and implement prioritised key smart city projects to address urban challenges	• Local authority • Technological partners / Solution providers
4	Update the Smart City Dashboard accordingly with newly identified pilot areas as well as strategies and initiatives that have been implemented	• MHLG • PLANMalaysia
	Policies	
5	Strengthening the implementation and enforcement of critical policies related to smart city development	• Relevant agencies
6	Formulate and implement secondary/supporting policies for smart city development	• Relevant agencies
	Governance	
7	Formulate a progress monitoring mechanism to evaluate outcome and monitor implementation performance of smart city projects	• Smart City Coordination Body
8	Reporting to Smart City Council on the overall progress of smart city implementation, opportunities, constraints, collaboration and etc	• Smart City Council Secretariat
9	Identify source of funding and opportunities for strategic alliance/collaboration with public/private sector, academia, universities, international bodies and etc	• Smart City Council
	ICT and Digital Infrastructure	
10	Collaboration with MCMC to plan suitable initiatives and devise an implementation mechanism for digital infrastructure provision	• Local Authority • KKMM
11	Implementing the strategies/initiatives proposed in the National Fiberisation and Connectivity Plan (NFCP) to expand existing fibre optic network, install undersea fibre optic cables, develop gigabyte networks in selected locations and ensure effective spectrum distribution in rural and isolated areas	• KKMM • MCMC
12	Obtain Cabinet/Cabinet Committee approval on the proposed use of state and federal buildings/ land/ Right of Way as potential sites to improve network coverage and internet speed	• KKMM
13	Expanding TNB's pilot project on HSBB made available through TNB's own fibre optics as part of its Smart Grid and Open Access initiatives	• TNB

2020-2022

2

PHASE 2

Development Stage

The projected action plan for Phase 3 (Advanced Development and Monitoring Stage), which will be carried out over 3 years from 2023 to 2025, of the Malaysia Smart City Framework implementation is as follows:

PHASE 3
Advance Devolepment and Monitoring Stage
3
2023-2025

#	Activities	Lead Agencies
Programmes		
1	Identify relevant indicators and threshold for project monitoring process	• Department of Standards Malaysia • Smart City Council • PLANMalaysia
2	Continue with and monitor the implementation of smart city projects	• Smart City Council
3	Identification of smart city initiatives for the next phase	• Smart City Council • PlanMalaysia
4	Strengthen industry-academia collaboration to foster innovation, R&D and commercialisation activities for future smart city deployment	• Smart City Council • Academia • Solution providers
5	Collaboration with relevant agencies to promote new investments in the digital economy space	• MITI • MIDA
6	Monitor and update the Smart City Dashboard according to the implementation of the smart initiatives that address the urban challenges in selected sites and indicators performance	• MHLG • PLANMalaysia
Policies		
7	Reporting on the overall performance of smart city development/implementation to Smart City Council	• Smart City Council Secretariat
8	Accreditation of smart city based on application by local authority or private developer	• Department of Standards Malaysia
Governance		
9	Creation of a performance dashboard / Balanced Scorecard (BSC) to showcase the performance and status of smart city implementation	• Smart City Council • Local Authority
10	Annual review/appraisal of achievement, issues and moving forward aspirations based on the vision/goals/KPIs set out in the Smart City Framework and the NFCP	• Smart City Council
ICT and Digital Infrastructure		
11	Continue the implementation of digital infrastructure and other requirements for smart city implementation beyond 2025	• MCMC
12	Establishment of National 5G Task Force	• MCMC • Smart City Council

Priority Intiatives

Out of the 92 initiatives proposed in this Smart City Framework, the following 30 initiatives have been identified as the priority initiatives to be rolled out within Phase 1 (Foundation Stage) of the implementation roadmap by 2020, although the completion could prolong beyond 2020 for some of these initiatives. The top 30 initiatives are:

#	Top 30 Initiatives	Key Implementing Agencies	Component
1	Enhance the usage of e-payment	• BNM	**Smart Economy**
2	Implement predictive policing	• RMP • Telco	**Smart Living**
3	Strengthen the implementation of crime prevention through CPTED	• Local Authorities • RMP, MOFT, JKR, NGOs, Service providers & Developers	
4	Enhance quality of life at public housing	• Local Authority • State Authority, RMP, MHLG, National Housing Department & NGOs	
5	Enhance patient monitoring system	• Ministry of Health • MIMOS Berhad	
6	Strengthen waste separation and reduction from source	• MHLG, MESTECC, NSWMD • SWCorp, DOE, Local Authority & SEDA	**Smart Environment**
7	Adopt smart planning to support planning decision making and to enhance disaster risk management	• Local Authority • MMD, NAHRIM, DID & JKR	
8	Develop a cloud-based flood prevention and monitoring system	• DID, Local Authorities, • MMD, NAHRIM, NADMA & JKR	
9	Introduce a systematic smart water management	• National Water Services Commission	
10	Replace the water supply pipes with infrastructure equipped with sensor technology and applications	• State Water Departments & JKR	
11	Implement the smart grid system to enhance energy efficiency and reliability	• Energy Commission, TNB	
12	Promote and enhance the low carbon city and societal initiatives at every level	• MESTECC, Local authorities	
13	Enhance programmes to improve sense of responsibility towards public properties	• MOE • PTA, Corporate Bodies, NGOs, Local Authority	**Smart People**
14	Review curriculum in subjects such as STEM, innovation, ICT and place emphasis on TVET in the education system	• Ministry of Education • MaGIC, TalentCorp, MOHR, Majlis Amanah Rakyat	
15	Strengthen industry-academia collaboration in digital workforce/ innovation	• MOE • MaGIC, TalentCorp, Universities, Majlis Amanah Rakyat & MDEC	
16	Enhance the use of digital platform to create a two-way interaction between the community and local authority	• Local authorities • KKMM & App inventor, service provider	
17	Implement lifelong learning programmes for the public	• Local Authorities • MoWFCD & NGOs	

#	Top 30 Initiatives	Key Implementing Agencies	Component
18	Publish annual meeting minutes, financial statements and budgets on respective government websites	• Ministries and agencies • State governments • Local authorities	**Smart Government**
19	Utilise electronic procurement architecture	• MOF, State government, Local authorities • E-procurement platform developers	
20	Establish customer satisfaction assessment in e-government services	• Ministries and agencies • Local authorities • State governments, KKMM • MAMPU	
21	AI and IoT Sensors for data collection, traffic management and pollution tracking	• KKR, MOT • Local Authorities, JKR & Private agencies	**Smart Mobility**
22	Smart traffic lights	• KKR, MOT • Local Authorities, JKR & Private agencies	
23	Integrate existing mobility applications into all-in-one mobile app	• MOT • Local authorities & Public transport operators	
24	On-demand car sharing from and to rail stations	• MOT, Car Sharing service providers • MRTCorp & Prasarana	
25	City-wide electric bus fleets	• MOT, GreenTech • TNB, Transport operators & Local authorities	
26	Strengthen the laws on cable-related theft and vandalism	• MOHA, RMP • KKMM, MCMC	**Smart Digital Infrastructure**
27	Sharing Infrastructure policy among telcos and across industries	• KKMM, State government • Telcos	
28	Encourage fibre optic installation in new developments	• KKMM • State government, Telcos	
29	Compliance with MSQoS standards on Quality of Service	• KKMM & MCMC	
30	Review and improve existing policies related to cybersecurity and personal data	• KKMM & PDPA • NACSA & CyberSecurity Malaysia	

MySMART CITY PILOT PROJECTS

09

Pilot City

MySmart city pilot project refers to the implementation of smart city policies, strategies, initiatives, and indicator at city level. The objectives of pilot projects are:

- To evaluate the suitability of smart city solution and initiatives in Malaysia
- To increase the quality and efficiency of city management through smart city approach

Five (5) cities have been chosen as pilot project areas, namely Kuala Lumpur, Johor Bahru, Kota Kinabalu, Kuching, and Kulim. The selection of these cities are based on three main criteria.

- Cities have been selected under ASEAN Smart City Network (ASCN)
- Cities have been identified as competitive cities as stated in 11MP
- Cities that represent different city hierarchy based on NUP2

Malaysia selected cities in ASCN

- Kuala Lumpur
- Johor Bahru
- Kota Kinabalu
- Kuching

Identified in Competitive City by 11MP

- Kuala Lumpur
- Johor Bahru
- Kota Kinabalu
- Kuching

Urban Hierarchy based on NUP2

Global City
Kuala Lumpur
Regional City
Johor Bahru & Kota Kinabalu
State City
Kuching
Main City
Kulim

Key Profile Of Pilot City

Kulim
- Population: 321,300 people
- Urban Hierarchy: Main City
- Area: 765km²
- Local Authorities:
    ◊ Kulim City Council
    ◊ Kulim Hi-Tech Park (KHTP) Local Authority
- City's Functions: Kulim is an ever-developing industrial district where the KHTP is the first high technology industrial park in Malaysia that was established in 1996. The KHTP accommodates high technology related industries and has become one of attractive destinations for foreign direct investment around the world especially Japanese investors

Kulim
321,300 population
765.00km²

Kuala Lumpur
1.45 million population
243.00km²

Kuala Lumpur
- Population: 1.45 million people
- Hierarchy: Global City
- Area: 243 km²
- Local Authority: Kuala Lumpur City Hall (KLCH)
- City's Functions: Kuala Lumpur functions as a federal, state and local administration, major national and international transportation nodes, storage and warehousing facilities, wholesale and retail, campus based educational institutions, space intensive recreational facilities, professional services and a wide range of manufacturing activity

Johor Bahru
1.5 million population
1,064.00km²

Johor Bahru
- Population: 1.5 million people
- Hierarchy: Regional City
- Area: 1,064 km²
- Local Authorities:
    ◊ Johor Bahru City Council (MBJB)
    ◊ Iskandar Puteri City Council (MBIP)
    ◊ Pasir Gudang Municipal Council (MPPG)
- City's Functions: Johor Bahru is one of the fastest growing cities in Malaysia after Kuala Lumpur, partly due to its close economic relations with Singapore. It is the fourth largest city in Malaysia. In recent years, the city has pioneered the practice of low carbon economy to limit greenhouse gasses and various private players have signed MoU to develop smart solutions towards making the city safe and sustainable

Kota Kinabalu

- Population: 457,326 people
- Hierarchy: Regional City
- Area: 351 km²
- Local Authority: Kota Kinabalu City Hall (KKCH)
- City's Functions: Kota Kinabalu is a medium-size city whose main economic activities are industrial production, consumer and business services. Kota Kinabalu has a higher proportion of residential land than other Malaysian cities, and its open/green space accounts for nearly half of the city's total area (due to the large hills terrain close to the city centre)

Kota Kinabalu

457,326 population
351.00km²

Kuching

684,900 population
431.01km²

Kuching

- Population: 684,900 people
- Hierarchy: State City
- Area: 431.01 km²
- Local Authorities:
  - ◊ Kuching South City Council (KSCC)
  - ◊ Kuching North City Hall (KNCH)
  - ◊ Padawan City Council
- City's Functions: Kuching is the capital city of Sarawak. Kuching is one of the main commercial and industrial centres in Sarawak, and it aims to become a major growth centre in East Malaysia. Kuching has been active in developing action plans and specific projects that they will undertake from 2018 - 2025

KUALA LUMPUR

Key Urban Challenges:

01

Low usage of public transportation

12.3%
or 7388 hectare of land covered for public transportation
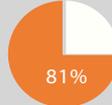
12.3%
Public transportation usage

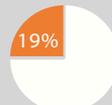*Sumber: KL Competitive City Master Plan Interim Report, 2017*

02

High number of solid waste generation and low recycling rates
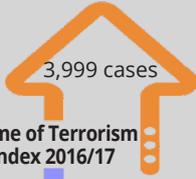
764,420 tonne waste generated

81%
619,660 tonne sent to landfill

19%
144,759 tonne recycled

Sumber: Alam Flora Sdn. Bhd., 2017

03

A relatively high crime rate

3,999 cases
Crime of Terrorism Index 2016/17
3,776 cases

13,213 cases
Property Crime Index 2016/17
9,483 cases

Sumber: DOSM, 2017

04

Low internet speed and internet access

6.9 mbps

Source: A Study on Gap Analysis of Communication Infrastructure Readiness for Implementation of Smart City, 2018

05

Limited data sharing among departments within KLCH

Source: KL Competitive City Master Plan Interim Report, 2017

Proposed Initiatives:

Urban challenges

01

Low usage of public transport

EXISTING INITIATIVES

1. 5 railways system
2. E-hailing
3. Bicycle lane
4. Covered pedestrian walkways
5. Park and Ride
6. Bas Go KL
7. City Brain

PROPOSED INITIATIVES

1. Increase the transit coverage
2. Increase access and diversity on first mile and last mile mode
3. Increase the bicycle lane facility and connectivity within the university
4. Introduce a single ticket with multiple rides and travel package discount system
5. Reduce public transportation fees
6. Improve and enhance travel journey apps
7. Install a GPS system on public buses
8. Encourage shuttle bus services for company workers
9. Enforcement initiatives need to be improved – fines etc
10. Integration of all existing parking apps into a single comprehensive app with real-time information and integrated payment option
11. Allow drivers to connect directly to physical parking meter via Bluetooth and prompt for payment via the app
12. A private-driven initiative with lesser CAPEX required compared to traditional Park n Ride facilities

INDICATORS

1. Percentage of public transport satisfaction
2. Public transport network for every 100,000 inhabitants (km)
3. Percentage of residents with access (within 0.5 km) to public transport
4. Transportation mode - the use of various forms of transport for travel to work

Urban challenges

02

High number of solid waste generation and low recycling rate

EXISTING INITIATIVES

1. Prohibit the use of polystyrene/plastic bags
2. One-stop recycling centre
3. Waste separation initiatives
4. No straw

PROPOSED INITIATIVES

1. Introduce smart bin at public housing and tourist attraction areas
2. Adapt the WtE technology
3. Introduce an automatic waste collection system
4. Enforce the waste separation from sources especially from residential areas
5. Encourage the use of bio-degradable plastics
6. Increase public awareness on waste separation and reduction
7. Encourage the developers to recycle construction waste
8. Encourage the waste to rewards campaign
9. Improve waste separation for hazardous items by adding a separate bin

INDICATORS

1. Solid waste generation rate per capita
2. Delivery of solid waste to landfills/day
3. Recycling rate per year
4. Percentage of waste diversion (recycle and recovery)

Urban challenges

03

A relatively high crime rate

EXISTING INITIATIVES

1. Safe city programme
2. Community-Oriented Policing
3. CPTED
4. CCTV
5. Rakan Cop

PROPOSED INITIATIVES

1. Increase the installation of CCTVs and coverage at public areas
2. Introduce the smart pole technology which includes CCTV, Wi-Fi, panic button on a single pole
3. Integrate the CCTV system between private and public management
4. Improve CCTVs at selected tourist/public areas by introducing facial recognition technology
5. Enhance existing CCTVs by adding other smart applications
6. Increase awareness of safe initiatives

INDICATORS

1. Number of crimes rate reported

Urban challenges

04

Low internet speed and internet access

EXISTING INITIATIVES

1. HSBB
2. KLCH wifi/Wireless project@KL

PROPOSED INITIATIVES

1. Enhance HSBB infrastructure and make it affordable
2. Increase the number of hotspot
3. Increase internet speed and coverage in urban areas by 100 Mbps for household/office/devices

INDICATORS

1. Average speed of internet

Urban challenges

05

Limited data sharing between departments within KLCH and external departments and agencies in Kuala Lumpur

EXISTING INITIATIVES

KLCH GIS system
- E-Government
- E-licensing
- E-procurment
- E-services
- E-housing
- E-complaint

PROPOSED INITIATIVES

1. Establishment of Urban Observatory
2. Establishment of open data policy within KLCH
3. Enforcement on data security for online application

INDICATORS

1. Number of open data to be shared

Existing Inventory

Waste can be divided into two categories, liquid or solid waste, and both can be hazardous. Both of these can be grouped into organic, re-usable and recyclable waste. Current garbage collection is inefficient, time-consuming and requires a huge amount of human energy. This is because the garbage collectors need to check whether the garbage is full or not according to the fixed schedule. Based on the inventory for waste management, most of the bins provided in Kuala Lumpur is lacking in terms of separation of waste, both in tourist sites or public housing areas. The inventory result will support the implementation of IoT for garbage monitoring system and alert garbage collectors when the bins are full by identifying the level of garbage based on the bin depth for Kuala Lumpur area.

Public security is a growing problem for cities worldwide. Existing technology helps knit together a private IoT to provide police and emergency services with new technologies to fight crime and make cities safer. A smart solution enables authorities to integrate a diverse range of information modules and communication methods across departments and regions. This means any authority can combine separate video surveillance networks with other public and private security systems to keep a watch over incidents of theft, civic disturbance and unauthorised access. In theory, it means zero blind spot in their surveillance network. Inventory has been done to identify a suitable area for implementing a smart solution to increase public safety.

Waste Management (Tourist Areas)

	Bukit Bintang Road	Tunku Abdul Rahman Road	Merdeka Square	Bukit Nanas
Waste bin usage (Capacity)	10 bins half/empty	1 bin full 2 bins half/empty	3 bins half/empty	3 bins full 1 bin half/empty
Type	8 closed bins 2 open bins	3 closed bins	3 closed bins	1 closed bin 3 open bins
System	10 mixed waste	3 mixed waste	3 mixed waste	4 mixed waste
Size	9 medium 1 small	3 medium	3 medium	1 medium 3 small

Waste Management (Residential Areas)

	PKNS Kerinchi Public Housing	Kampung Baru (Raja Muda Musa Road)	Wangsa Maju 1 Public Housing	Sentul Phase 3 Public Housing
Waste bin usage (Capacity)	1 bin full 1 bin half/empty	5 bins full 5 bins half/empty	9 bins half/empty 1 bin full	5 bins full 2 bins half/empty
Type	1 closed bin 1 open bin	6 closed bins 4 open bins	4 closed bins 6 open bins	3 closed bins 4 open bins
System	2 mixed waste	10 mixed waste	8 mixed waste 2 separate waste	6 mixed waste 1 separate waste
Size	1 medium 2 large	9 medium 1 small	7 large 3 medium	4 medium 3 large

Safety (Tourist Areas)

	Bukit Bintang Road	KLCC Park	Tunku Abdul Rahman Road	Merdeka Square
CCTV	2	1	-	1
Bollard	2	2	3	-
Mirror	1	1	-	-
Fences	1	2	2	-
Condition	All working well			

Safety (Residential Areas)

	PKNS Kerinchi Public Housing	Kampung Baru (Raja Muda Musa Road)	Wangsa Maju 1 Public Housing	Sentul Phase 3 Public Housing
CCTV	1	1	2	-
Bollard	1	5	2	1
Mirror	2	-	-	-
Fences	4	-	2	2
Condition	All working well			

E-payment

	Tunku Abdul Rahman Road	Kampung Baru (Raja Muda Musa Road)	Bukit Bintang Road
Type	6 shoplots	2 single building shops	6 shop lots
Debit/Credit Card	6	2	6
Apps	2	1	5
In-House Card	1	-	1
QR Code	1	1	4

Project Implementation Briefs (PIBs) - Kuala Lumpur

Project Details		PIB Code	KL P1
		Component	Smart Government
Project Name	Kuala Lumpur Urban Observatory (KLUO)	Project Type	System
		Priority	High
		Ease of Implementation	Difficult
		Cost of implementation	High

Project Description

KLUO is important for KLCH to formulate coordination with other stakeholders for data collection, data analysis and the use of urban indicators to solve urban issues in Kuala Lumpur. Apart from that, KLUO is a platform for urban sustainability data and information exchange for the stakeholders including foreign, local investors and the public.

- To capture the complex interrelations and interactions between buildings and infrastructure, people and the natural environment for Kuala Lumpur
- To analyse indicators related to the current situation of different urban issues in Kuala Lumpur such as socio-economic situation, health, housing, infrastructures and transportation
- KLUO also supports the prioritisation of issues, identifying constraints and elaborating proposals on urban development issues

Issues Being Resolved (Project Rationale)

Limited data sharing among departments within KLCH, external departments and agencies in Kuala Lumpur

Expected Benefits

It provides action-oriented analyses geared towards decisions to support development policy formulation, priority setting and planning

Benchmarking Insight

1. **Singapore Urban Observatory (OneMap)**
- OneMap is an integrated online geospatial platform that provides reliable, timely and accurate location-based information and services to the public. It is a multi-agency platform built on a common base map of Singapore and provides a myriad of services and functions that allow users to search and navigate intelligently for places of interest such as museums, hawker centres, childcare services, parks and sports centres
- It is the first major application of the Singapore Geospatial Collaborative Environment (SGSPACE) initiative with over 30 participating public agencies adopting a common map platform to publish thematic information and deliver useful map-based services

2. **Al-Madinah Local Urban Observatory (MLOU)**
- MLOU has become a recognised centre of excellence and expertise in monitoring urban indicators, now providing expert consultations to all other sub-regional planning commissions in the Kingdom of Saudi Arabia as well as within the entire Arab Gulf States region
- The project has been a great success in terms of contributing information to the decision-making process at the provincial level of Al-Madinah. It benefits almost all sectors of the economy (strategic planning, health, labour market, education, etc.) and has all the population of the region (1.5 million persons) in addition to around 7 million Pilgrims and visitors throughout the year as its direct beneficiaries

Project Details

	No..	Initiatives	Description
Local Reference	1.	National Physical Plan 3 Chapter 7: Implementation of National Physical Plan	P2: Establishment of Malaysia Urban Observatory (MUO) Functions of MUO: 1. Observation and valuation centre 2. Sustainable Data Centre 3. Urban Wellbeing Centre of Excellence (URBANICE MALAYSIA) 4. Technical Service Centre 5. Centre for Sustainable Urbanisation
	2.	Iskandar Malaysia Urban Observatory (IMUO)	1. Resource optimisation and low carbon 2. Wealth generation 3. Wealth sharing and inclusiveness
Site Location	Kuala Lumpur City Hall		

Site Location	**Kuala Lumpur**

Communication Action Plan

	Stakeholders	Role	Actions Required
Key Implementing Agencies (Public)	**Kuala Lumpur City Hall (KLCH)**	Implementation	• Gather data from all departments • Create open data policy between all departments
		Monitoring	• Identify the number of approved data shared between different departments

Monitoring Mechanism

	KPI	2019-2022	2023-2025	>2025
Key Performance Indicators (KPIs)	Number of data to be shared by different departments	50%	100%	100%
Additional Remarks	To ensure better planning, monitoring and evaluation of programmes and projects of KLCH			

Project Details		PIB Code	KL P2
		Component	Smart Environment
		Project Type	Project
Project Name	**Smart Bin at Public Housing and Tourist Attraction Areas**	Priority	High
		Ease of Implementation	Easy
		Cost of implementation	Low

Project Description

- The application of planned model of garbage collection system for residential or business areas. Within the planned system, the extent of waste within the garbage bin is detected with the assistance of level sensor and it will ceaselessly communicate with the authorised control room through the GSM module
- Micro-controller is employed to interface the detector system with GSM system. An additional interface is developed to supervise the required info associated with the rubbish for numerous hand-picked locations

Project Rationale

High quantity of solid waste generation and low recycling rates

Expected Benefits

Correct management of waste materials is very important to keep up a healthy and hygienic environment

Benchmarking Insight

1. ECUBELABS - South Korea

CleanCUBE is a solar-powered trash compactor which can hold up to 8 times more waste compared to non-compacting bins, reducing collection frequency by up to 80%. It is compatible with standard 120L and 240L wheelie bins for easy and safe trash removal, and it also communicates information it collects in real time through wireless transmission to CleanCityNetworks, the cloud-based monitoring and data analytics platform. CleanCUBE can be equipped with various optional features such as LED backlight, LCD panel, graphic wraps, and WiFi router

Site Location

- Public housing
- Tourist attraction areas (Bukit Bintang Road, Tunku Abdul Rahman Road, Merdeka Square, KLCC Park)

Site Location	Kuala Lumpur

Communication Action Plan

	Stakeholders	Role	Actions Required
Key Implementing Agencies (Public)	KLCH	Implementation	1. Local innovation and manufacturing for smart bin technology 2. Identification of suitable locations for smart bin implementation 3. Installation of smart bin at selected areas
	SWCorp	Implementation	
	NSWMD	Monitoring	1. Monitor solid waste reduction at selected areas 2. Monitor the effectiveness of the smart bin collection
	DOE	Monitoring	

Monitoring Mechanism

	KPI	2019-2022	2023-2025	>2025
Key Performance Indicators (KPIs)	Identification of suitable locations for smart bin implementation	50%	100%	100%
	Installation of smart bin at selected areas	50%	100%	100%
	Monitoring of the smart bins usage by conducting data analysis derived from the waste collection data sensor	0%	50%	100%

Additional Remarks	This can be best used by local authorities to improve the management of waste collection

Project Details		PIB Code	KL P3
		Component	Smart Economy
Project Name	**E-payment usage for lower retail activities (retail shops, hawkers, stalls & kiosks)**	Project Type	Project
		Priority	High
		Ease of Implementation	Easy
		Cost of implementation	Low

Project Description

- The electronic payment system has increasingly grown over the past decade due to the growing widespread of internet-based banking and shopping. As the world advances more with technology development, we can see the rise of electronic payment systems and payment processing devices. As these increase, improve, and provide ever more secure online payment transactions, the percentage of cheque and cash transactions will decrease.

Project Rationale

- Lack of financial and business services
- Weak development of innovative business and enterprise

Expected Benefits

- Capable to track transactions and reduce the risk of money laundering or illegal transaction
- Improve the economic growth by easing the spending process of foreigners/tourists with limited local currency in hand

Benchmarking Insight

Alipay	WeChat
One of the two most widely used mobile payment platforms in China	The main rival of Alipay as a commonly used e-payment application

Additional Remarks

Both of these platforms are being used in various retail transactions in China. These two platforms have dominated the mobile payment/digital wallet industry in China, bringing a total of 38.6 trillion yuan (USD 5.57 trillion) of cashless transactions in year 2016.

Existing Initiatives

No.	Initiatives	Description
1.	Touch 'n Go e-wallet	Touch 'n Go eWallet is an electronic money (e-money) service via mobile application offered by Touch 'n Go Digital Sdn. Bhd. (TNGD). Touch 'n Go eWallet provides services such as reloads, payments and even a loyalty reward programme via user's smart phone, anywhere and anytime

Site Location	Kuala Lumpur

Communication Action Plan

	Stakeholders	Role	Actions Required
Key Implementing Agencies (Public)	BNM	Policy	1. Establish new application or expand existing application of e-wallet (eg: GrabPay, Touch 'n Go) 2. Internet access, retailers to have the necessary account, users to have necessary application 3. To introduce policy mandate for implementation of cashless financial transaction 4. To exchange payments in a timely and cost-effective manner
	Service providers	Implementation	

Monitoring Mechanism

	KPI	2019-2022	2023-2025	>2025
Key Performance Indicators (KPIs)	Percentage of cashless transaction	50%	75%	100%

Additional Remarks	No specific monitoring process is required

Project Details		PIB Code	KL P4
		Component	Smart Living
Project Name	**Installation of Smart Pole**	Project Type	Project
		Priority	High
		Ease of Implementation	Moderate
		Cost of implementation	Moderate

Project Description

- This is a structure/platform built on the street that can perform various functions, including placing emergency call, making announcement, light the street and generate solar energy

Project Rationale

1. Crime rate is relatively high

Expected Benefits

1. Smart poles can increase urban efficiency, while at the same time keep the clutter of street furniture to a minimum
2. It can incorporate software controls and sensors that can receive and transmit information, therefore having the capability to support all kinds of smart city applications

Benchmarking Insight

U-Pole Service – South Korea

A utility pole equipped with solar panel, an onboard battery, a wireless communication hub, a smart LED streetlight, and an electric mobile charging port.

This pole is designed to help citizens and cities to grow smart, with clean-energy communities with reliable electrical and communication networks.

Created for streets, campuses, parking lots - and any common placement for streetlight - the Smart Pole blends with next generation of design with a sleek, modern appearance
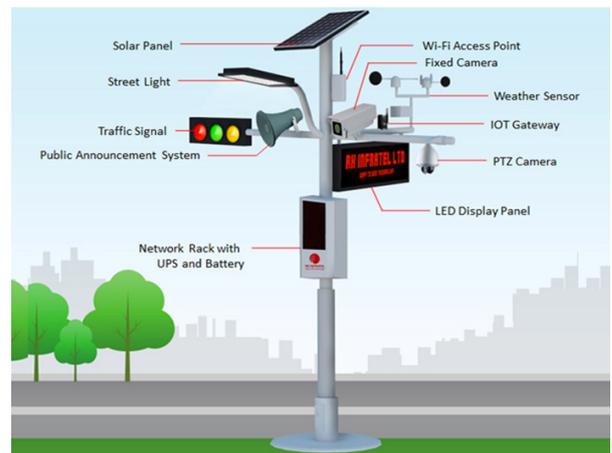
Source: SimbaNET

Site Location	Kuala Lumpur

Communication Action Plan

	Stakeholders	Role	Actions Required
Key Implementing Agencies (Public)	KLCH Service providers	Implementation	1. Establish control centre for response action and monitoring 2. Integration of monitoring systems 3. Innovation and manufacturing of smart pole technology

Monitoring Mechanism

	KPI	2019-2022	2023-2025	>2025
Key Performance Indicators (KPIs)	Number of smart pole installation in Kuala Lumpur	30%	50%	100%

Additional Remarks	Will provide robust coverage of the area with real-time data related to environment, traffic, security and other useful information

JOHOR BAHRU

01
Low capacity at water catchment, leading to water shortage

Increasing water usage and inefficient water consumption practices

8% Water Reserve

24.7% National Non-Revenue Water (NRW)

02
Decrease of river water quality due to untreated water discharge & squatters

55 Water Quality Index (JB)

3.11 Mg/l Ammonia level at Sungai Skudai (2016)

03
Limited public transport system and coverage

18% Estimated public transportation Modal Split

59% Coverage of Residential Regions with Bus Transit routes

04
No centralised data repository system

05
Lack of centralised complaint management

The existing app only handles complaints manually and does not involve community participation

Existing and proposed initiatives

Urban challenges 01 — Low capacity at water catchment, leading to water shortage

EXISTING INITIATIVES

1. Water catchment issue is proposed to be resolved using mini dams (in study stage)
2. Pipe network with sensors
3. Rain water harvesting

PROPOSED INITIATIVES

1. Iskandar Malaysia smart water monitoring and management
2. Water level monitoring cameras with auto detect function

INDICATORS

1. National NRW reduction to less than 15% in 2025
2. Water reserve to cap at minimum 15% at all time

Urban challenges 02 — Decrease of river water quality due to untreated water discharge & squatters

EXISTING INITIATIVES

1. Sungai Segget revitalisation
2. Sungai Skudai rejuvenation programme
3. Sungai Masai rehabilitation programme
4. Iskandar Malaysia river monitoring and management tool (IM RMMT)

PROPOSED INITIATIVES

1. Real-time sensor to monitor water quality data
2. Sensor to monitor hydro morphology and update every 2 years
3. Remote sensing devices to monitor pollution, cleanliness and usage of recycling bins for both water and air
4. Possible to strengthen local authority policy on waste water (e.g. grease trap)
5. Pollution audit on industries by zoning

INDICATORS

1. River Water Quality Index at Class II

Urban challenges 03 — Limited public transport system and coverage

EXISTING INITIATIVES

1. Rapid transit system (ongoing)
2. Bus rapid transit (ongoing)
3. Bicycle sharing system
4. Non-motorised facilities enhancement
5. Integrated mobility management system (which cover real-time information) (ongoing with UK)
6. *Bas Muafakat* Johor and *Bas Iskandar* Malaysia

PROPOSED INITIATIVES

1. Physical and digital integration of all public transport
2. Considering constant rerouting of feeder bus travelling line according to waze real-time information

INDICATORS

1. 60% public transport modal split

Urban challenges

04
No centralised data repository system

EXISTING INITIATIVES

1. Project Management Automated System (PRoMAS)
2. Integrated Operations Centre (IOC) by Inneonusa
3. Malaysia Urban Observatory (MUO)
4. Iskandar Malaysia Urban Observatory (IMUO) by IRDA (Iskandar Regional Development Authority)
5. DOSM database integration in mobile app - MyLocalStat

PROPOSED INITIATIVES

1. Smart Nation Platform to enable public sector to pull data from multiple sensors and help agencies to run the country efficiently

INDICATORS

1. Availability of data sharing platform in local government

Urban challenges

05
Lack of centralised complaint management

EXISTING INITIATIVES

1. Platform for public participation (eg iKepoh, SISPAA etc)

Note: This study was conducted during the implementation period of iKepoh. Since then, iKepoh has been upgraded to iTegur.

PROPOSED INITIATIVES

1. Improvise existing e-aduan app (iKepoh) to be on par with QLUE (Indonesia) and OneService App (Singapore) and transform/upgrade the existing e-aduan app into community app

INDICATORS

1. Number of complaints resolved
2. Number of users of the community apps
3. User satisfaction level

Existing Inventory

Example of complaint platforms by Government of Malaysia

iKepoh, KPKT

Version	3.1.8
Updated	7 October 2018
Downloads	5,000+
User Reviews	98
Rank	3.5 star

Major user review topics:
- Bad service and response time
- Login and registration failure
- Inaccurate location access
- Non-user friendly
- Outdated information

Rakyat Responz, PCB (Public Complaints Bureau)

Version	2.0.6
Updated	7 November 2018
Downloads	5,000+
User Reviews	72
Rank	4.1 star

Major user review topics:
- Inefficient response time
- Registration failure
- Inaccurate location access

Water catchment

Category	Current data
1) Number of dam	17
2) Dam's capacity	1,074 million sqm
3) Number of water treatment plants	44
4) Clean water capacity that can be treated	2,059.18 million liter per day
5) Current consumption rate (including NRW 25%)	1,713.64 million liter per day
6) Surplus (4)-(5)	345.51 million liter per day
7) Buffer	Critical, 15% only
8) Supply fleet	99.8%

Source : Badan Kawal Selia Air Johor (BAKAJ), 2016
Johor State Structure Plan 2030

Project Implementation Briefs (PIBs) - Johor Bahru

Project Details		PIB Code	JB P1
		Component	Smart Government
	Enhance the current E-Aduan	Project Type	Project
Project Name		Priority	High
		Ease of Implementation	Difficult
		Cost of implementation	High

Project Description

MHLG has developed an e-aduan application called "iKepoh", which can be downloaded for free by public to make complaints to the local authorities. Within the app, users can select from 10 categories of complaints: damaged roads, plants, traffic lights, advertisement/sign boards, animals, garbage, parking and construction, open burning, toilets and drainage. Users have to enable the GPS function on their phone before making a complaint.

The objective of "iKepoh" is to have a more effective monitoring and management of complaints by local authority and MHLG via a shared platform. The target audience of the apps is the public as well as local authorities. However, many users including local authorities have raised concerns on the use of "iKepoh".

The app should be upgraded and improved to give better user experience as well as enabling the functions below:

- Bug fixes to reduce app crashes to provide smooth user experience (eg. GPS function)
- Integrate the platform with more agencies and local authorities so that relevant agencies can act on the reports/complaints promptly
- Allow users to monitor actions taken by relevant agencies
- Allow users to view the statistics on the efficiency of issues being resolved
- Enhance the real-time information sharing experience where users can view other reported incidents and provide additional comments
- Include geo-tag function for location accuracy

Note: This study was conducted during the implementation period of iKepoh. Since then, iKepoh has been replaced with iTegur.

Project Rationale

1. There are more than one platforms related to submission of complaints established by different agencies (federal : iKepoh and SISPAA, and state)
2. Lack of integration between the existing e-aduan
3. The apps could not detect actual location or allow location search for reports/complaints to be made by location
4. The apps do not have function of viewing overall report filed by location that the public can just add comments on top of the reported incidents instead of creating a new complaint file
5. There are frequent bugs popping up that hinder user experience, most of the functions could not be used smoothly
6. The apps do not provide real-time information to inform the users of the current status of the incidents or whether the reported incidents have been resolved

Expected Benefits

1. Enhanced function of "iKepoh" will provide convenience to the public on reporting incidents real-time via mobile app instead of physical visit to relevant agencies
2. All complaints or incidents reported can be monitored and managed in a shared platform where relevant agencies can take prompt response, thereby increasing the transparency of the local authorities
3. The platform or dashboard allows local authorities or related agencies to communicate better as well as to monitor the complaints/report statistics and measure the efficiency of agencies in resolving the issues

Project Details

1. Indonesia (Nation): LAPOR!

LAPOR! is a platform that was established by the Indonesian Government. It provides a one-stop system to manage citizens' complaints and requests with "No Wrong Door" policy. Citizens no longer have to find out which agencies they need to direct their concerns, they can just submit them to LAPOR!. Through LAPOR!, follow-up responses from the institution in charge and citizens who submitted the complaint can be tracked online

2. Indonesia (Jakarta): Qlue

Smart city app developer Qlue is pushing for a sustainable and safe city, and promotes government transparency and accountability. Qlue works closely with city institutions, local communities, and police departments in combating threats such as drugs, terrorism, and other crime-related activities. Qlue app started with collecting citizens' complaints and now has a virtual reality section to explore tourist sites in the city. Jakarta Smart City Unit has partnered with Qlue to build a dashboard, analysing data from online complaints, sensors and traffic apps. The complaints data will be used for floods and traffic predictions as well as plans for dengue hotspots predictions. Qlue has become a strategic part of Jakarta administration

3. Singapore: OneService

Singapore's OneService complaints app let users pick the date and time when problem was seen or occurred. This could help officials better track and resolve cases. The government has created a separate unit – the Municipal Services Officer – to get these complaints addressed, particularly in areas that require coordination across agencies. The unit is already linked with at least 10 agencies, and is working on expanding this network to other agencies and town councils

Existing Initiatives

No.	Initiatives	Descriptions
1.	EzADU by KPDNHEP	EzADU is a system developed by KPDNHEP to store and manage all complaints collected from various sources. Public can use this platform to lodge complaints as well as relevant agencies use this platform to resolve complaints.
2.	Rakyat Responz by PCB	Rakyat Responz is developed by Public Complaints Bureau (PCB) to facilitate the public to channel complaints, submit questions, suggestions and appreciation directly to government agencies
3.	#betterPenang by Penang community	Citizen Action Technology (CAT) is a community owned platform which allows users to post complaints and ideas to make Penang a better place for everyone. The app was later adopted by local authorities to respond to complaints. Officials answer to citizens directly on the app, in some cases responding with photos on how the problem is being addressed

Site Location	Johor Bahru

Communication Action Plan

	Stakeholders	Role	Actions Required
Key Implementing Agencies (Public)	MHLG	Data integration for city management	• Collect opinions/feedback from various local authorities to improve the app • Invite more agencies/local authorities to use real-time information in the apps in their city management • Conduct predictive analysis using the information from the platform such as flood, traffic, dengue hotspot prediction
	Local authorities UPENJ	Conduct predictive analysis on platform data in city management	• Provide feedback on information required from the platform for mobile apps developer enhancement • Monitor the complaints/feedbacks/ suggestions on the platform frequently • Take immediate response to solve the issues within their region • Use data on platform to conduct predictive analysis for city management
	IRDA PCB	Coordinator	• Coordinate efforts between the federal and state agencies with the local authorities as well as the private players during implementation
Key Implementing Agencies (Private)	MHLG In-house mobile apps developer	Enhance apps functionality	• Enhance user experience • Integrate information sharing platform with various agencies • Real-time statistics sharing • Reports/complaints action progress

Monitoring Mechanism

	KPI	2019-2022	2023-2025	>2025
Key Performance Indicators (KPIs)	No. of active users of iKepoh	50% of registered users	80% of registered users	100% of registered users
	No. of complaints received and resolved via iKepoh	2,000	5,000	10,000
	User rating (star)	3 star	4 star	5 star
Additional Remarks	The "iKepoh" platform can be very useful in handling public complaints and receive feedbacks from the ground. Local authorities can monitor the feedback closely in city management. If data are collected accurately, the information can be used for predictive analysis for flood, traffic or even dengue hotspot prediction. To achieve all the ideal outcome, the top priority is to enhance the features of the app and promote it to the public for active use and engagement. However, proper mechanisms need to be established to filter out "critical complaints" from "normal complaints" to avoid the platform from being inundated with irrelevant complaints or feedback from the public which may not need intervention from the local authorities. Also, the app needs to have a mechanism for local authorities to forward the reports to other relevant agencies as not all complaints can be resolved by the local authorities alone			

Project Details		PIB Code	JB P2
		Component	Smart Environment
Project Name	**Smart Water Technologies for Johor Bahru Water Catchment**	Project Type	Project
		Priority	High
		Ease of Implementation	Difficult
		Cost of implementation	High

Background

Johor Bahru – a major city within the Iskandar Malaysia economic region on track to become an international metropolis, is attracting significant investments in the industrial and commercial sectors. However, newer development projects were introduced at a rapid pace and urbanisation has created an imbalance in the development of water supply utilities and infrastructures. Additionally, global weather changes have accelerated signs of water related problems within this region. The water shortages and rationing along the Iskandar Reservoir supply pipeline in 2015 highlighted the risk of a possible greater systemic failure and probable inadequacy of current measures in place.

The situation is aggravated by increasing water usage and inefficient water consumption practices. Johor Bahru's population is projected to grow from 1.5 million in 2010 to 2.14 million by 2030, based on medium variant projections (MNRE, 2000–2050) This growth, coupled with the city's strategic plan to build itself into an International Industrial and Commercial Hub, will increase water demand for domestic and industrial consumption. The absence of a well-planned water catchment system means that there is an imbalance in the demand and supply of water across the city. Increasingly, rainfall is observed to fall downstream of the water treatment plants (IRDA, 2018). During the dry seasons of 2016 and 2017, the water buffer in the reservoirs supplying to Iskandar Malaysia fell to about 5% to 8% - a very unhealthy level.

Johor Bahru is currently re-examining its water management strategies to alleviate the situation. It is currently working on an Integrated Urban Water Management (IUWM) Blueprint to comprehensively manage and plan its water ecosystem, strengthening the city's resilience against changing weather patterns and shocks to its water supply.

	The Conventional Scenario	The New Scenario
Waste Water Reuse	• Waste water will be treated and discharge into rivers	• Waste water reuse can also be considered to be reused as non-potable
Sustainability initiatives	• Rain water diverted away from urban areas • Water source, waste water and rain water systems are physically segregated	• Integrated water, energy and resource recovery to optimise our resource usage and recovery • Adopt sustainability initiatives in Iskandar Malaysia
Water Catchment	• Treated water supplied without considering the end user requirement	• Departure from the traditional centralised water supply system and infrastructure • Smaller water catchment nodes within existing and future development areas can be identified and harnessed to cushion the impact of climate change
Water Delivery	• Single directional supply cistern • Emphasis on centralised water supply system and infrastructure	• Effectively ensure treated water supplied to the right user and based on need by integrating the provision of potable and non-potable water to cater for industry needs
Public Participation	• Lack of community participation in decision making	• Initiate inter-agency collaboration with the community in decision-making processes

A comparison between the existing water management system and the envisioned Integrated Urban Water Management concept. *(Source: Iskandar Regional Development Authority)*

Background

First, the blueprint aims to explore feasible alternative water supplies for the city. The new system envisions wastewater reuse for non-potable needs, using groundwater and water transfer from other catchments, a decentralised water catchment system to optimise the potential for rainwater harvesting, and a needs-based water provision system that integrates potable and non-potable uses. With these alternative sources, the city aims to increase its water reserves by 20% all year and reduce its over reliance on surface water (Ibid)

Second, the blueprint aims to cultivate greater awareness of water sustainability and behavioural change among individuals and firms. This effort includes using smart water management systems that monitor and publish information real-time on water usage through end devices such as mobile phones. It will also involve upgrading the water infrastructure to improve water conservation. Third, the blueprint recognises that effective execution of the project will rely on an enabling environment, appropriate use of management instruments and support from institutions. Digital solutions offer the possibility to streamline processes and policies and enable evidence-based decision making. One potential project identified by the city makes use of integrated GIS-based monitoring and data analytics tools to make timely and informed decisions on water resource management, such as identifying potential industry locations and need for water infrastructure investments.

Progress has been made. Old cement asbestos pipes have been progressively replaced by newer pipes to reduce water loss during transmission since 2005 (IRDA). The city government has made plans to channel water from Sungai Lenggor to the Congok Dam to address shortages (Mohd Farhaan Shah, 2016). It is also currently doing a feasibility study (Zazali Musa, 2016) of groundwater as an alternative water source through tube wells (Zazali Musa and Kathleen Ann Kili, 2016).

The next step, according to the city, is to establish a comprehensive framework to bring together the concerted efforts of the federal and state water agencies, civilians and industries to tackle the issue in a holistic manner. The city is actively engaging with solution partners to deliver its ambitious programme.

Project Description

Many cities worldwide has leveraged smart city technologies to address their water scarcity issues. While these technologies may not be able to resolve the root cause of water crisis such as reduced rainfall and deforestation, they can help the relevant agencies to predict issues and detect problems via IoT sensors and AI analytics.

For Johor Bahru, the proposed smart water technologies contain three (3) main elements:

1. Smart Water Meter

A smart meter that can be linked to mobile phone via an interactive app which can show the users the breakdown of their water consumption so that they can keep track and manage their consumption accordingly. It can also detect leakages and notify the users. The smart meter will be installed primarily at households to manage domestic water consumption

Project Details

Project Description

2. Smart Water Quality Sensors for monitoring and analytics

Optimising water facilities using IoT sensors which can detect leakages and monitor the water distribution network. With smart water quality sensors, it is possible to monitor water quality in real-time from remote sites or across numerous locations and even while in transit. This makes water monitoring easy, instant, and responsive, saving users both time and cost. Moreover, instant feedback drives greater productivity and revenue. These sensors, combined with cameras, can help operators to detect water quality and quality and set trigger points when minimum criteria is not met

3. Predictive Technology using AI analytics by a Central Command Centre

Operators can utilise the data collected from IoT sensors and cameras deployed at various catchment areas to perform predictive analytics. This includes analytics on water level, water quality, rainfall, flood and disaster warning. Apart from IoT sensors and cameras, satellite imaging and GIS data are also useful for these predictions and analytics, provided that these data are collected and integrated to a centralised command centre which will act as the custodian of water data, perform real-time predictive analytics and share these data with the relevant authorities for immediate action

Project Rationale

1. Water shortage, due to the surge in demand for both potable and non-potable water
2. Deteriorating water quality level, due to saline intrusion, deforestation, pollution etc
3. Unplanned breakdowns and natural disasters

Expected Benefits

1. Empowering households by enabling them to keep track and manage their water consumption
2. Real-time monitoring of water quality and quantity even from remote sites
3. Time and cost savings from water usage optimisation and leakage detection
4. Collation and integration of water-related data to a centralised command centre for analytics
5. Predictive technology to reduce water supply intrusions from unplanned breakdowns and natural disasters
6. Ability to integrate and share data with relevant authorities for immediate action

Project Details

Benchmarking Insight

1. South Korea:

K-Water Hydro Intelligent Toolkit:

- Real-time Hydrological Data Acquisition and Processing System (RHDAPS) which uses satellite imaging to gauge water level and quality
- Precipitation Forecasting System (PFS) to measure and predict rainfall
- Flood Analysis System (FAS) which is a real-time flood analysis for flood control
- Reservoir Water Supply System (RWSS) to optimise water supply by estimating demand
- Generation Integrated Operations System (GIOS) which involves remote monitoring of dam and weir operations
- Satellite-based flood forecasting and warning equipment
- Water disaster monitoring system through GIS, CCTV cameras and other tools

2. Singapore:

IoT-enabled sensors to collect real-time data by Hitachi:

- Optimisation of water facilities by detecting leaks or monitoring how water is being distributed across the network
- Allows people to make informed decisions and monitor via apps
- Predictive technology to gain insights on flood
- Sharing data with relevant authorities
- Analysis using cloud-based and AI analytics

3. Saudi Arabia

Solar-based desalination plant:

- The process of desalination is carried out by the renewable solar energy
- The city of Al Khafji have the largest solar based desalination plant in the world
- The country is aiming at powering every desalination plant with solar energy by 2019

4. United Kingdom

Smart Water metering system:

- Online smart system facilitates the residents to keep track of everyday water usage
- The meters provide precise information on how the water is used and in how much quantity.
- The smart meter is also able to detect leaks and save costs.

Existing Initiatives

No.	Initiatives	Descriptions
1.	Gazetting water catchment areas as "protected areas"	• The state government wants to gazette all 15 water catchment areas in the state as "protected areas" to better manage its water resources • With the gazette, signs and fences would be put up at certain spots to warn people against fishing or planting trees or crops within the catchment areas *(Source: The Star, April 2015)*
2.	Buffer zones to be extended to stop water pollution in dams and catchment areas	• The buffer zones in 14 gazetted dam and catchment areas in Johor will be extended to 500 metres from the current 50 metres to solve the problem of water pollution • Johor Water Regulatory Authority (Bakaj) will install three water quality surveillance units in Sungai Johor to monitor pollution and as an early warning to water treatment plants to take action to prevent worse water disruption • Since early last year, the state government had frozen licences for all sand-mining activities in Sungai Johor. The move was successful in reducing pollution in Sungai Johor in terms of turbidity and suspended solid wastes *(Source: TheSunDaily, May 2017)*

Site Location	Water catchment areas, including dams and weirs, and river basins

Communication Action Plan

	Stakeholders	Role	Actions Required
Key Implementing Agencies (Public)	Ranhill SAJ	Smart water meters and IoT sensors	• Deploying the smart water meters to selected households • Equipping water catchment areas with smart water IoT sensors and cameras to detect water quality and quantity
	BAKAJ	Central Command Centre	• Collection and integration of water-related data from the deployed IoT sensors, cameras, satellite images and GIS data • Data sharing with relevant authorities for immediate action
Key Implementing Agencies (Private)	Johor State Economic Planning Unit (UPEN)	Funding Support	• Provide funding assistance and advisory for the implementation of smart water technologies
	National Water Services (SPAN)	Policy Regulator	• Advise on policies relating to water supply to implement the smart water project • Implement/enforce laws and recommend reforms to the water supply laws
	Johor Economic Planning Unit (IRDA)	Coordinator	• Coordinate the efforts between the federal and state agencies with the local authorities as well as the private players during implementation
	Technology companies	Solution providers	• Propose suitable and cost-effective solution for the smart water metering, IoT sensors and water quality monitors

Monitoring Mechanism

	KPI	2025
Key Performance Indicators (KPIs)	Reduction in national NRW	50%
	Water Reserve cap	15% - 20%

Additional Remarks	From various stakeholder engagement sessions conducted, one of the key findings is that there are many policies that are already in place but not being enforced. Therefore, it is crucial for the government agencies to not only introduce a new policy but also to ensure compliance with the policy via strict enforcement

KOTA KINABALU

Key Urban Challenges:

01

Ineffective solid waste management

Amount of solid waste disposed

800 tonnes per day

(Aggregated waste from Kota Kinabalu, Putatan, Penampang, Tuaran and Kota Belud

Source: Kota Kinabalu City Hall, 2017

Only **1 out of 22 landfills**

in Sabah is a

sanitary landfill

Source: National Solid Waste Management Department, 2017

Occurrence of open burning on landfills

	2013	2014	2015	2016	2017
Public complaints	2	0	3	1	8
Air surveillance	6	6	4	1	0

Source: Department of Environment Sabah, 2017

02

Risk of inadequate water supply

Current supply

110 MLD

VS

Current demand

92.5 MLD

→ 70 MLD (Household)
→ 20 MLD (Commercial)
→ 2.5 MLD (Industrial)

Source: Kota Kinabalu City Hall, 2018

03

Lack of integrated public transport system

12% Modal share in Kota Kinabalu

Source: Greater KK Masterplan, 2018

04

Lack of affordable housing

Approximately **110 hectares** of land are occupied by squatter housing

Source: Kota Kinabalu City Hall, 2018

Urban challenges

01

Ineffective solid waste management

EXISTING INITIATIVES

1. Ban on the disposal of used tyres at the Kayu Madang landfill
2. Encourage food waste separation by restaurants
3. Trash free zones
4. Plastic bags reduction campaign
5. Recyclables collection centres

PROPOSED INITIATIVES

1. Focus on building or upgrading to sanitary landfills. Currently, Sabah has only one sanitary landfill operated at Level IV which is located at Kayu Madang, Telipok. Meanwhile, there are 13 landfills in Sabah that accept all types of waste that might not be an environmentally sustainable practice. Efforts should be taken to increase the number of sanitary landfills that accept certain types of waste and dispose them properly
2. Charge scheme for municipal solid waste – impose additional handling fees to discourage the public from disposing certain type of municipal solid waste. The charge will be based on types of waste and weight of the waste disposed

INDICATORS

1. Number of sanitary landfills
2. Total amount of waste disposed of in landfills

Urban challenges

02

Risk of inadequate water supply

EXISTING INITIATIVES

1. Maintenance and replacement of water supply infrastructure
2. Development of additional 30 reservoirs with the optimum capacity of approximately 8 million litres per day (MLD) each

PROPOSED INITIATIVES

1. Flowmeter that measures actual water supply utilisation. Installation of flowmeter is for monitoring purpose. Since Kota Kinabalu has limited water supply and a high non-revenue water rate, it is important to monitor in real-time the actual water flows to ensure that water loss is minimal and mitigating measures can be taken at suspected leakage sites
2. Rain water harvesting as a mean to increase water supply in Kota Kinabalu and reduce the demand for ground water and river water sources. Harvested rain water provides alternative water source to cater for daily activities such as cleaning, laundry and gardening

INDICATORS

1. Number of flowmeters installed in water supply distribution system
2. Volume of water supply from rain water harvesting initiative

Urban challenges

03

Lack of integrated public

transport system

EXISTING INITIATIVES

1. Planned bus rapid transit (BRT) system
2. Planned special bus lane
3. Bicycle and pedestrian lane (from Tanjung Aru to Universiti Malaysia Sabah)

PROPOSED INITIATIVES

1. Use of data analytics in selecting the best route for BRT

BRT system is being considered as a key public transportation option in Kota Kinabalu for the immediate and medium term. Leveraging on this opportunity, it is proposed that smart elements are incorporated into the planning of the route. In determining the route, the concentration of people on the move during specified time frame should be taken into consideration. This can be best done through the utilisation of positioning data. For example, Seoul leveraged on big data analytics from phone call data to assist them in designing the route for the Owl Bus (an overnight bus service)

INDICATORS

1. Utilisation of data analytics for planning purpose

Urban challenges

04

Lack of affordable housing

EXISTING INITIATIVES

1. Supply of low cost housing through People's Housing Programme (PHP) flats

PROPOSED INITIATIVES

1. Use smart construction materials in affordable housing

The use of innovative construction materials will help achieve greater efficiency and cost reduction in the provision of affordable housing. Incorporation of graphene in the production of concrete is described as being twice as strong and four times more water resistant than existing concretes. Self-healing concrete, which is still in the infancy stage, can lengthen the lifespan of buildings as it fills up cracks or ruptures from harsh environmental conditions using a special bacteria. Universiti Malaysia Sabah and Universiti Teknologi Malaysia have developed a smart construction material, the interlocking brick system, which is heralded as being able to lower the construction costs of low-cost houses

INDICATORS

1. Percentage of affordable housing using smart construction materials

**Existing Inventory**

Public Transport - Bus Route

	Type of bus	Type of service	Road Width	Level of Service	Lane	Traffic condition
Jalan Kepayan	Mini bus and Bus	Intercity and Intracity	20 - 25m	C and D E (After Office Hours)	6	51
Jalan Coastal	Mini bus and Bus	Intercity and Intracity	20 - 25m	C and D E (After Office Hours)	4-6	28
Jalan Tun Razak	Mini bus and Bus	Intracity	20-25m	E	4-6	32
Jalan Haji Saman	Mini bus and Bus	Intracity	20m	C and D	4	15
Jalan Tun Fuad Stephen	Mini bus and Bus	Intracity	20 – 40 m	C and D E (After Office Hours)	4-6	27
Jalan UMS	Mini bus and Bus	Intracity	20 – 40 m	C and D E (After Office Hours)	4-6	23
Jalan Mat Salleh	Mini bus and Bus	Intracity	20m	B and C and D E (After Office Hours)	4	17
Jalan Tunku Abdul Rahman	Mini bus and Bus	Intracity	20 – 30 m	C and D E (After Office Hours)	4-6	27
Jalan KK Bypass	Mini bus and Bus	Intracity	15 – 20 m	C and D E (After Office Hours)	4	13

Project Implementation Briefs (PIBs) - Kota Kinabalu

Project Details		PIB Code	KK P1
		Component	Smart Environment
Project Name	**Water Supply Distribution Monitoring System**	Project Type	Project
		Priority	High
		Ease of Implementation	Moderate
		Cost of implementation	Medium

Project Description

The system is a platform for real-time monitoring of water distribution system that can improve system management and operation by providing integrated measurement and analytics. The system consists of two components: i) probes and sensors that sample and transmit data in real-time within the water supply distribution network, and ii) data management and analytics software that perform diagnostics to detect and localise abnormal occurrences in the water supply distribution system, such as pipe leakages and bursts. Utilities management personnel will take the necessary steps after being alerted of pipe abnormalities. Unlike traditional methods of water pipe leak detection, the system can locate areas of leaks along the water supply system with a higher degree of certainty. Wireless sensors, deployed into the pressured water pipes, can detect pressure, flow, acoustics and even water quality. The range of data received by the data management and analytics centre allows engineers to better pinpoint potential abnormalities within the water supply distribution system and take mitigation measures such as pipe replacement or maintenance
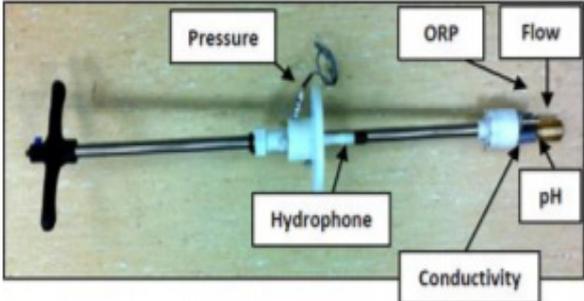
Source : MIT Open Arcade

Project Rationale

1. High rate of NRW

Expected Benefits

1. Better management of water resources
2. Reduce water revenue loss

Benchmarking Insight

Water supply pipeline monitoring (Singapore)

- Singapore's water regulator, Public Utilities Board (PUB), has installed 320 sensors in the country's water supply pipelines to detect water leakages. The sensors measure the flow rate and the pressure of the water, as well as detect the noise made when water escapes through cracks in the pipes. Data collected is sent to PUB's command centre, which monitors the condition of the pipes. Singapore's NRW is at 5%, but intends to cut that to 3.2%. PUB plans to install these sensors on the NEWater (treated wastewater) pipeline

Existing Initiatives

No.	Initiatives	Description
1.	Developing water reservoirs	Approximately 30 units of reservoirs with the optimum capacity of approximately 8 MLD each have been developed by Water Department. These water tanks have a total capacity of approximately 240 MLD. But this is considered inadequate to serve Kota Kinabalu's current population and development

Communication Action Plan

	Stakeholders	Role	Actions Required
Key Implementing Agencies (Public)	Kota Kinabalu City Hall (KKCH)	Pilot project	• Engage with Sabah State Water Department to pilot project implementation in Kota Kinabalu
	Sabah State Water Department	Project owner	• Identify location of pipes to implement monitoring system • Establish scope of system needed (data collection, monitoring, decision-making support, etc.) • Engage with private solution providers • Assess system feasibility with given scope and budget • Devise financing scheme for the project • Obtain or procure water supply distribution monitoring system • Regulate development and operations of monitoring system • Set up the necessary control centre and allocate personnel for the implementation of system
	Ministry of Infrastructure Development Sabah	Funder	• Advise, revise and finalise funding scheme for the project • Allocate funding for project
Key Implementing Agencies (Private)	Private solutions provider	Solutions provider	• Provide solutions (for free or on commercial basis) to Sabah State Water Department according to scope and specifications requested • Set up and oversee initial operations of the systems

Monitoring Mechanism

	KPI	2019-2022	2023-2025	>2025
Key Performance Indicators (KPIs)	Identify project site, scope and specifications	50%	100%	100%
	Engage with relevant private solutions providers	50%	100%	100%
	Set up and operate system	0%	50%	100%

Project Details		PIB Code	KK P2
		Component	Smart Mobility
Project Name	**Bus Rapid Transit (BRT) Route Planning based on Mobile Data Analytics**	Project Type	Project
		Priority	Medium
		Ease of Implementation	Moderate
		Cost of implementation	Medium

Project Description

Mobile data analytics can be utilised in the planning of routes for the BRT in Kota Kinabalu. Mobile data can be used to derive mobility or travel patterns of people. This approach in modeling mobility patterns is newer than the conventional approaches of using travel diary surveys and population census. Mobile data can estimate people's location when they move about carrying out their daily activities. Therefore, travel demand, dense point of origination and destination can be established. This will aid in the planning of BRT routes in Kota Kinabalu. Relevant city authorities will need to work and come to an agreement with telecommunication companies to obtain non-personalised mobile data. Relevant city authorities will then need to analyse this data to determine mobility patterns of its citizens before finalising the most appropriate routes for the BRT

Source : MIT News

Project Rationale

1. Sub-optimal planning of BRT routes
2. Lack of coverage in high demand areas

Expected Benefits

1. Well planned and heavily utilised bus routes
2. Lower costs of route planning

Benchmarking Insight

1. Bicycle lanes planning (Estonia)

Tartu City Government used mobile data to determine high demand areas for the construction of bicycle lanes. The city government collaborated with telecommunications companies and mobile data analytics companies in this initiative

2. Bus route optimisation (Ivory Coast)

IBM developed a new model for optimising urban transportation system for the city of Abidjan. Using movement data collected from millions of cell-phone users in the city, IBM recommended changes in the city's bus routes

Existing Initiatives

No.	Initiatives	Description
1.	Bicycle and pedestrian lane	Alternative transportation from Tanjung Aru to Universiti Malaysia Sabah
2.	Planned BRT system	30 km public bus system with dedicated bus lanes on existing roads and one way traffic flow in central business district

Communication Action Plan

	Stakeholders	Role	Actions Required
Key Implementing Agencies (Public)	Kota Kinabalu City Hall (KKCH)	Project owner	• Engage with private telecommunication companies to obtain or procure mobile data for the recent years • Define scope of mobile data required (call detail records, location area handles, device updates, GPS, etc.) • Analyse mobile data and illustrate traffic demand
	Sabah State Attorney General	Legal adviser	• Advise KKCH on mobile data procurement agreement with private telecommunication companies in accordance with Personal Data Protection Act
	Commercial Vehicles Licensing Board Sabah	Transport regulator	• Take stock of mobile data driven demand model in the assessment of BRT route plans
Key Implementing Agencies (Private)	Private telecommunication companies	Data owners	• Provide non-personalised mobile data (for free or on commercial basis) to KKCH according to scope and specifications requested

Monitoring Mechanism

	KPI	2019-2022	2023-2025	>2025
Key Performance Indicators (KPIs)	Engage with relevant private telecommunication companies	50%	100%	100%
	Formal request or procurement of mobile data from telecommunication companies	50%	100%	100%
	Mobile data analytics performed	0%	50%	100%
	Traffic demand modelling	0%	50%	100%
Additional Remarks	Use of mobile data to model mobility demand is a new initiative so there are no domestic references that can be used in estimating costing, setting KPIs and determining the success or failure of the initiative			

Project Details		PIB Code	KK P3

		PIB Code	KK P3
		Component	Smart Environment
Project Name	**Sanitary Landfill Development Prioritisation**	Project Type	Project
		Priority	Long Term
		Ease of Implementation	Moderate
		Cost of implementation	High

Project Description

The additional sanitary landfills or the upgrading of non-sanitary landfills into sanitary landfills will help Kota Kinabalu achieves a more integrated solid waste management system. Sanitary landfills are considered environmentally sustainable and resource efficient final disposal sites for solid waste. Identification of new sites or non-sanitary sites for upgrading should be performed as Kayu Madang Landfill, the sole sanitary landfill serving Kota Kinabalu area is nearing its full capacity.

New advances in technology may be featured in the identified sanitary landfill projects such as anaerobic bioreactor and gas collection system. However, the four basic elements of a sanitary landfill must be met:

Source : Wikimedia Commons

• Leachate collection and treatment
• Geological and hydrogeological engineering preparations
• Control and management of landfill operations
• Planned waste emplacement and covering

Project Rationale

1. Insufficient sanitary landfill capacity
2. Waste disposal in non-sanitary conditions

Expected Benefits

1. Larger solid waste disposal capacity for the medium to long-term (contingent on sanitary landfill capacity)

Benchmarking Insight

1. Landfill Directive (European Union)

The directive sets out requirements on landfill categories, operations and procedures. In assessing landfill operations applications, operators in EU member states need to furnish, among others, proposed methods for pollution prevention and abatement and the plan for closure and aftercare procedures

2. Mixed use development in Tokyo's New Sea Surface Disposal Site (Japan)

Landfill is planned and operated with mixed use development objective. Currently, solid waste is packed 30 metres deep, covered with top layer of soil, and features exhaust pipes for methane gas. Beyond 2020, a green space with leisure facilities is expected to be built on the landfill.

Existing Initiatives

No	Initiatives	Descriptions
1.	Encouraging food waste separation	Eateries are encouraged to install food waste separation processors
2.	Plastic bags reduction campaign	Participating shopping outlets to charge RM0.20 per plastic bag on shoppers on weekends and Mondays

Site Location	Kota Kinabalu

Communication Action Plan

	Stakeholders	Role	Actions Required
Key Implementing Agencies (Public)	Kota Kinabalu City Hall (KKCH)	Project owner, development and operations regulator	• Identify and plan sanitary landfill development • Request for proposals on design and operation of sanitary landfill development • Funding of sanitary landfill • Appointment of sanitary landfill developer and operator • Review and update development and operating standards for sanitary landfills
	Sabah Ministry of Local Government and Housing	Project facilitator	• Provide technical support in the planning stages • Advise on potential state government funding for KKCH
	Sabah Environmental Protection Department	Environmental regulator	• Advise KKCH on compliance with relevant environmental regulations and standards
Key Implementing Agencies (Private)	Private landfill developers and operators	Project developers and operators	• Develop and/or operate sanitary landfills as provided in relevant agreements with KKCH

Monitoring Mechanism

	KPI	2019-2022	2023-2025	>2025
Key Performance Indicators (KPIs)	Identification and plans for sanitary landfill development	50%	100%	100%
	Finalise funding arrangements	50%	100%	100%
	Sanitary landfill development completion	0%	50%	100%

KUCHING

Key Urban Challenges:

01
Heavy traffic congestion

Increasing number of vehicles in the city-
over 360,000 vehicles estimated in Kuching
by **2020**

*Source: Study on Urban Traffic in Kuching 2010-2030,
Sarawak.*

Ratio of travel time during the peak periods to
travel time at free flow periods is **50:20**

Source: Sarawak Public Works Department

87% of the people in Kuching City drive to work and
5% ride their motorcycles

*Source: "Travel Mode Choice Preferences of Urban Commuters in
Kuching City", Resdiansyah (a research partially funded by Dewan
Bandaraya Kuching Utara and Universiti Malaysia Sarawak), 2017*

02
Severe flash flood

54 locations
identified as flood-prone areas
(including in Samarahan area)

Source: Department of Irrigation and Drainage Sarawak, 2018

Number of persons affected by disaster per **100,000**
people

0.04 (average flood evacuees 2015-2018)

Source: Jawatankuasa Pengurusan Bencana Negeri Sarawak, 2018

04
Lack of affordable -priced housing

100,000 units of houses within
the price range of RM250,000 to
RM350,000 will be in demand in
Sarawak to service the middle-
income group
*Source: Sarawak Housing and Real
Estate Developers' Association*

60,000 units of affordable housing for the low-
income group are needed in Sarawak
Source: Ministry of Local Government and Housing Sarawak

3,962 units of low-cost and affordable houses
including People's Housing Programme (PHP) during
the Tenth Malaysia Plan period (2011-2015)

Source: Department of Information Malaysia, 2015

03
Alarming number of vandalism cases

1,356 vandalism cases with total cost of
RM434,685 in 2009 - 2010
Source: Dewan Bandaraya Kuching Utara

Cable theft and vandalism case at the LED
Giant Board Operation Room at Petra Jaya's
Gateway Gate in 2016

*Source: Dewan Bandaraya Kuching Utara,
Greater KK Masterplan, 2018*

Urban challenges

01

Heavy traffic congestion

EXISTING INITIATIVES

1. Intelligent traffic light - pilot projects along four (4) critical routes:
    • Airport – Jalan Tun Razak – Dewan Undangan Negeri
    • Green Road
    • Kota Samarahan – Jalan Song
    • Satok – Kuching Sentral
2. Installation of CCTV for traffic condition monitoring
3. Connected Citizens Programme – Collaboration with Waze Google

PROPOSED INITIATIVES

1. Intelligent traffic lights with integrated traffic control centre

Sensors on intelligent traffic lights can detect the presence of vehicles and speed of vehicles movement. Information collected will be communicated to the traffic control centre to intelligently route vehicle and pedestrian traffic

This is complemented with an integrated traffic control centre. Since traffic lights in Kuching are regulated by five different authorities, an integrated traffic control centre is needed to manage traffic lights in a more integrated manner. This initiative will ensure that the traffic congestion condition is alleviated as much as possible

INDICATORS

1. Number of intelligent traffic lights installed
2. Presence of integrated traffic control centre

Urban challenges

02

Severe flash flood

EXISTING INITIATIVES

1. Detection of river water level
2. Warning system (billboards)

PROPOSED INITIATIVES

1. Installation of water level sensor at street lights poles

Leverage on potential new technology such as smart street lights that feature water level sensors to increase the coverage of water level monitoring in the city. Water level information will feed into an interactive decision support system that helps city authorities to make informed decisions in the case of high water levels

2. Disaster warning text notification to local residents in the affected area

In the event of severe weather, the cell phone towers in the affected areas will send an emergency notification to mobile phone users within range

INDICATORS

1. Number of water level sensors installed
2. Presence of disaster warning text notification system

Urban challenges

03

Alarming number of vandalism cases

EXISTING INITIATIVES

1. "Safe Township" programme (awareness campaign, community involvement, installation of more lights and CCTV and increasing police patrols)

PROPOSED INITIATIVES

1. Crime monitoring through live CCTV and distress audio sensor

Utilising on live videos from CCTV, surveillance of criminal activities including vandalism, can be performed. Through image recognition function, cameras can actively monitor and detect any abnormal activities. Additionally, sound sensors can also be installed to detect distress sounds such as shouts or screams by civilians in emergency situations. The centre operator will then check on the situation through video footage and dispatch emergency response personnel to the location for immediate assistance

INDICATORS

1. Number of CCTVs installed
2. Number of sound sensors installed
3. Number of crime incidents

Urban challenges

04

Lack of affordable housing

EXISTING INITIATIVES

1. Relocation of villagers to Darul Hana development area for better basic utilities, drainage, roads and recreational areas

PROPOSED INITIATIVES

1. Use smart construction materials in affordable housing

Construction time and cost can be reduced with the use of smart construction materials such as innovative cements and interlocking brick system. Precast concrete, which is a form of concrete that is prepared, cast and cured off-site, usually in a controlled factory environment, can also be introduced in affordable housing construction to potentially save cost and time

INDICATORS

1. Percentage of affordable housing projects using smart construction materials

Existing Inventory

Traffic system - Number of Traffic Light

57 Traffic lights at federal roads (Owned by JKR)

84 Traffic lights at federal roads (Owned by Local Authority)

Traffic system - Intelligent Traffic Light

4 Routes for pilot phase

Flash flood

9 Stations with hourly water level monitoring

54 Smart Flood Detection System (under planning)

Project Implementation Briefs (PIBs) - Kuching

Project Details		PIB Code	KCH P1
		Component	Smart Mobility
Project Name	**Intelligent traffic light with integrated traffic control centre in Kuching**	Project Type	Project
		Priority	High
		Ease of Implementation	Moderate
		Cost of implementation	High

Project Description

Intelligent traffic light taps into real-time traffic flow data to determine when traffic lights should go red or green. Each intersection builds and updates its own lighting plan every few seconds by using underground sensors to detect the presence of vehicles. In some cases, surveillance cameras are also installed at traffic light poles to monitor traffic and congestion on roads. Each stretch of road is then split into zones, and the time it takes for vehicles to pass through each one is monitored. This allows the system to calculate variations in traffic flow throughout the approach to each intersection and predict how the traffic will flow. This aggregated picture of traffic is used to calculate light sequencing plans, while the expected outflow of traffic from each intersection is transmitted to the next traffic signal on the network
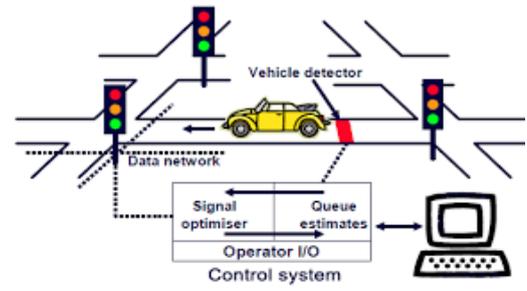
Image source: Smarter Cambridge Transport

Issues Being Resolved (Project Rationale)

1. Lengthy travel time due to traffic congestion

Expected Benefits

1. Smoothing traffic flows and prioritising traffic in response to demand in real time
2. Enable a much more effective response to traffic incidents
3. Reduce intersection wait times and overall journey times

Benchmarking Insight

1. Smart Traffic Light in Pittsburgh, United States

Where the smart traffic light technology has been installed, intersection wait times have fallen by up to 40%, journey times by as much as 25%, and braking by 30%

Existing Initiatives

No.	Initiatives	Descriptions
1.	Smart Traffic Management in Cyberjaya	• Collaboration between Cyberview Sdn Bhd and Telekom Malaysia Berhad • The traffic light system installed along Persiaran Multimedia, a stretch of about 3.5km consists of eight intersections of traffic lights • Waiting time has been reduced by 65% to between 8 – 11 minutes from approximately 32 minutes previously to go from one end to the other during peak hours

Site Location	Kuching

4 routes have been identified as the pilot of smart traffic light implementation:

1. Airport – Jalan Tun Razak – Dewan Undangan Negeri
2. Green Road
3. Kota Samarahan – Jalan Song
4. Satok – Kuching Sentral

- Route #1
- Route #2
- Route #3
- Route #4

Image source: Jabatan Kerja Raya Sarawak

Communication Action Plan

	Stakeholders	Role	Actions Required
Key Implementing Agencies (Public)	Owners of existing traffic lights in Kuching area: • Sarawak Public Works Department • Kuching North City Hall • Kuching South City Council • Padawan Municipal Council • Kota Samarahan Municipal Council	Implementation	• Identify and shortlist major road intersections and traffic hotspots for smart traffic light installation • Retrofit existing traffic lights with sensors and controls • Integrate data captured from the smart traffic lights to a central traffic command centre for analytics and preemptive measures

Monitoring Mechanism

	KPI	2019-2022	2023-2025	>2025
Key Performance Indicators (KPIs)	Identification of routes for smart traffic light	30%	50%	100%
	Identification of number of units and time frame for installation	30%	50%	100%
	Installation of sensors at identified intersections	20%	50%	80%

From stakeholder engagements, traffic lights in Kuching are regulated by five different authorities. Without coordination and integration of traffic light system between the authorities, there tend to be difficulties in monitoring and executing systematic traffic light sequencing in the event of an accident and an irregular traffic situation

Project Details		PIB Code	KCH P2
		Component	Smart Environment
Project Name	**Water level sensors in smart street lights**	Project Type	Project
		Priority	Medium
		Ease of Implementation	Moderate
		Cost of implementation	High

Project Description

By setting up an array of sensors in public amenities, local authorities can get more nuanced insight into how to solve interconnected problems. Street lights can double as data collectors, communicating with a central control system. With incidents of flash flood that easily occur, local authorities of Kuching can install additional water level sensors at street lights, at many locations around Kuching. Sensors at the bottom of street lights send out alarms if water levels rise dangerously. Real-time data from these sensors can be used to automatically inform fundamental services like emergency alerts to the relevant authorities, as well as to the public
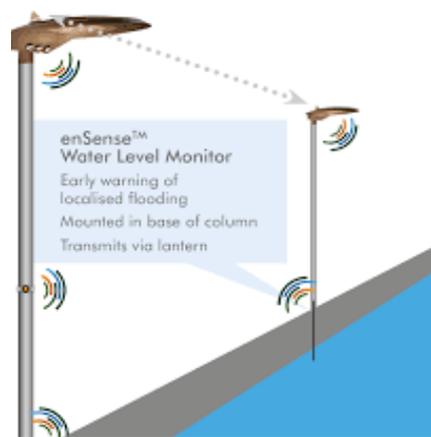
Image source: enLight® enSense™ Water Level Sensor

Issues Being Resolved (Project Rationale)

1. Flash flood occurrence

Expected Benefits

1. Increase the coverage of water level monitoring around Kuching
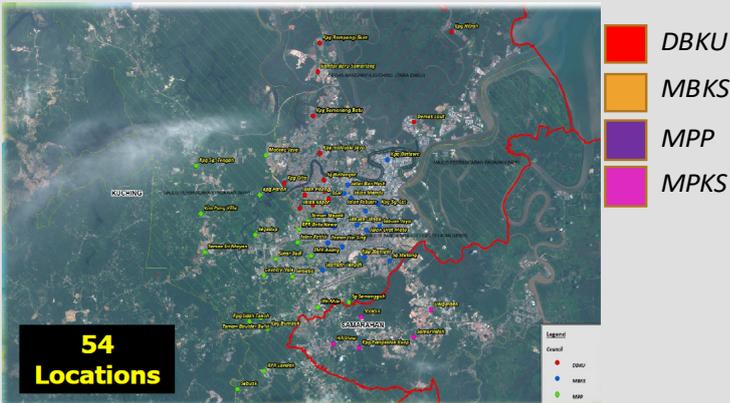2. Identification of exact location with problematic drainage system to divert heavy rain flows

Benchmarking Insight

Humble Lamp Posts (Milan, Italy)

• Implemented 'Humble Smart Lamp Posts', 100 light automation sensors + 250 wifi sensors + 10 environmental sensors
• Installation of sensors commenced in early 2018

Existing Initiatives

No.	Initiatives	Descriptions
1.	LED-based street lights (without environmental sensors) in Melaka	• Collaboration between State of Melaka with Philips under Philips CityTouch programme in year 2016 • 150w LED bulbs are installed in 1,000 lamp posts • Total cost incurred is RM2.69 million

Site Location	**Kuching**

	Currently, 54 locations are identified as flood-prone areas in Kuching. As a start, these sensors can be installed around these areas	

Image source: Department of Irrigation and Drainage Sarawak

Communication Action Plan

	Stakeholders	Role	Actions Required
Key Implementing Agencies (Public)	Department of Irrigation and Drainage Sarawak	Disseminate information	• Disseminate detailed information about the flood-prone areas • Propose appropriate locations for installation of water level sensors • Integrate data collection from the new sensors to the existing warning system
	• Kuching North City Hall • Kuching South City Council • Padawan Municipal Council • Kota Samarahan Municipal Council	Implementation	• Install smart street lights, together with the water level sensors at identified locations under their respective jurisdiction • Monitor and maintain the operation of the smart street lights • Integrate data collection from the new sensors to the existing warning system (in Department of Irrigation and Drainage)
	Sarawak Public Works Department	Implementation	• Propose suitable hardware and software for the purpose

Monitoring Mechanism

	KPI	2019-2022	2023-2025	>2025
Key Performance Indicators (KPIs)	Technical detailing for sensors and street lights	30%	50%	100%
	Identification of locations, number of units and time frame for installation	30%	50%	100%
	Number of sensors installed	20%	50%	80%

KULIM

Key Urban Challenges:

01

Limited internet coverage and speed

Average internet speed in Kulim
< 10 Mbps

Source: nPerf SAS Company, Bitrate test, 2018

02

Insufficient holistic security infrastructure throughout Kulim

25 units of 360° CCTV in Kulim
2016 – 892 cases
2017 – 809 cases
Reduce - 9.3%

Source: Kulim City Council, 2018

03

Static development progress of community farming

256 Reserve open space area
Existing Urban Farming Programme :
- 4 neighbourhood areas (Taman Angsana, Taman Lembah Impiana, Taman Serai Setia, Taman Lobak)

Upcoming *Agro Komuniti* by end of 2018 :
- 14 neighbourhood areas

Proposed Community Farming in 2019 :
- 18 neighbourhood areas

Source: Kulim City Council, 2018

04

Enhancement of public participation in decision making

1 council member for each zone

Source: Kulim City Council, 2018

05

Lack of R&D activities and collaboration between industrial training and industry players in KHTP

R&D zone comprises a 91.5 acre parcel earmarked for R&D activities that include Techno centre

Source: Kulim Hi-tech Park (KHTP) Local Authority , 2018

Urban challenges

01
Limited internet coverage and speed

EXISTING INITIATIVES

1. Telecommunication network coverage
2. Telekom Malaysia internet coverage

PROPOSED INITIATIVES

1. Installation of digital infrastructure by stages:

   First stage
   • Kulim city and KHTP

   Second stage
   • Cargo airport

INDICATORS

1. Number of telecommunication towers
2. Percentage of city served by wireless broadband (3G and 4G)
3. Number of public wifi hotspots in the city

Urban challenges

02
Insufficient holistic security infrastructure throughout Kulim

EXISTING INITIATIVES

1. Safe city programme
2. Local authority CCTV monitoring centre
3. CCTV monitoring centre between Majlis Perbandaran Kulim and RMP

PROPOSED INITIATIVES

1. Providing integrated CCTV command & control centre between local authority, KHTP Authority, Kulim City Council and RMP
2. Integration between private and public CCTV systems
3. Increase the installation of CCTVs and coverage area
4. Enhance the existing CCTVs by adding smart application (eg: Smart Pole)

INDICATORS

1. Number of crime rate reported
2. Percentage of crime reduction
3. Number of CCTVs in the city

Urban challenges
03
Opportunity in developing non-productive open spaces within neighbourhood areas into community farming

EXISTING INITIATIVES

1. Urban farming
2. Community farming programme
3. Community oriented policing
4. *MBI Desaku* community farming
5. Community Farming (*Kebun Komuniti*)

PROPOSED INITIATIVES

1. Innovation of smart agriculture startup (E-Farming)
2. Encouraging community engagement in urban farming by providing more farmland
3. Modernising existing community farming to smart farming by the innovation of IoT technologies such as:
   • Installation of machine vision technology – tracking urban farming using overhead cameras
   • Smart sensors and data analytics

INDICATORS

1. Existing number and areas of community farming

Urban challenges
04
Enhancement of public participation in decision making

EXISTING INITIATIVES

1. Traditional two-way communication between local authority and citizens

PROPOSED INITIATIVES

1. Enhance community empowerment by using mobile application and social media
2. Create system to invite public to participate in open discussion with local authority for proposed project planning

INDICATORS

1. Number of public participation
2. Types of medium that are linked to the community
3. Local authorities' responsiveness

Urban challenges
05
Lack of R&D activities and collaboration between industrial training and industry players in KHTP

EXISTING INITIATIVES

1. Collaboration between industry and learning institutions for industrial training
2. Kulim net database

PROPOSED INITIATIVES

1. Providing industrial training or seminar related to industrial sector in Kulim Hi-Tech Park (KHTP)
2. Enhancing innovation of business startup hub at KHTP
3. Enhancing collaboration between industrial entrepreneurs and higher learning institutions

INDICATORS

1. Number of employment
2. Number of innovation activities hubs in the city
3. R&D expenditure as a percentage of city's GDP

Existing Inventory

Safety

25	Number of CCTV at Kulim	**5**	Number of CCTV at KHTP

9	Type of CCTV 360 Degree	**5**
3	Voice CCTV	**3**
10	24 Hours CCTV	**5**
10	Real-time CCTV	**5**
	Condition: All working well	

Community Farming Programme

Community Farming

- Existing *Agro Komuniti* at 4 neighbourhood areas (*Taman Angsana, Taman Lembah Impiana, Taman Serai Setia, Taman Lobak*)
- New upcoming *Agro Komuniti* by end of 2018 at *Taman Lagenda, Taman Serai Wangi, Taman Mutiara, Taman Kemunting, Taman Kenari, Taman Makmur, Taman Sejahtera, Taman Tiram, Taman Tunku Putera, Taman Nilam Baiduri, Taman Lobak 2* and *Taman Ria*
- Proposed Community Farming (*Kebun Komuniti*) in 2019 at *Taman Desa Aman, Taman Desa Sentosa, Taman Sejahtera, Taman Bidara, Taman Salad, Taman Cekur Manis, Taman Kijang, Taman Sutera, Taman Serai PKNK, Taman Senangin, Taman Sentosa, Taman Camar, Taman Merpati, Taman Selasih 5, Taman Aman* and *Taman Seri Mahkota*

Techniques

- ✅ Hyroponic
- ✅ Green house
- ✅ A Frame Structures

Project Implementation Briefs (PIBs) - Kulim

Project Details		PIB Code	KM P1
		Component	Smart Digital Infrastructure
Project Name	**Enhancing internet speed and connectivity**	Project Type	Project
		Priority	High
		Ease of Implementation	Difficult
		Cost of implementation	High

Project Description

1. To enhance the internet speed, coverage and provide seamless connectivity at all areas in the city
2. To allow the citizens to fully capitalise on the advantages of modern technologies
3. To provide stable internet connectivity and ensure the smooth conduct of business and commercial activities in a city

Project Rationale

1. Limited internet speed and coverage (fixed/wireless)
2. HSBB/Wifi only limited at town centre area

Expected Benefits

1. Improved internet coverage and seamless connectivity in the rural and urban through high speed Internet
2. Cities can effectively empower their communities to fully embrace a digital lifestyle
3. Attracting more investors to boost the development of digital economy, expand job opportunities and accelerate innovation
4. Enable service providers to run their networks more efficiently
5. Offering better quality of experience and greater reliability
6. Link the local market with the global market thereby offering better opportunities for various businesses

Benchmarking Insight

Hong Kong:

1. Hong Kong has a robust telecommunications network. As of April 2017, Hong Kong has eight submarine cable landing stations connecting to 10 regional and trans-Pacific submarine cable systems. Hong Kong is also connected to China via a number of overland cables
2. Together with other submarine cable systems being constructed, the total capacity will approach 200 Tbps by the end of 2018. Hong Kong has a very high level of reliability of worldwide interconnectivity
3. Hong Kong has launched the wi-fi connected city programme with extensive coverage providing wi-fi access points at Mass Transit Railway (MTR) stations, Airport Express stations and trains, offices, major tourist attractions, shopping malls, coffee shops, restaurants, hospitals, public libraries, parks, etc. In 2014, the Government collaborated with the industry to launch the common brand "Wi-Fi.HK" to promote wi-fi service offered to the public and private sectors completely free, or free for a certain period of time in Hong Kong

Benchmarking Insight

Lithuania:

1. There are 28,671 Mobile Open WiFi hotspots in Lithuania
2. No. 1 in the ranking of the top 20 countries for fastest public wi-fi, measured by average download speeds in megabites per second (Mbps)
3. The reason for Lithuania's fast internet speed is due to heavy investment and prioritisation of free public wi-fi. Since 2011, the country has been in the top ranks for speed and efficiency of public internet access, along with other Eastern European countries such as Croatia (No. 2), Estonia (No. 3), and Romania (No. 5).
4. Topping the list of fastest public wi-fi is Lithuania, with average download speeds of 16.6 Mbps, nearly double of that in the United States

Existing Initiatives

No.	Initiatives	Descriptions
1.	Mobile broadband coverage expansion	• 1425 new towers completed

Communication Action Plan

	Stakeholders	Role	Actions Required
Key Implementing Agencies (Public)	Local authority	Implementation	• Identify and shortlist potential locations to be equipped with public wi-fi hotspots
Key Implementing Agencies (Private)	Telco operators	Wifi hosting	• Provision of equipment and media access control (MAC) address to host the public wi-fi
	Internet infrastructure providers (Example: Huawei etc.)	Equipment provider	• Study the cost and implications of the wi-fi equipment installation • Develop cost recovery model to generate revenue via internet sharing model and other sources

Monitoring Mechanism

	KPI	2019-2022	2023-2025	>2025
Key Performance Indicators (KPIs)	Average internet speed in Kulim	4 gigabits-per-second (Gbps)		
	Types of internet	4G	5G	
	Internet penetration rate	95% internet coverage with 55% high-speed internet	30% internet coverage with 55% high-speed internet	

Project Details		PIB Code	KM P2
		Component	Smart People
		Project Type	Programme
Project Name	**Encouraging community empowerment through urban farming programme**	Priority	Medium
		Ease of Implementation	Moderate
		Cost of implementation	Medium

Project Description

1. Encourage residents in urban areas to produce food and seen as a practical approach in reducing daily spending
2. Promote agricultural scientific and technological innovation and to guide modern agricultural development toward efficient production, product safety, resource economy and environment–friendly improvement

Project Rationale

1. Developing non-productive open spaces within neighbourhood area and abandoned area into urban farming

Expected Benefits

1. Kitchen expenses of project participants are expected to be reduced
2. Open spaces around the housing area would be optimally utilised
3. Interest in farming could be created and be a beneficial hobby
4. Food safety could be guaranteed both for pesticide-free and sufficient food supply for urbanities

Benchmarking Insight

China:

1. China is a country with wide-scale deployment of smartphones and IoT systems that have led to a rapid adoption of precision agriculture solutions. China's initiatives to promote precision farming techniques are expected to drive the growth of the market further

Existing Initiatives

No.	Initiatives	Description
1.	Urban farming programme (*Kebun Komuniti/Agro Komuniti*)	• Existing *Agro Komuniti* at 4 neighbourhood areas (*Taman Angsana, Taman Lembah Impiana, Taman Serai Setia, Taman Lobak*) • New upcoming *Agro Komuniti* by end of 2018 at *Taman Lagenda, Taman Serai Wangi, Taman Mutiara, Taman Kemunting, Taman Kenari, Taman Makmur, Taman Sejahtera, Taman Tiram, Taman Tunku Putera, Taman Nilam Baiduri, Taman Lobak 2* and *Taman Ria* • Proposed Community Farming (*Kebun Komuniti*) in 2019 at *Taman Desa Aman, Taman Desa Sentosa, Taman Sejahtera, Taman Bidara, Taman Salad, Taman Cekur Manis, Taman Kijang, Taman Sutera, Taman Serai PKNK, Taman Senangin, Taman Sentosa, Taman Camar, Taman Merpati, Taman Selasih 5, Taman Aman* and *Taman Seri Mahkota*

Communication Action Plan

	Stakeholders	Role	Actions Required
Key Implementing Agencies (Public)	Kulim City Council	Project owner	• Provide land • Engage with community group and developers • Provide funding
	Developer	Land owner	• Provide land • Implement urban farming
Key Implementing Agencies (Private)	Community Group	Managing and monitoring	• Manage community participation, • Monitor farming activities and returns
	Community	Farmers	• Responsible for managing and operating farm business

Monitoring Mechanism

	KPI	2019-2022	2023-2025	>2025
Key Performance Indicators (KPIs)	Provision of farmland	16 locations	40 locations	60 locations

Community participation in urban farming is highly related to the level of awareness on the benefits of the activity. To be successful, it is important to ensure continuous community involvement in the implementation of urban farming

Project Details		PIB Code	KM P3
		Component	Smart Government
Project Name	**Enhancement of public participation through online full council meeting**	Project Type	Programme
		Priority	High
		Ease of Implementation	Difficult
		Cost of implementation	Low

Project Description

1. To promote collaborative governance and increase the participation and engagement in government through ICT advancement
2. To optimise services in the urban space
3. To increase the total number of participants, ICT-based solutions such as social media to help spread the word, collect feedback, and thus support decision-making based on the public needs
4. Public participation is widely recognised as a critical aspect in a variety of public accountability, policy, regulatory, and environmental processes. It is sometimes a regulatory requirement. Through effective public participation, the processes and outcomes of planning, policy, and decision-making are expected to be more efficient, equitable, and sustainable

Project Rationale

1. Engage the of public in decision making
2. To inform the public on the proposed planning project and obtain their opinion

Expected Benefits

1. Encourage the public to contribute meaningful input to the decision-making agencies
2. Provide the opportunity for communication between decision-making agencies and the public
3. Encourage public participation in any programmes or activities organised by local authority
4. Example: recycle campaign, awareness campaign etc

Benchmarking Insight

1. **Estonia:**

99% of the public services are available online 24/7. E-services are only impossible for marriages, divorces and real-estate transactions. Some of e-government services offered:

- State Portal, eesti.ee, is a one-stop-shop for hundreds of e-services offered by various government institutions
- Online town hall meeting
- Geographic information services
- E-business registration
- E-tax system

2. **Denmark**

Denmark has the world's best in e-government initiatives, according to the 2018 United Nations E-Government Survey. One key approach was to create a user-friendly and simple digital sector under Denmark's Digital Strategy 2016 – 2020. Key initiatives undertaken:

- Data will be collected about user experience so that solutions can constantly be improved
- Work on selected user journeys, for example divorces or business startups, will secure easier and more straightforward self-service processes
- A number of common public-sector support programmes will be gathered together so that it is easier for citizens and businesses to get help or to be guided to the right authority

	No.	Initiatives	Description
Existing Initiatives	1.	Full council meeting (once in every two weeks)	• Full council meetings are a way for local and national politicians to meet with their constituents, either to hear from them on topics of interest or to discuss specific upcoming legislation or regulation • Attendees use full council meeting to voice their opinions
	2.	WhatsApp application	• Directly channel public perception or complaints to the officer and council members for each zone through WhatsApp application

Communication Action Plan

	Stakeholders	Role	Actions Required
Key Implementing Agencies (Public)	Kulim City Council	Implementation	• Coordinate online full council meeting • Council members • Liaison officer • Coordinate activities by zone • Handling public complaints

Monitoring Mechanism

	KPI	2019-2022	2023-2025	>2025
Key Performance Indicators (KPIs)	Number of registered participants	25%	50%	99%
	Number of active users using online town hall meeting	25%	50%	99%

|	
Additional Remarks	Public participation can be time-consuming and sometimes expensive. To do it effectively, organisations have to build capacity by using ICT advancement in conducting online town hall meeting. If done poorly, public participation process can result in, for example, loss of faith in the agency. A negative experience of the process may lead participants to have negative perception of the outcome, and they may be less likely to participate in future processes

MySMART CITY PROPOSED DASHBOARD INTERFACE

10

MYSmart City Proposed Dashboard Interface
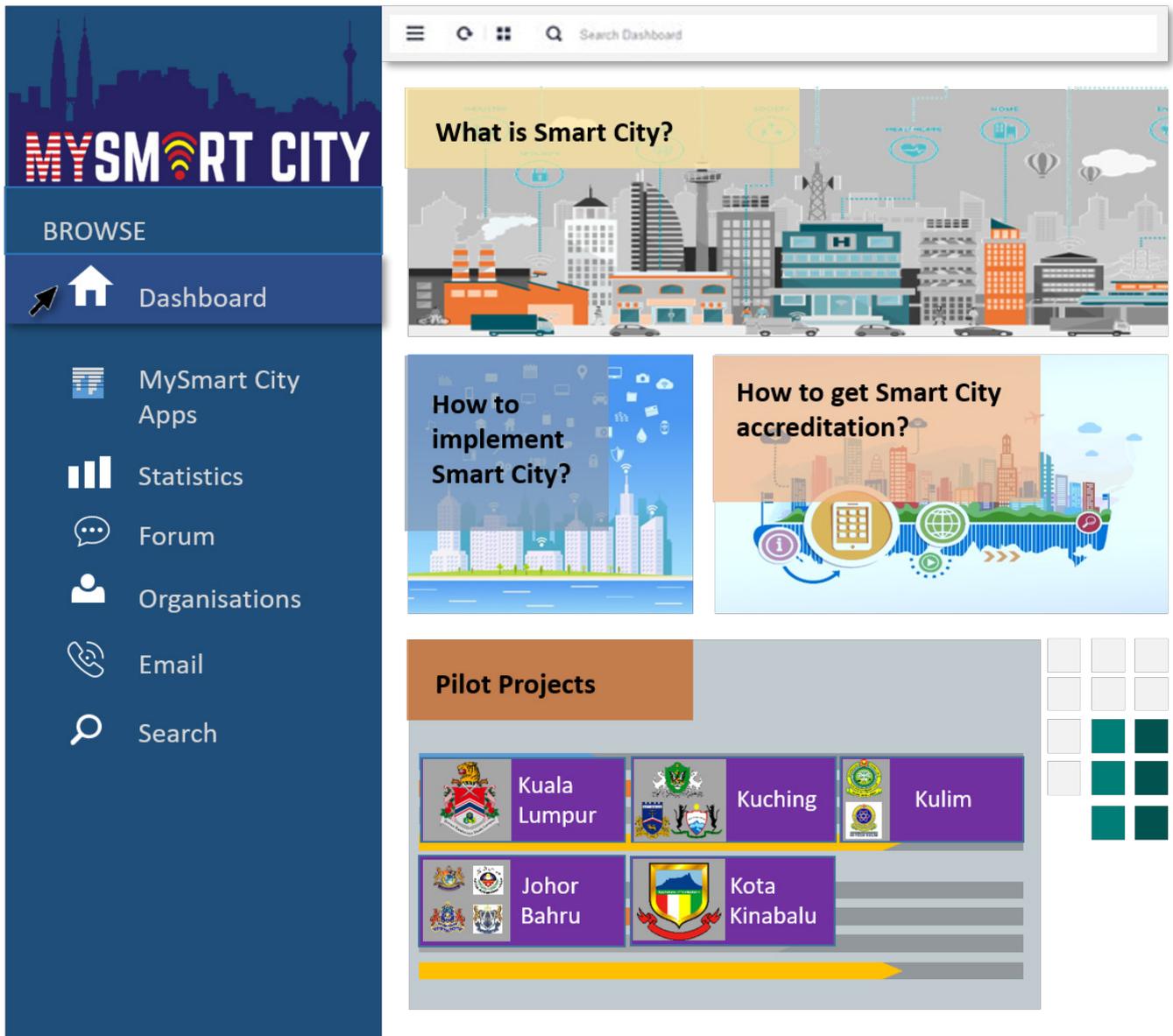
BROWSE

- **Dashboard**
- What is Smart City?
- How to implement Smart City?
- How to get Smart City Accreditation?
- Top 30 Initiatives
- Pilot Projects

- MySmart City Apps
- Statistics
- Forum
- Organisations
- Email
- Search

What is Smart City?

Search Dashboard

Vision

Diversity Where Lives Converge
Menuju ke arah kualiti kehidupan yang pintar — Liveability, aspire and vibrant
Smart city way for the future — Smart beyond excellence. Integration of technology and people for an advanced nation. Smart Malaysia - an intelligent platform for our citizens to have better living standards.

→ MYSM●RT CITY — Quality and Smart Living

Definition

Cities that use ICT and technological advances to address urban issues including to improve quality of life, promote economic growth, develop sustainable and safe environment and also encourage efficient urban management practice

Criteria

- Primary and basic infrastructure
- Focus areas are aligned with the needs of the city
- Master policies and synergistic partnership
- Strong political will
- Data and information protection
- Gender and vulnerable group inclusivity

- Connectivity and modern digital infrastructure
- Low Carbon Society
- Engagement of broader community of innovators
- Government data sharing
- Community empowerment

Policy

1. Primary infrastructure shall be upgraded to incorporate smart and IOT elements towards addressing core urban challenges
2. Shared digital infrastructure and internet connectivity shall be enhanced for all cities in Malaysia
3. Quality of human capital shall be heightened to meet future demands of industry and overall environment in smart city
4. Open government practices shall be strengthened in the smart city context
5. Cybersecurity shall be established and strengthened in smart city context
6. Accreditation of smart city standards shall be introduced to set a standard for smart city qualification and recognition
7. Gender equality and social inclusion of all groups, including the vulnerable, shall be given emphasis in smart city development
8. Sustainable and smart environment practices shall be encouraged in all development of smart city
9. Public transport system shall be physically and digitally integrated with seamless accessibility
10. E-Government shall be strengthened in the development of smart city
11. Safety and security shall be improved to enhance quality of life
12. Development of digital economy in Malaysia shall be intensified to complement smart city initiatives
13. Community empowerment shall be enhanced in smart city planning and governance
14. Public Private Partnerships (PPPs) shall be emphasised in smart city initiatives
15. Local government capabilities and resource base shall be enhanced
16. Ensure healthy lives and promote wellbeing at all ages

Components

- Smart Economy
- Smart Living
- Smart Environment
- Smart People
- Smart Digital Infrastructure
- Smart Mobility
- Smart Governance

MYSMART CITY

BROWSE

- Dashboard
- What is Smart City?
- How to implement Smart City?
- How to get Smart City Accreditation?
- Top 30 Initiatives
- Pilot Projects

- MySmart City Apps
- Statistics
- Forum
- Organisations
- Email
- Search

How to implement Smart City?

1 Identify your city level of smartness

	Level 1	Level 2	Level 3	Level 4	Level 5
SMART PEOPLE	Conventional lifestyle ★ Average moral intelligence ★ Local authority dependence ★ Basic school facilities and education technique	Public awareness on ★ The benefit of the basic infrastructure ★ Sustainable way of living ★ Full usage of basic infrastructure in school/ working environment	Application of advance technology ★ Awareness of the benefit of the technology ★ Improved moral intelligence ★ Integrate advance technology in school/ working environment	Integration between technology and the people ★ Use of smart solutions in daily lives ★ Talented human capital - majority ★ Digital lifestyle ★ Empowered community	★ Digital workforce ★ Cashless society
SMART GOVERNMENT	★ Over-the-counter government services ★ Paper-based information	★ Local authority website ★ e-government services ★ Electronic documents	★ Data sharing platform among government and with public ★ Integration of different operating systems ★ Standalone applications for various municipal functions	One-stop centres local authority application (e-government services, public information, public feedback / complaints) Data analysis on public websites and applications usage	★ Wide use of data sharing platform ★ Urban observatory ★ 100% e-government services ★ Timely and detailed information disclosure
SMART MOBILITY	★ Highly traditional ★ Mobility is heavily oriented towards private transport ★ Manual operation ★ Low compliance with schedule / quality	★ Limited public transport options ★ Emerging smart applications ★ Cashless payment option	★ Public transport-oriented mobility development ★ Central command centre ★ There is emphasis on non-motorised transport ★ Park n Ride facilities	★ Multiple modes of public transportation ★ Real-time schedule info ★ Smart applications (e.g. Smart traffic lights, smart parking) can be observed ★ Integrated digital payment	★ Highly integrated transportation & payment system ★ Seamless and efficient Inter-connectivity ★ Sustainable mobility (Green, Electric vehicles)
SMART INFRASTRUCTURE	★ Poor internet speed ★ Very limited mobile network coverage ★ No sensors/cameras to capture data	★ Silos exist in data management ★ Low internet speed ★ Moderate mobile network coverage ★ Limited cameras/sensors in place to capture data	★ High speed internet exists in limited areas ★ Good mobile network coverage ★ Data sharing is emerging	★ Open Data policy in place ★ Data sharing centre ★ High accessibility of non-sensitive data for public ★ Wide internet coverage ★ High speed internet is widely available	★ Seamless integration of city management and data sharing among agencies ★ Real time info on building management ★ Ultra high-speed internet ★ Stable network coverage (both indoor & outdoor)
Note:	Traditional Infrastructure: physical and social	Smart way of doing things on physical initiatives and deployment of advanced technology	Tech Base includes networks of connected devices and sensors and deployment of advanced technology	Higher level of technology advancement, Smart Applications (QR Code, apps etc) and data analysis capabilities	Adoption and usage and deployment of advanced technology

How to implement Smart City?

2 Identify key urban challenges

Economy | Living | Environment | People | Government | Mobility | Digital Infrastructure

- Loss of green area
- Improper solid waste management
- Air pollution
- Water pollution
- Flash flood
- Landslide
- High rate off non-revenue water
- High usage of non-renewable energy

3 Strategy and Initiatives

Preserve green area and enhance the management of trees in public parks

- Improve the tree inventory system for tree protection and management towards electronic inventory system
- Specify the tree choice based on durability, maintenance cost, and crown dimensions
- Increase the frequency of tree inventory

4 Indicator and Threshold

Indicator	Description	Current conditions	Indicative Value
Loss of green area			
Percentage Relative Tree Canopy Cover	Relative Tree Canopy Cover achieves desired degree of tree cover, based on potential or according to goals set for entire municipality and for each neighbourhood or land use	17% tree cover	40% tree cover by 2025
Percentage of land cover and land use			

5 Key Players and Source of Funding

Implementers	Monitoring
• Local authority • GLC	• Smart city council

BROWSE

- Dashboard
- What is Smart City?
- How to implement Smart City?
- How to get Smart City Accreditation?
- Top 30 Initiatives
- Pilot Projects

- MySmart City Apps
- Statistics
- Forum
- Organisations
- Email
- Search

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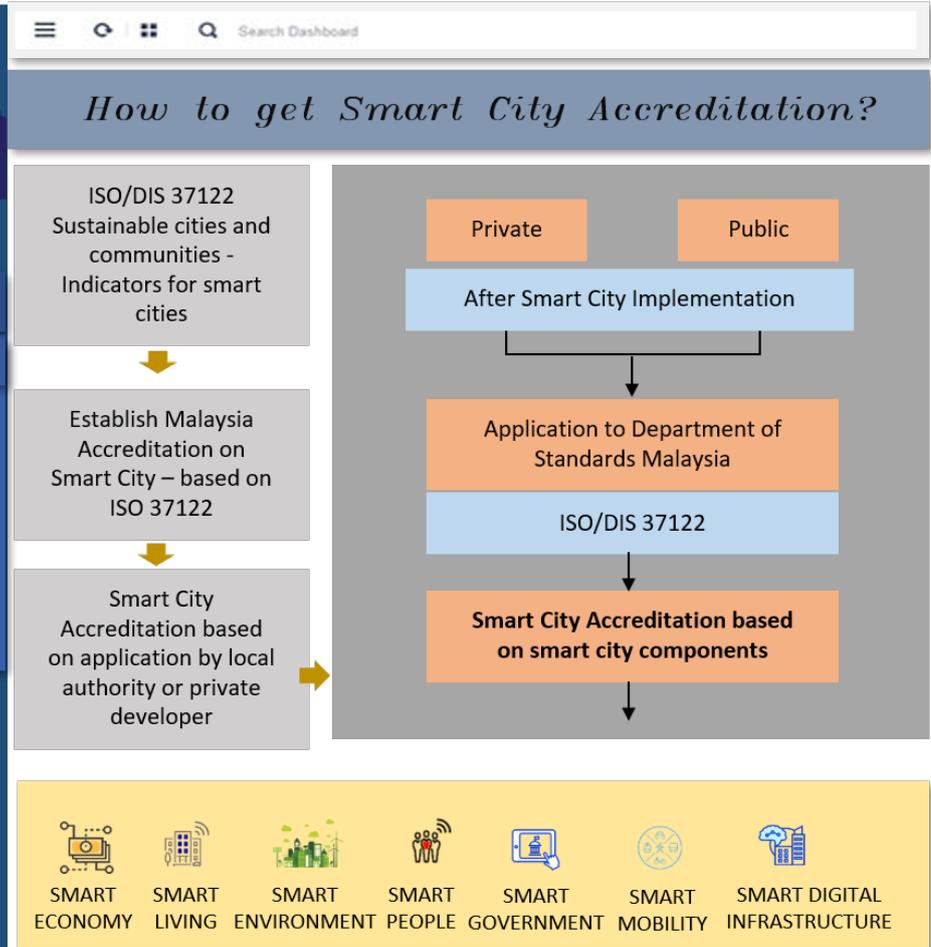 - Pilot Projects
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Search Dashboard

How to get Smart City Accreditation?

ISO/DIS 37122 Sustainable cities and communities - Indicators for smart cities

↓

Establish Malaysia Accreditation on Smart City – based on ISO 37122

↓

Smart City Accreditation based on application by local authority or private developer

→

Private   Public

After Smart City Implementation

↓

Application to Department of Standards Malaysia

ISO/DIS 37122

↓

Smart City Accreditation based on smart city components

↓

SMART ECONOMY   SMART LIVING   SMART ENVIRONMENT   SMART PEOPLE   SMART GOVERNMENT   SMART MOBILITY   SMART DIGITAL INFRASTRUCTURE

MYSMART CITY

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- 🏠 **Dashboard**
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- Top 30 Initiatives
- ➤ **Pilot Projects**

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- 📊 Statistics
- 💬 Forum
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- 📞 Email
- 🔍 Search

Kuala Lumpur

Pilot Projects

Key urban challenges

- High amount of solid waste generation and low recycling rates
  - Low usage of public transport
  - Lack of financial and business services
  - A relatively high crime rate
  - Low internet speed and internet access
  - Limited data sharing between departments within KLCH and external departments & agencies in Kuala Lumpur

Initiatives

1. Introduce a smart bin at public housing and tourist attraction areas
2. Adapt the Waste to Energy technology

Project Implementation Briefs (PIB)

PROJECT DETAILS		PIB Code	KL P1
Project Name	Smart Bin at Public Housing and Tourist Attraction Areas	Component	Smart Environment
		Project Type	Project
		Priority	High

SMART ECONOMY
SMART LIVING
SMART ENVIRONMENT
SMART PEOPLE
SMART GOVERNMENT
SMART MOBILITY
SMART DIGITAL INFRASTRUCTURE

Location
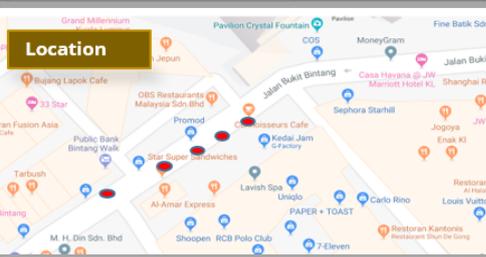
Management response

Community response

Total Number 🔍	Smart Bin ID 🔍	Level of usage 🔍	Collection record 📊

MY SMART CITY

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SMART ECONOMY

SMART LIVING

SMART ENVIRONMENT

SMART PEOPLE

SMART GOVERNMENT

SMART MOBILITY

SMART DIGITAL INFRASTRUCTURE

Alipay

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Boost

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fave PAY

Startup

in your pocket
Travel apps