ASEAN SUSTAINABLE URBANISATION STRATEGY

one vision
one identity
one community

ASEAN Sustainable Urbanisation Strategy

The ASEAN Secretariat
Jakarta

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ASEAN: A Community of Opportunities for All

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Foreword

A key objective of the ASEAN Community Vision 2025 is to raise the standards of living of our peoples, empowering them to seize opportunities and address the challenges they will face in the coming years. Urbanisation is at the heart of this process. Half of ASEAN peoples already live in urban areas and by 2025 a further 70 million people in this region will be city dwellers. Creating sustainable and liveable cities in ASEAN will be crucial to narrowing the existing development gaps, strengthening resilience, promoting innovations, improving well-being, and enhancing connectivity among our peoples.

As cities grow, they benefit from economies of scale and deeper social, cultural, and economic networks. However, rapid urbanisation in ASEAN can make it difficult for urban infrastructure development to keep pace. This in turn gives rise to issues related to economic inequality, congestion, as well as environmental and health costs. However, fast technological advancements present cities with numerous opportunities to prepare for and tackle these urbanisation challenges.

The ways in which cities develop and address the urbanisation process matter to all of us and require a pro-active approach. With that in mind, the development of the ASEAN Sustainable Urbanisation Strategy (ASUS) as a key initiative under the Master Plan on ASEAN Connectivity (MPAC) 2025 is timely. In developing ASUS, we have taken stock of the many trends impacting urbanisation as well as the relevant lessons learnt and best practices from the region and globally. In order to promote and support sustainable urbanisation, the ASUS has prioritised the most crucial areas for ASEAN cities to focus on and developed practical action templates which cities can customise to their unique contexts. In short, the ASUS provides the foundation of knowledge to help ASEAN cities of varying sizes across networks in their respective journey towards achieving sustainable urbanisation, while giving due consideration to their individual uniqueness.

Building sustainable and liveable cities in ASEAN will be no small task. However, with focus and determination, concrete strategies and mutual support, it is a task that ASEAN and its partners are well equipped to address. Our actions today in how we build and sustain our cities will shape the livelihoods of generations to come. Let us work together to ensure that our children, their children and all future generations live, work, and play in a better urban environment.

Dato Lim Jock Hoi,

Secretary-General of ASEAN

Preface

JOINT STATEMENT BY THE CHAIRS OF THE ASEAN CONNECTIVITY COORDINATING COMMITTEE AND THE LEAD IMPLEMENTING BODY FOR SUSTAINABLE INFRASTRUCTURE

Today, half of all people in ASEAN live in urban areas and an additional 70 million people are forecast to live in ASEAN cities by 2025. Economic growth is occurring at a rapid pace not only in mega-cities such as Jakarta, Manila and Bangkok, but increasingly in middleweight cities, with populations between 500,000 and five million.

Urbanisation is a crucial driver of economic growth. No country has yet achieved middle-income status without a significant shift of its population into cities. The underlying causes include the benefits of economy of scale for larger cities, as well as the higher wages that people typically receive as they transition from an agrarian to an urban society.

The immediate need for cities in ASEAN is to provide adequate and sustainable urban infrastructure to meet the increasing pace of urbanisation. In the process of meeting infrastructure demands, smart urbanisation applications could potentially provide a way for cities to leapfrog in technology and facilitate optimal use of existing infrastructure.

However, urbanisation also poses challenges related to inclusiveness (particularly housing), environmental pollution, economic efficiency (linked to rising traffic congestion), health and cultural heritage. While presenting opportunities for women and girls that are often unavailable in rural settings, urbanisation can also cause them to seek work in the informal sector, contributing to income disparity and increased risk, including from violent crime. These challenges can be amplified by rapid and haphazard urbanisation, which has occurred in many ASEAN countries. These challenges must be addressed in order to achieve sustainable urbanisation. Cities need to develop strategies to sustain the momentum of economic activities, provision of housing, healthcare, education, energy services, and mitigate the impacts of climate change, as well as manage various other priorities.

The ASEAN Connectivity Coordinating Committee (ACCC), comprising the Committee of Permanent Representatives to ASEAN, has been tasked by ASEAN Leaders to facilitate the implementation of the MPAC 2025. There are several linkages between sustainable urbanisation and ASEAN Connectivity:

1. ASEAN will only realise true ASEAN Connectivity if cities are able to respond effectively to the negative effects of urbanisation. For example, tackling traffic congestion is essential to supporting connectivity of people, goods, and services.
2. ASEAN cities play a critical role in the realisation of the ASEAN Economic Community, where ASEAN Connectivity is a critical enabler, that helps to expand and improve production and distribution networks in ASEAN.
3. Given that ASEAN cities have evolved differently and at very different paces, there is an opportunity for ASEAN cities to leverage each other's comparative advantages and experiences to overcome the challenges of urbanisation. Connecting cities will enhance cities' efforts coordinate and develop their own customised urbanisation strategies.

The Lead Implementing Body for Sustainable Infrastructure (LIB-SI) was established to coordinate the implementation of Sustainable Infrastructure under MPAC 2025.

The development of an ASEAN Sustainable Urbanisation Strategy (ASUS), one of the initiatives under the MPAC 2025 Strategic Area of Sustainable Infrastructure, will support and improve the effectiveness of various ASEAN city networks, including the ASEAN Smart Cities Network (ASCN), the ASEAN Sustainable Development Goals (SDG) Frontrunner

Cities Programme, ASEAN Mayors Forum, and various other city networks in ASEAN, such as those operating under the Brunei Darussalam-Indonesia-Malaysia-Philippines – East ASEAN Growth Area (BIMP-EAGA), and the Indonesia-Malaysia-Thailand – Growth Triangle (IMT-GT). A large number of cities in each of these networks share common priorities and concerns, and the ASUS aims to propose solution to these shared concerns to improve the effectiveness of these networks. 'Toolkits' will be provided to assist cities prioritise areas of focus related to sustainable urbanisation, and to develop high quality action plans in specific areas, which can be customised to the local city context.

The ASEAN Vision 2020, adopted by the ASEAN Leaders on the 30th Anniversary of ASEAN, envisages ASEAN as a Community of Southeast Asian nations, outward looking, living in peace, stability and prosperity, bonded together in partnership in dynamic development and in a community of caring societies. The ASUS will play an important role in helping ASEAN achieve this vision and enhancing connectivity in the region.

Ambassador Tan Hung Seng,

Chair of the ACCC and Permanent Representative of the Republic of Singapore to ASEAN

Mr. Khoo Teng Chye,

Chair of the LIB-SI and Executive Director Centre for Liveable Cities (CLC)

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ASEAN SUSTAINABLE URBANISATION STRATEGY

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Initial identified priority actions	▪ Introduce and improve access to digital payment solutions to enhance financial inclusion	▪ Develop and expand affordable housing solutions	▪ Introduce digital solutions to enhance safety and security in cities	▪ Enhance solid waste management systems	▪ Introduce and improve Bus Rapid Transit (BRT) systems ▪ Develop and enhance traffic management systems ▪ Develop flood management systems	▪ Develop digital skills through "industry boot camps"

EXECUTIVE SUMMARY

- The Master Plan on ASEAN Connectivity (MPAC) 2025, adopted by ASEAN Leaders at the 28th / 29th ASEAN Summits in Vientiane, Laos, in September 2016 aims to achieve a *seamlessly and comprehensively connected and integrated ASEAN that will promote competitiveness, inclusiveness, and a greater sense of Community.* It comprises fifteen initiatives in the five strategic areas of: (a) Sustainable Infrastructure; (b) Digital Innovation; (c) Seamless Logistics; (d) Regulatory Excellence; and (e) People Mobility.

- The ASEAN Sustainable Urbanisation Strategy (ASUS) is one of the initiatives under the strategic area of Sustainable Infrastructure. The Strategy consists of this report as well as two accompanying toolkits that will assist local governments in ASEAN to advance sustainable urbanisation in their cities.

- Sustainable urbanisation focuses on promoting actions that enable urban areas to capture the benefits linked to large concentrations of people, while building resilience to the associated challenges. The ASUS employs a framework of sustainable urbanisation based on six areas ('civic & social'; 'health & well-being'; 'security'; 'quality environment'; 'built infrastructure' and 'industry & innovation') and eighteen sub-areas which is closely aligned with the ASEAN Smart Cities (ASC) framework, developed as part of the ASEAN Smart Cities Network (ASCN).

- Eight major trends are shaping urbanisation in ASEAN:

  1) *Urbanisation is rising (particularly in middleweight cities)*. Today, half of all people in ASEAN are already living in urban areas and an additional 70 million more people are forecast to live in cities by 2025. Yet, this growth is increasingly happening in middleweight regions, with a population between 500,000 and five million. Underpinning this growth of urban areas are three main factors: strategically located cities benefitting from the increase of cross-border trade and logistics; the formation of economic clusters (often also referred to as economic zones); and the growing importance and development of satellite regions to ASEAN's mega-cities.

  2) *Cities are becoming increasingly independent*. Many ASEAN Member States (AMS) are increasingly shifting the responsibility of public services to local city governments, granting them increased autonomy.

  3) *Digital technologies are transforming cities and governments are increasingly turning to technology to manage and monitor their cities*. Several technological innovations have been widely adopted by ASEAN cities. Disruptive technologies including cloud computing, the Internet of Things (IoT), open data and big data, have the potential to generate between US$220-US$625 billion in annual economic impact in ASEAN by 2030 but are also estimated to potentially displace 12-17 million non-farm jobs in ASEAN from 2015 to 2030.

  4) *Economic growth is neither inclusive nor equally distributed*. In many Asian cities, including in Southeast Asia, income inequality has risen and is often higher than in rural areas. The prevalence of urban poverty and inequality has several implications for cities in ASEAN including the spread of slums and informal settlements, increase in informal employment, a lack of financial inclusion and spreading gender inequality.

  5) *Urban sprawl is creating concerns for congestion, economic efficiency, and cultural heritage*. Rapid urbanisation in ASEAN has led to a large share of urban growth

involving unplanned, unstructured expansion, with high rates of car use which has resulted in chronic traffic congestion, costing about 2-5 percent of GDP per year.

6) *The resource footprint of cities is expanding*. While ASEAN's urban population has grown by around 3 percent annually, the rate of carbon dioxide (CO2) emissions have increased by 6.1 percent annually. By 2025, the amount of waste volume in ASEAN will increase by 150 percent from 1995 levels. Many ASEAN cities are also among the world's cities most exposed to natural disasters and environmental concerns, particularly from rising sea levels as a result of climate change.

7) *Increasing emphasis is placed on maintaining rule of law, including in relation to new threats such as cyber-security*. Cities in ASEAN are stepping up anti-crime efforts by increasing the number of police officers, and cooperation on trans-national crime and terrorism. There have also been several instances of cyber-attacks in various AMS, yet 78 percent of internet users in Southeast Asia have not received any formal education on cyber-security.

8) *Non-communicable diseases are becoming more prevalent amongst urban populations*. Southeast Asia had the highest urban ambient air pollution levels worldwide in 2016, with annual mean levels often exceeding 5-10 times World Health Organization (WHO) limits which has been linked to illnesses such as cancer, asthma and bronchitis. Cities in ASEAN also suffer from a rising proportion of adults with obesity and elevated stress levels.

- A stocktake of existing actions[1] supporting urbanisation across ASEAN revealed that a majority of actions have a strong focus on the areas of built infrastructure, quality environment, and civic & social, while health & well-being and security receive less attention. The stocktake also revealed that only 9 percent of actions are being implemented at an ASEAN and 10 percent at the Global/Asia level, implying a potentially large opportunity for more work to be done at the ASEAN level. Common barriers to implementing past actions related to sustainable urbanisation include a lack of coordination (with other government departments at the city-level, as well as with relevant regional and national agencies), information failures, gaps in cities' implementation and strategic planning capacity, and an inability to access alternative sources of finance.

- The ASUS identified 7 priority sub-areas of sustainable urbanisation and 8 respective priority actions for ASEAN, based on a range of criteria including their importance for promoting sustainable urbanisation, their relevance for city priorities in ASEAN, their alignment with Dialogue Partners' and other External Partners' (DPs and OEPs) priorities, and the potential for ASEAN to add value to the activities of cities. While each individual city in ASEAN will have different priorities depending on their local context, these priority sub-areas and actions were identified for cities in ASEAN on aggregate. Table 1 outlines the priority sub-areas and actions for sustainable urbanisation in ASEAN. A 'toolkit' has been developed which provides high quality action plans for each of these actions, which cities can customise to their local contexts. A further toolkit is provided to help cities carry out their own prioritisation of sub-areas and actions, most relevant to their context.

[1] For the purpose of the ASUS 'action' is used as an aggregate term for projects, programmes, initiatives etc.

TABLE 1: PRIORITY SUB-AREAS AND ACTIONS FOR SUSTAINABLE URBANISATION IN ASEAN

#	Sub-area	Action
1	Inclusive & equitable growth	1) Introduce and improve access to digital payment solutions to enhance financial inclusion
2	Housing & home	2) Develop and expand affordable housing solutions
3	Personal safety & security	3) Introduce digital solutions to enhance safety and security in cities
4	Water, waste & sanitation	4) Enhance solid waste management systems
5	Mobility	5) Introduce and improve Bus Rapid Transit (BRT) systems
		6) Develop and enhance traffic management systems
6	Urban resilience	7) Develop flood management systems
7	Education	8) Develop digital skills through 'industry boot camps'

- To ensure effective utilisation of the ASUS by AMS cities, strong implementing and monitoring & evaluation (M&E) mechanisms are vital. This is particularly important given that the ASUS is not an implementing body in itself, but rather focuses on providing high quality content (through this report and accompanying toolkits) for cities to utilise. To disseminate these toolkits to cities, the ASUS will work closely with ASEAN city networks, such as the ASCN, the ASEAN Sustainable Development Goals (SDG) Frontrunner Cities Programme, and various other city networks in ASEAN, such as those operating under the Brunei Darussalam-Indonesia-Malaysia-Philippines – East ASEAN Growth Area (BIMP-EAGA), and the Indonesia-Malaysia-Thailand – Growth Triangle (IMT-GT). A set of relevant output and outcome metrics have been identified to track progress of the implementation of the ASUS.

1. ANALYSING THE TRENDS IMPACTING URBANISATION IN ASEAN

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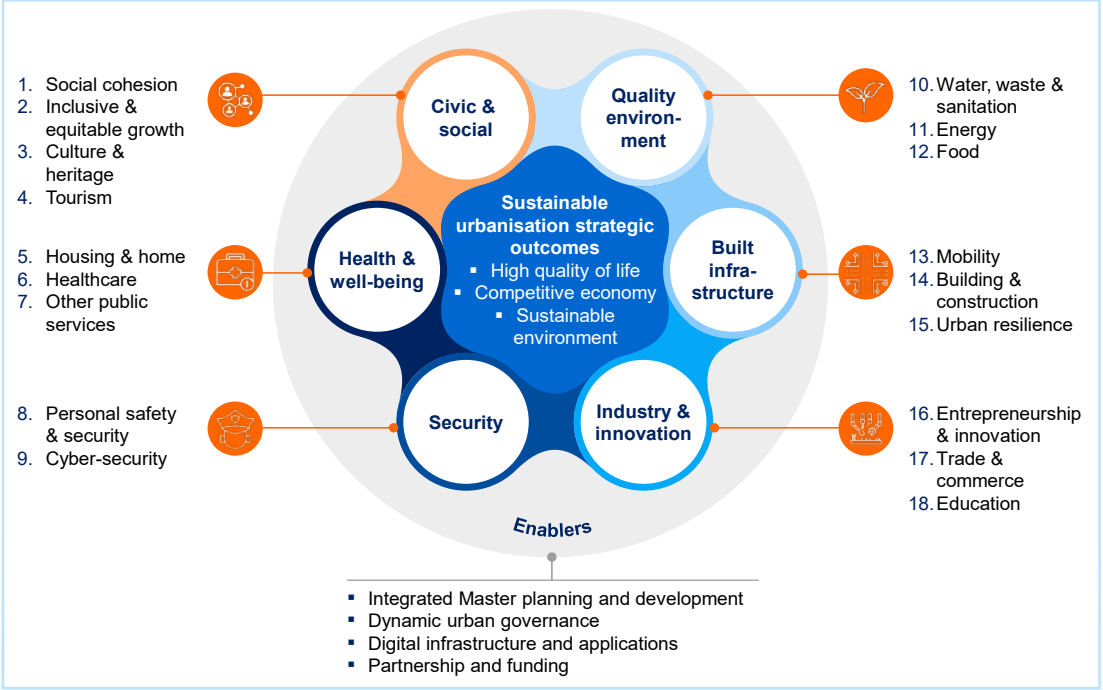
I. FRAMEWORK FOR APPROACHING SUSTAINABLE URBANISATION IN ASEAN

The ASEAN Sustainable Urbanisation Strategy (ASUS) employs a framework of sustainable urbanisation based on six areas and eighteen sub-areas (hereafter referred to as the 'ASUS framework'). The ASUS framework draws on the important work of the Centre for Liveable Cities (CLC) and ensuring a framework consistent with that being used by the ASEAN Smart Cities Network (ASCN), that is the ASEAN Smart Cities (ASC) framework. This is important to ensure that while the ASUS is an initiative under the MPAC 2025, it is able to connect seamlessly and effectively utilise synergies with other ongoing programmes, forums and efforts in ASEAN.

While the six areas of the ASUS framework are the same as those of ASC framework, the sub-areas have been clearly defined and adapted from the draft ASC framework to (a) be consistent with the stocktake of actions in sustainable urbanisation conducted by the ASUS; and (b) reflect the priorities of ASEAN Member States (AMS) and Dialogue Partners and other External Partners (DPs and OEPs) who were engaged during this exercise. Exhibit 1 provides an overview of the ASUS framework.

EXHIBIT 1: THE ASUS FRAMEWORK

The strategy employs a framework of sustainable urbanisation centred around 6 areas and 18 sub-areas



SOURCE: Centre for Liveable Cities (CLC), Team analysis

The six areas of sustainable urbanisation are defined as follows:

1. CIVIC & SOCIAL

This relates to factors influencing the civil and social health of a city, and covers four sub-areas:

- **Social cohesion.** This sub-area includes actions promoting social cohesion, such as female empowerment initiatives, racial integration efforts, and youth or elderly 'focused' initiatives. Meaning, these actions will touch on 'inclusive & equitable growth', 'housing & home', 'healthcare', 'entrepreneurship & innovation' and 'education' but are included here, since they put specific social groups front and centre of their activities, catering towards their specific needs.
- **Inclusive & equitable growth.** This sub-area includes actions which address economic issues around ensuring that the benefits of city growth are distributed equitably among city residents (e.g. social safety nets, public work programmes creating jobs in impoverished urban areas, etc).
- **Culture & heritage.** This sub-area includes actions to preserve historical sites in cities and to promote local cultures as well as to help minorities retain their cultures.
- **Tourism.** This sub-area includes actions which promote the tourism sector, including infrastructure and talent development, and supporting policies (e.g. promotion efforts to key overseas markets).

2. HEALTH & WELL-BEING

This relates to factors influencing the health and well-being of urban residents and covers three sub-areas:

- **Housing & home.** This sub-area includes actions focusing on improving the efficiency of public services to provide a pleasant and affordable living environment, including the provision of affordable housing, public spaces and facilities (e.g. public housing, slum upgrading, community centres, green spaces).
- **Healthcare.** This sub-area includes actions promoting access to affordable, high-quality healthcare for residents.
- **Other public services**. This sub-area includes actions supporting the broader delivery of other services that improve health and well-being, such as emergency services and nutrition (e.g. food programmes, school meals, etc).

3. SECURITY

This relates to ensuring the security of urban residents and covers two sub-areas:

- **Personal safety & security.** This sub-area includes actions that safeguard citizens against crime, terrorism, and natural disasters. This could include smart solutions to policing, disaster relief, and potential measures to combat other transnational issues (e.g. human trafficking).
- **Cyber-security.** This sub-area includes actions supporting the protection of networked infrastructure against cyber-crime and cyber-terrorism.

4. QUALITY ENVIRONMENT

This relates to ensuring a high-quality urban environment and covers three sub-areas:

- **Water, waste & sanitation.** This sub-area includes actions which address the challenges of accessing and increasing the efficiency of water delivery, waste

management, and sanitation. An example could be the creation of closed loop waste systems which seek to reduce, recycle, and reuse waste components.

- **Energy.** This sub-area includes actions promoting access to energy, higher energy efficiency, and switching to less polluting sources of energy. It includes smart grid developments in cities, the promotion of renewable energies (such as rooftop solar projects), and energy efficiency initiatives (outside buildings and vehicles which are covered in separate sub-areas).
- **Food.** This sub-area includes actions to enhance urban food supply, including promotion of urban agriculture, food traceability systems, and reduction of food waste or loss. Note: food nutrition issues are covered under the health and well-being area.

5. *BUILT INFRASTRUCTURE*

This relates to ensuring efficient, resilient, and environmentally-friendly built infrastructure and covers three sub-areas:

- **Mobility.** This sub-area includes actions promoting the access, affordability and efficiency of transport as well as reducing transport-related pollutants (such as greenhouse gas emissions). It includes the development of public transport infrastructure, ride sharing, smart transport solutions, and more efficient internal combustion engines.
- **Building & construction.** This sub-area focuses on improving the efficiency and sustainability of building usage and construction (e.g. optimising building space through shared offices, building energy efficiency, modular buildings, sustainable construction materials, smart buildings and construction).
- **Urban resilience.** This sub-area focuses on promoting urban resilience against disaster risks and potential impacts of climate change (e.g. city flood defences, early warning systems).

6. *INDUSTRY & INNOVATION*

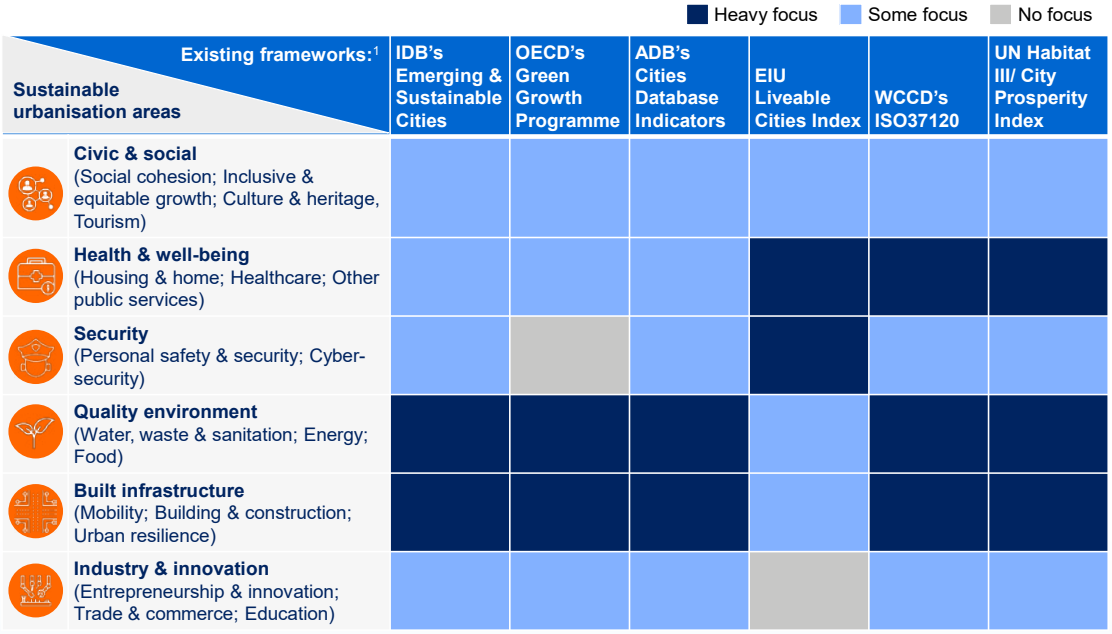
This relates to encouraging a strong and innovative business environment, and includes three sub-areas:

- **Entrepreneurship & innovation.** This sub-area focuses on promoting entrepreneurship and innovation (e.g. digital hubs, support for MSMEs).
- **Trade & commerce.** This sub-area focuses on promoting trade between cities through special economic zones and sector-specific development plans.
- **Education.** This sub-area focuses on producing an appropriately skilled workforce that can be resilient to changing industry needs and automation. It includes skills retraining, digital skills development, and vocational training programmes (with the exception of education covered in other areas such as for tourism and healthcare professionals).

The ASUS framework aims to provide comprehensive coverage of relevant sustainable urbanisation issues. A comparison of this framework to existing frameworks is provided in Exhibit 2.

EXHIBIT 2: ASUS FRAMEWORK ALIGNMENT TO EXISTING FRAMEWORKS

These 6 areas are closely aligned with existing sustainable urbanisation frameworks



1 Heavy focus: more than 15 percent of the indicators in the framework measure the specific issues in the area; Some focus: less than 15 percent of the indicators in the framework measure issues in the area; No focus: no indicator measures issues in the area.

SOURCE: Team analysis

- **Inter-American Development Bank (IDB) Emerging & Sustainable Cities Initiative (ESCI).** The ESCI was created by the IDB in 2010 to address rapid and unregulated urbanisation in Latin American and Caribbean cities.[2] Part of the initiative required the IDB to develop a set of 120 indicators to support city assessment, and to quickly develop Action Plans to address weaker performing areas. To date, over 77 cities have participated in the programme. While there is significant overlap between the ESCI and the ASUS, the ESCI framework is limited in geography and has not been extended to cities beyond Latin America and the Caribbean. The framework places a strong emphasis on 'quality environment' and 'built infrastructure' – as defined by the ASUS framework. Approximately 21 percent and 20 percent of the indicators in the framework measure performance in these areas respectively.

- **Organisation for Economic Co-operation and Development (OECD) Green Growth Programme (Southeast Asia).** As part of its report, 'Urban Green Growth in Dynamic Asia', the OECD recommends a set of 39 indicators to measure the efficacy of cities to support economic growth while reducing negative environmental externalities, and the impact on natural resources and environmental services - related services – including disposal services, natural resource production/extraction services, and consumer services which use natural resources to provide for direct or indirect human consumption.[3] The proposed framework has been tailored to a Southeast Asian context and examines areas which are similar to the ASUS. Over 30 percent of the indicators measure the present and long-term performance of cities to maintain a 'quality environment'. Indicators in this

2 *Indicators of the Emerging and Sustainable Cities Initiative (ESCI)*, Inter-American Development Bank, 2013.

3 *Urban green growth in dynamic Asia*, Organisation for Economic Co-operation and Development, 2016.

area include 'remaining life of current landfill(s)' and 'heavy metals emission intensity of manufacturing industries'.[4] Another area explored in detail is 'built infrastructure'. Indicators in this area (around 17 percent all indicators) include population density and the average travel speed on primary thoroughfares during peak hours.[5] However, whilst going in-depth into the two aforementioned areas, the framework does not examine the area of 'safety & security', as there is limited overlap between this area with sustainable environmental growth.

- **Asian Development Bank (ADB) Cities Book Database.** The ADB's cities data book database initiative has created an urban indicator system for city administrators and urban managers to track urbanisation and identify areas which require additional resources for improvement for 14 Asian cities.[6] Over 110 indicators that measure the ADB's urban sector goals, strategies, and targets were included as part of the framework. Similar to other frameworks, there is a strong emphasis placed on the areas of 'built infrastructure' (over 37 percent of all the indicators) and 'quality environment' (15 percent). Expenditure on road infrastructure (in the area of 'built infrastructure'), level of unaccounted usage of utility services and air pollution concentrations (in the area of 'quality environment') are some of the indicators to measure the impact of urbanisation in these areas. The comprehensive framework also examines other elements like urban governance and management – particularly around improving computerisation of government services, cost of collecting taxes, and proportion of city staff undergoing skills training.

- **Economist Intelligence Unit (EIU) Liveable Cities Index.** The EIU's Liveable Cities Index measures the challenges to lifestyle choices (i.e. quality of life) in 140 cities globally. While not a framework to measure sustainable urbanisation per se, there are several overlaps between becoming a liveable city and sustainable urbanisation. The Liveable Cities Index has a strong focus on issues around access to healthcare and ensuring personal safety – grouped under 'health & well-being' and 'security' respectively in the ASUS. Around 23 and 17 percent of indicators measure the performance of cities in these areas respectively. In the area of 'security' the indicators – which are mostly proprietary indexes of the EIU – aim to ascertain the prevalence of petty and violent crime, the threat of terror, and the threat of civil unrest. Indicators around the area of 'health & well-being' (also mostly indexes) examine the availability and quality of public and private healthcare. A limitation of this framework is that the area of 'industry & innovation' – defined in the ASUS framework – is not examined as it does not directly relate to quality of life, but as shown earlier, is important to sustainable urbanisation in cities.

- **World Council on City Data (WCCD) ISO 37120.** ISO 37120 is the first set of standardised indicators to measure sustainable development of cities globally. This framework aims to assess the performance of cities and measure their progress over time.[7] The standardised indicators also support cities to draw comparative lessons between each other. Cities can obtain different levels of certification (from 'aspirational' to 'platinum') based on the number of indicators reported and verified according to ISO 37120.[8] The framework places emphasis on three areas in the ASUS framework: 'quality environment' (36 percent of indicators), 'health & well-being' (20 percent of indicators) and 'built infrastructure' (16 percent of indicators). Indicators included in the framework

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4 *Urban green growth in dynamic Asia*, Organisation for Economic Co-operation and Development, 2016.

5 *Ibid.*

6 *Urban Indicators for Managing Cities*, Asian Development Bank, 2001.

7 ISO 37120 briefing note: the first ISO International Standard on city indicators, *International Organisation for Standardisation*, 2014.

8 World Council on City Data, Created by Cities, for Cities, 2014.

require detailed data. For example, indicators include the number of fire related deaths, and availability of primary, secondary and tertiary wastewater treatment. To date, only two Southeast Asian cities (Hai Phong, Viet Nam and Makati, Philippines) have been certified.

- **UN Habitat III's City Prosperity Index (CPI) Initiative.** The CPI Initiative is a set of indicators developed by UN Habitat to measure urbanisation and progress towards meeting the goals set in the 2030 Development Agenda and the New Urban Agenda.[9] The CPI has similar focus areas to that of the WCCD ISO 37120 framework; over 36 percent of indicators measure performance in 'built infrastructure'; 16 percent in 'quality environment'; and 16 percent in 'health & well-being'. However, while the number of participating cities is large globally (400 in total), the CPI has limited reach in Southeast Asia - only four cities (Jakarta, Bangkok, Ha Noi and Ho Chi Minh City) have provided data for this initiative.[10]

II. KEY URBANISATION TRENDS IN ASEAN

An important starting point when trying to understand how to promote sustainable urbanisation in ASEAN cities is to examine the trends (at the global, regional, sub-regional, national, and sub-national levels) that are shaping urbanisation in the region. Based on a comprehensive review of the relevant literature and extensive consultation with policymakers, urbanisation practitioners and experts, the following eight trends were identified: 1) Urbanisation is rising (particularly in middleweight cities); 2) Cities are becoming increasingly independent; 3) Digital technologies are transforming cities and governments are increasingly turning to technology to manage and monitor their cities; 4) Economic growth is neither inclusive nor equally distributed; 5) Urban sprawl is creating concerns for congestion, economic efficiency, and cultural heritage; 6) The resource footprint of cities is expanding; 7) Increasing emphasis is placed on maintaining rule of law, including in relation to new threats such as cyber-security; and 8) Non-communicable diseases are becoming more prevalent amongst urban populations .

TREND 1: GROWTH OF URBANISATION

Over the next two decades, nearly all of the world's net population growth is expected to occur in urban areas, with about 1.4 million people added each week.[11] Today, half of the people in ASEAN live in urban areas, i.e. cities, and an additional 70 million more people are forecast to live in cities by 2025 (Exhibit 3).[12]

[9] *City Prosperity Initiative*, UN Habitat, 2014.

[10] *Ibid*.

[11] *World Urbanization Prospects: The 2018 Revision,* United Nations Department of Economic and Social Affairs, Population Division, 2018.

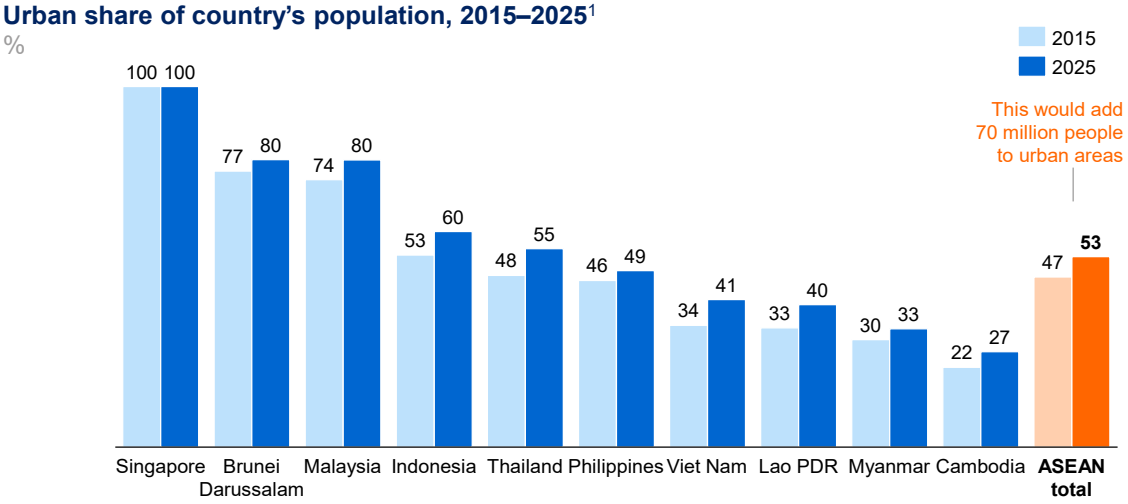
[12] *Ibid*.

EXHIBIT 3: GROWTH OF URBANISATION IN ASEAN

Growth of urbanisation

An additional 70 million people are expected to live in urban areas in ASEAN by 2025

Urban share of country's population, 2015–2025[1]



Increase in urban population, 2015-25
Million

1 Urban population refers to people living in urban areas as defined by national statistical offices.

SOURCE: United Nations Department of Economic and Social Affairs Population Division World Urbanization Prospects 2018; Team analysis

Economic growth is increasingly happening not only in mega-cities such as Jakarta, Manila and Bangkok, but also in middleweight regions, with a population between 500,000 and five million (Exhibit 4). Underpinning this growth of urban areas are three main factors, particularly prevalent for middleweight regions:

- **Cross-border trade and logistics.** Given its proximity to India, China, and Japan, ASEAN is well positioned to benefit from all types of global flows. By 2025 more than half of the world's consuming class will live within a five-hour flight of Myanmar.[13] Further supporting this growth are factors such as the ASEAN Economic Community (AEC) with its emphasis on promoting the free flow of goods, services, and investment among the AMS, and major trade deals with other countries outside ASEAN. Cities in middleweight regions which have benefited most are those on major maritime or land transit routes such as Cebu in the Philippines and Johor in Malaysia, as well as regions that benefit from cross-border trade, such as Khon Kaen and Chiang Rai in northern Thailand.

- **Economic clusters.** In ASEAN, there are more than 1,600 registered economic clusters (often also referred to as economic zones) of various types.[14] Examples include, Export Processing Zones (EPZs), Free Trade Zones (FTZs) and Business Process Outsourcing (BPO) which are flourishing across ASEAN. Most AMS have created Special Economic Zones (SEZ) (which refers to one or more industrial estates, EPZs, FTZs, tourism centres, economic zones and other industrial structures (e.g. a port) in a defined or demarcated

[13] Defined as households with more than US$7,500 in annual income (in 2005 purchasing power parity terms).

[14] *ASEAN Investment Report 2017 - Foreign Direct Investment and Economic Zones in ASEAN,* United Nations Conference on Trade and Development, 2017.

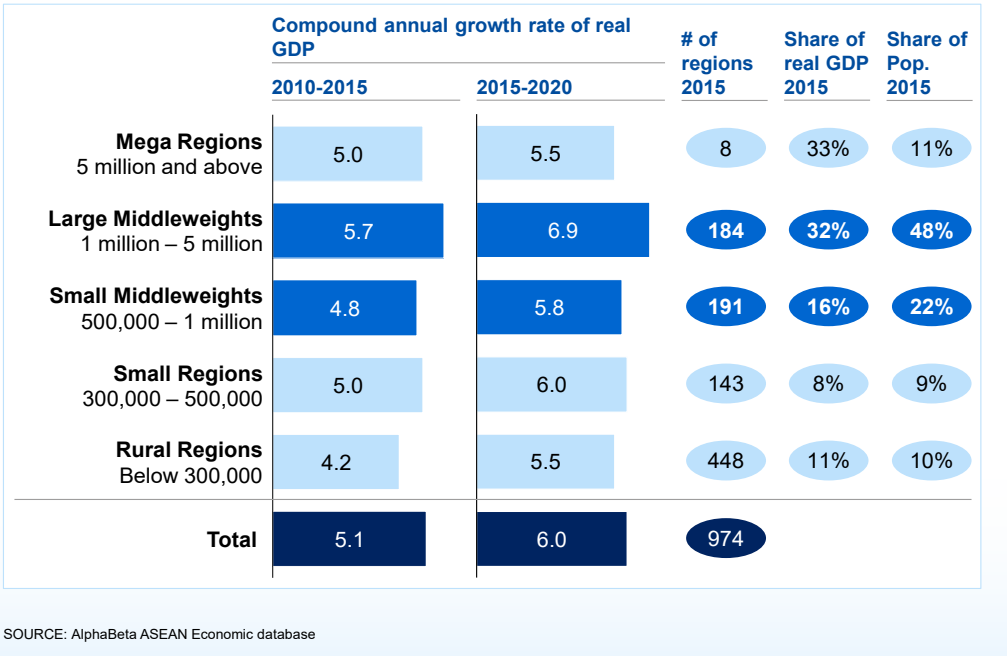
areas), over 70 in total as of December 2016.[15] Economic clusters have contributed to economic growth by driving exports and attracting Foreign Direct Investment (FDI). For example, in 2016, Cambodia, SEZs accounted for 13.5 percent of national exports, while in the Philippines, (mostly) foreign investment in Philippine Economic Zone Authority-registered economic zones amounted to US$ 4.6 billion, or 58 percent of total FDI.[16] Beyond the Philippines, which has achieved significant growth in BPO, other cities have also been supporting sub-regional growth in ASEAN, including the Batam FTZ (Singapore-Indonesia), the Southern Regional Industrial Estate (Thailand), the Tanjung Emas EPZ (Indonesia), the Port Klang Free Zone (Malaysia), the Thilawa SEZ (Myanmar), and the Than Thuan EPZ (Viet Nam).

- **Satellite region.** As the mega-cities of ASEAN become increasingly congested and the cost of living rises, cities in neighbouring regions which are in a commutable distance from these mega-cities are benefiting. These regions, known as satellite regions, include the likes of Bekasi and Tangerang in Indonesia, and Cavite and Bulacan in the Philippines.

EXHIBIT 4: ECONOMIC GROWTH BY SIZE OF REGION IN ASEAN

Growth of urbanisation

Middleweights, not mega regions, are growing the fastest in ASEAN



SOURCE: AlphaBeta ASEAN Economic database

TREND 2: INCREASING CITY AUTONOMY

'Decentralisation' refers to the process of conferring a degree of self-government to local authorities.[17] In Asia, rapid economic growth coupled with a growing urban middle class has led to increasing demand for additional government services which a centralised form of governance can find difficult to sustain. Consequently, many national governments are increasingly shifting the responsibility of public services to local city governments, granting

[15] *ASEAN Investment Report 2017 - Foreign Direct Investment and Economic Zones in ASEAN,* United Nations Conference on Trade and Development, 2017.

[16] *Ibid.*

[17] *Co-creating the urban future the agenda of metropolises, cities and territories*, United Cities and Local Governments, 2017.

increased autonomy.[18] If the degree of decentralisation were measured by sub-national governments' expenditure as a share of total expenditure, many Asian countries – particularly in East Asia – exhibit one of the highest levels of decentralisation.[19] For example, 70 percent of total expenditures are allocated at the sub-national level in China and 45 percent in Viet Nam – compared to only 36 percent in Australia and 9 percent in New Zealand.[20]

This trend is also noticeable in ASEAN where many national governments have endowed local governments with additional authority to manage the needs of their constituents:[21]

- **Cambodia.** Officials at the communal level are fully responsible for the delivery of public services, including having greater autonomy to decide the types of programmes to be implemented.[22]

- **Indonesia.** As a result of decentralisation reforms in 2001, local governments are now responsible for issues surrounding health, public works, agriculture, and labour.[23] This earned Indonesia the label of 'fast starter' in the World Bank's review of decentralisation in Asia.[24] In 2017, the World Bank approved a new financing fund, *The Regional Infrastructure Development Fund*, which allows sub-national governments to borrow funds for investments in infrastructure (e.g. sanitation, water supply, environment infrastructure, affordable housing).[25]

- **Lao PDR.** As part of the country's urban development strategy, the government enacted legislation in 2000 which decentralised governance to the sub-national level. District governments were given the autonomy to develop urban development plans, and villages have been given an expanded role of implementing these plans.[26]

- **Malaysia.** While most administrative functions are centralised in Malaysia, there has been increasing autonomy for state-level governments – particularly in Sabah and Sarawak. In recent years, local governments in these two states have been given increasing control over their revenues and administrative processes (e.g. education).[27]

- **Myanmar.** Since 2011, partially elected parliaments have been functioning in each region of Myanmar. These officials have partial control over budget allocations and service provision. Greater decision-making powers have also been granted to township authorities.[28]

- **Philippines.** The Local Government Code of 1991 transformed local governments into self-reliant communities and active partners in nation building. The code also endowed local government units with fiscal autonomy to decide on their budgets.[29]

- **Thailand.** Since the revision of the country's decentralisation act in 2003, local governments have become responsible for the delivery of services including infrastructure,

[18] *Decentralization and local democracy in the world*, World Bank, 2008; and Kioe Sheng Yap, *Good Urban Governance in Southeast Asia*, Environment and Urbanization Asia, 2010.

[19] *Fiscal Decentralization in Asia: Challenges and Opportunities*, Asian Development Bank, 2011.

[20] *Ibid.*

[21] Singapore and Brunei Darussalam were not included in this analysis as the former is a city-state. The majority of the population in Brunei Darussalam live in its capital.

[22] *The Rules of the Intergovernmental Game in East Asia: Decentralisation Frameworks and Processes,* World Bank, 2005.

[23] Hutchinson, *(De)centralization and the missing middle in Indonesia and Malaysia*, ISEAS Economics Working Paper, 2015.

[24] *Ibid.*

[25] *World Bank Approves New Financing to Support Infrastructure Development across Indonesia*, World Bank, 2017.

[26] *Urban Development Sector Assessment, Strategy, and Road Map*, Asian Development Bank, 2012.

[27] *Honouring Sabah's rights in MA63,* New Straits Times, 2018.

[28] *Fiscal decentralisation and national reconciliation in Myanmar*, International Growth Centre, 2016.

[29] *Fiscal Decentralisation in the Philippines* Asian Development Bank, 2012.

health and hygiene, education, economic productivity, culture and nature, and security and safety of the community.[30]

- **Viet Nam.** Administrative reforms since 1986 have handed over regulatory control to sub-national governments.[31] By the mid-2000s, state budget, investment, land and resource management and planning management, and public services were under the purview of sub-national government agencies.[32]

As a result of decentralisation and increasing autonomy of cities, there has been greater emphasis on promoting city networks with a view of directly engaging city leaders as the main stakeholders. The ASEAN Mayors Forum[33], the ASEAN Initiative on Environmentally Sustainable Cities (AIESC)[34], and the recently announced ASCN, are just some programmes that focus on engaging cities directly.

TREND 3: EMERGENCE OF DIGITAL TECHNOLOGIES TO TRANSFORM CITIES

The impact of digital technologies is significant across ASEAN. According to the McKinsey Global Institute (MGI), disruptive technologies (particularly Mobile Internet, big data, cloud technology, the Internet of Things, and the automation of knowledge work), have the potential to generate between US$220-US$625 billion in annual economic impact in ASEAN by 2030.[35] On the downside, such technologies are estimated to potentially displace 12-17 million non-farm jobs in ASEAN from 2015 to 2030.[36] Cities are typically at the frontier of new technology adoption given that their economies of scale allow providers to pilot new technology cost effectively (e.g. rolling out of fibre wire broadband or mobile data networks is more cost effective in dense population centres due to high fixed infrastructure costs). Past research has identified several major business opportunities linked to technology being applied to sustainability issues in cities; for Asia combined, the biggest opportunities include affordable housing (US$1 trillion), energy efficiency in buildings (US$770 billion), and electric and hybrid vehicles (US$320 billion).[37]

Local governments are increasingly leveraging technologies. As cities get larger and more populous, previous operating processes – especially manual delivery and monitoring of city services – are no longer administratively or financially feasible. Governments are starting to recognise the role of information and communications technology to meet the needs of urban residents in an economical and socially inclusive manner.[38]

Several technological innovations have been widely adopted by ASEAN cities:

- **Cloud computing.** Cloud computing, which refers to the provision of remote computing power as a service, offers city governments a significant opportunity to reduce cost and optimise city services. Cloud computing could hold the potential to tackle key challenges in ASEAN cities, such as congestion (discussed later in this chapter). For example, Alicloud announced that it will be working with the city of Kuala Lumpur to deploy 'City

[30] Huttaya Poodee, *Decentralization and Local Economic Development: Case of Northeast, Thailand*, Graduate School of Public Policy, University of Tokyo, 2015.

[31] Anh Vu Thanh Tu, *Vietnam: Decentralization Amidst Fragmentation*, Journal of Southeast Asian Economics, 2016.

[32] Ibid.

[33] Information available at: http://www.aseanmayorsforum2017.com/

[34] Information available at: http://environment.asean.org/awgesc/

[35] *Southeast Asia at the crossroads: Three paths to prosperity*, McKinsey Global Institute, 2014.

[36] *No Ordinary Disruption: The Forces Reshaping Asia*, McKinsey Global Institute, 2015.

[37] *Valuing the SDG prize in cities*, Business & Sustainable Development Commission, 2017.

[38] *Sustainable Urbanisation*, Booz & Company, 2010.

Brain', a cloud-based traffic management system. The system will support municipal officials to make live traffic predictions, optimise traffic flow and detect traffic incidents.[39]

- **Internet of Things (IoT).** IoT refers to networks of sensors and actuators embedded in machines and other physical objects that connect with one another and the Internet. Open standard protocols (e.g. HTTP and IP) are allowing previously siloed datasets to be used in tandem with each other. This supports better monitoring of cities. IoT spending in the region is expected to grow by 34 percent annually, from an estimated US$10 billion in 2014 to US$58 billion by 2020.[40] IoT has been applied across a range of applications in ASEAN cities, including waste management, detection of water leakage, and efficient public transportation. For example, Thailand's water authority has implemented a state-of-the-art system to monitor and consolidate data across all of its regional water systems to track supply, losses, customer use, and water levels during flooding. It relies on IoT to capture real-time data and uses big data analytics to synthesize the information and shape their responses in real-time.[41] In Singapore, dynamic electronic road pricing makes use of Radio-frequency Identification (RFID) technology to identify bottlenecks and raise congestion pricing for vehicles.[42]

- **Open data.** Open data refers to data that is freely and publicly accessible (i.e. a wide range of users is permitted to access the data), machine readable (i.e. the data can be processed automatically), low cost (i.e. data can be accessed free or at negligible cost), and flexible (i.e. limitations on the use, transformation, and distribution of data are minimal). Open data has generated a great deal of excitement around the world for its potential to empower citizens, change how government works, and improve the delivery of public services. At a global level, open data can help unlock US$3-US$5 trillion in economic value annually across seven sectors.[43] AMS are actively providing open data portals; at present, Indonesia, Malaysia, Philippines, Singapore, Thailand and Viet Nam have portals with several thousand indicators and datasets. Some cities – including Bandar Aceh, Bandung and Jakarta – have also launched their own separate open data portals.[44] The Open Data for Resilience Initiative trains stakeholders to use open data to understand the status of existing infrastructure and demographics to adapt to climate change mitigate flood risk.[45] Urban communities have a crucial role to play in collecting, building, refreshing and disseminating open data.

- **Big data analytics.** Big data refers to data sets of a size beyond the ability for a typical database software tools to capture, store, manage, and analyse.[46] By 2020 an estimated 1.7 megabytes of information will be created per second for every human on the planet.[47] ASEAN cities are harnessing these datasets and analytics to improve the efficiency of city operations and public services. For example, the World Bank worked with the Philippine government to develop an open-source platform which collected and analysed traffic speed data from taxi drivers in Cebu to optimise traffic flows in the city. This programme has been expanded to other ASEAN cities through partnerships with ride-sharing company, GrabTaxi.[48] Cities across ASEAN are also examining ways to

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[39] *Alibaba is reshaping city traffic with artificial intelligence*, Quartz, 2018.

[40] *Rapid growth of connected devices expected to drive adoption of Internet of Things (IoT) in Asia Pacific*, Frost & Sullivan, 2014.

[41] *Thailand's water authority to join up all data across three provinces*, FutureGov, 2014 and, *AGT International helps Hydro & Agro Informatics Institute of Thailand develop advanced flood management system,* AGT International, 2012.

[42] See Singapore Land Transport Authority website and Ministry of Transport website.

[43] *Open data: Unlocking innovation and performance with liquid information*, McKinsey Global Institute, 2013.

[44] Bhunia, Priyankar, *Brief look at Open Government Data in 6 ASEAN Countries*, 2017.

[45] Information available at: https://opendri.org/

[46] This incorporates a moving definition of how big a data set needs to be in order to be considered big data — a number that varies by sector, depending on what software tools and sizes of data sets are common in an industry, and over time as technology advances. See *Big data: The next frontier for innovation, competition, and productivity*, McKinsey Global Institute, June 2011.

[47] *Big Data: 20 Mind-Boggling Facts Everyone Must Read*, Forbes, 2015.

[48] *Open Traffic Data to Revolutionise Transport*, World Bank, 2016

use consumption data to develop smart electricity grids which improve the reliability and distribution of electricity.[49]

Exhibit 5 provides some additional, country specific examples of how ASEAN governments are integrating digital technologies across their cities.

EXHIBIT 5: EXAMPLES OF CITY LEVEL APPLICATIONS OF DIGITAL TECHNOLOGIES IN ASEAN

Emergence of digital technologies

Governments across Southeast Asia are integrating digital technologies across their cities

Country	City	City level actions
	Bandar Seri Begawan, Brunei Darussalam	Working with Ericsson to pilot 5G and IoT – with full deployment expected by 2021
	Phnom Penh, Cambodia	ICT Federation of Cambodia is constructing a SMART town near Phnom Penh. The new town will make use of ICT in various aspects in order to boost performance and convenience, optimise resource consumption, and actively connect with citizens
	Jakarta, Indonesia	Jakarta Smart City program aims to transform Jakarta into a more transparent and liveable city. Recently the local government introduced a programme developed by QLUE to receive and process complaints from the public as well as to monitor the work of civil servants
	Vientiane, Lao PDR	Introduced connected CCTV system and connected household electricity meter system in Vientiane
	Kuala Lumpur, Malaysia	Malaysia Digital Economy Corporation has promoted IoT through a partnership with LoRa alliance to improve low-power Wide Area Network (WAN) in the Klang valley
	Yangon, Myanmar	Introduced the Yangon Payment System in 2017 which will standardise payment methods on public transport. The card system will help Yangon Region Transport Authority to ensure better bus services for the public
	Clark City, Philippines	Clark Green City is being developed as a smart city; aside from spatial planning, the city is in the midst of developing disaster resilience mechanisms
	Singapore	Singapore's Smart Nation initiative includes plans to develop a national digital identity, e-payments, Smart Nation Sensor platforms, Smart urban mobility, and bundling of digital government services
	Phuket, Thailand	Phuket has been designated to be part of Thailand's Smart Cities programme; Some of the projects underway include smart transportation systems, smart surveillance systems, and a big data operations centre
	Da Nang, Viet Nam	Da Nang aims to be the first smart city of Vietnam by 2025, and has collaborated with IBM in their "IBM Smarter Cities" programme to develop smart city infrastructure to address issues such as air control, water management, waste management, energy, and disaster warning

SOURCE: Desktop research; Team analysis

TREND 4: INEQUALITY AND NON-INCLUSIVE GROWTH

While cities have been engines of growth, the benefits of this growth have not been shared equitably. In many Asian cities, including in Southeast Asia, income inequality has risen and is often higher than in rural areas.[50] For example, a recent ADB report found that urban inequality has been consistently higher than rural inequality in Indonesia for the past 30 years (1990-2010).[51] This is not limited to only large cities, several middleweight cities have a higher level of inequality than their capitals. For example, the Gini-coefficient in secondary cities like Chiang Mai (0.58) and Davao City (0.44) are higher than their respective capitals, Bangkok (0.48) and Manila (0.40).[52]

The prevalence of urban poverty and inequality has several implications for cities in ASEAN:

[49] Nuaimi et. al., *Applications of Big Data to Smart Cities*, Journal of Internet Services and Applications, 2015.

[50] *The State of Asian Cities*, United Nations Habitat, 2010.

[51] *Inequality in Asia and the Pacific: Trends, Drivers, and Policy Implications*, Asian Development Bank, 2014.

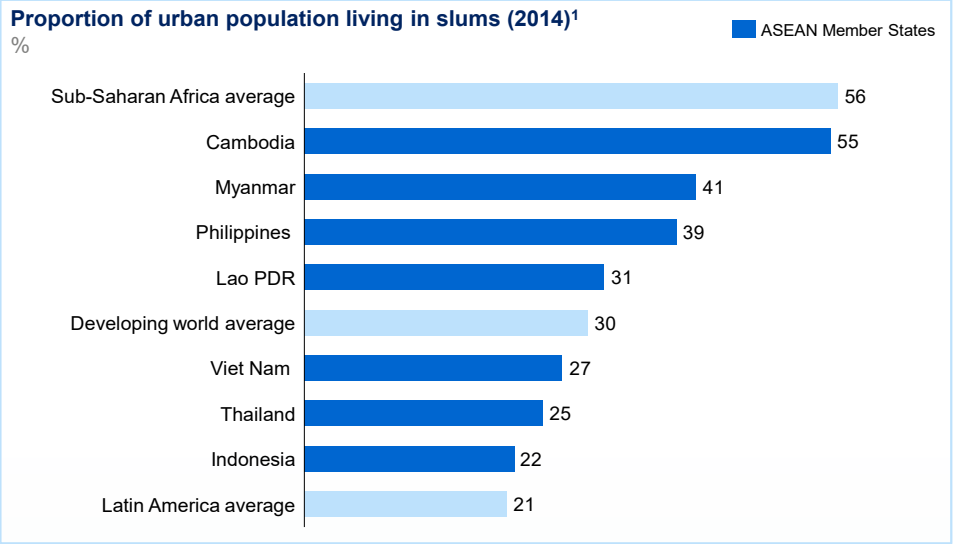
[52] *Urban Poverty in Asia*, Asian Development Bank, 2014. The Gini coefficient is a conventional measure for assessing inequalities in a given city/ country. A higher coefficient indicates a wider disparity between income groups and a lower coefficient indicates a lower income disparity between income groups within the population.

- **Spread of slums and informal settlements.** As a result of rapid rural migration, local governments can struggle with supplying sufficient infrastructure, housing and public services resulting in financial and access problems for urban migrants.[53] This has resulted in the expansion of slums and/or informal settlements in and around cities. According to the World Bank, the Asia-Pacific (APAC) region has the largest slum populations in the world at 250 million people.[54] In ASEAN, between 22-55 percent of the urban population live in slums (Exhibit 6). As a result of these informal settlements, the urban poor often do not have access to water and sanitation – with almost 27 percent of people in ASEAN not having access to improved sanitation facilities.[55] Aside from the prevalence of water borne diseases (e.g. cholera, typhoid), studies have shown that health outcomes associated with such living conditions lead to high infant and child mortality rates.[56]

EXHIBIT 6: URBAN SLUM POPULATION IN ASEAN

Inequality and non-inclusive growth

The urban slum population in several ASEAN Member States is higher than the developing world average



1 Data for Singapore, Malaysia and Brunei Darussalam were not reported by UN Habitat.

SOURCE: UN Habitat; Team analysis

- **Informal employment.** The urban poor also hold inadequate and unstable sources of income. The share of informal jobs as percentage of employment across sectors lies at over 70 percent in Viet Nam, over 80 percent in Indonesia and Myanmar, and over 90 percent in Cambodia.[57] A large majority of the work has a high risk of injury – which could prevent them from earning an income. This situation is compounded by gender discrimination in labour markets.[58]

- **Financial exclusion.** According to the World Bank, financial inclusion in ASEAN is approximately 50 percent of the population – much lower than the APAC average of

[53] *Urbanisation, rural–urban migration and urban poverty*, International Institute for Environment and Development, 2015.

[54] *East Asia, Pacific have most slum dwellers*, The Straits Times, 2017.

[55] *ASEAN Social Progress,* ASEAN Statistics Office, 2017.

[56] *Health and health-related indicators in slum, rural, and urban communities: a comparative analysis*, Global Health Action, 2016.

[57] Based on latest available figures reported in *World Employment and Social Outlook: Trends 2018*, ILO, 2018.

[58] *Urbanisation, rural–urban migration and urban poverty*, International Institute for Environment and Development, 2015.

70 percent.[59] There are potential upsides from increasing financial inclusion. Based on 2014 estimates, according to the MGI, MSMEs and individuals in emerging South East Asia, had the opportunity to obtain US$295 billion in new loans from leveraging digital financial services to their full potential.[60] Further, leakages in public spending and payment collection emerging South East Asia could be reduced by US$10 billion.

- **Gender inequality.** Many women in ASEAN cities work in low paid and insecure jobs in the informal sector.[61] Women also face gaps in terms of access to financial services. In Southeast Asia, the MGI estimates that 49 percent of women are excluded from financial services, increasing their risk of falling below the poverty line.[62]

TREND 5: CONGESTION DRIVEN BY URBAN SPRAWL

Rapid urbanisation in ASEAN has led to a large share of urban growth involving unplanned, unstructured expansion, with high rates of car use. The uncontrolled expansion of urban development is characterised by low density, segregated land use and insufficient infrastructure, i.e. urban sprawl. While many AMS have advanced legislation on regional planning designed to limit urban sprawl, the implementation of these laws is challenging due to rapid growth and poor enforcement mechanisms.[63] Loose land use controls bring about several challenges such as the risk of destruction of cultural heritage in cities. In a speech in 1995, Singapore's founding father, Lee Kuan Yew, reflected: 'In our rush to rebuild Singapore, we knocked down many old and quaint Singapore buildings. Then we realised we were destroying a valuable part of our cultural heritage.'[64]

One of the major implications of urban sprawl is that it can lead to insufficient supply of public transport infrastructure. As a result, a substantial proportion of people in ASEAN cities rely on personal vehicles to commute. Recent research found that passenger car sales in ASEAN outpaced all other regions in the world, growing at an estimated 8 percent in 2017. [65] This growth was close to 19 percent in Cambodia, the Philippines, and Viet Nam.[66] However, the surge in the number of cars has not been met with adequate transport infrastructure, leading to growing congestion woes in ASEAN. The average number of hours that a commuter spends in traffic per annum in Bangkok and Jakarta is estimated to be 64 and 63 hours respectively.[67] Congestion is also affecting smaller cities like Bandung and Chiang Mai, which are now experiencing longer commuting times. There is a significant economic cost to this. The ADB estimates that road congestion costs Asian economies 2-5 percent of their gross domestic product (GDP) every year due to lost time and higher transport cost.[68] For example, total time-related cost of commuting in Indonesian cities is currently estimated at IDR 498 trillion (US$37 billion) per year and could increase by over 41 percent in 2020.[69] New business models supported by technology can help alleviate the

[59] *Financial Inclusion in ASEAN - Presentation for the ASEAN Working Group on Financial Inclusion*, World Bank, 2016.

[60] *Digital Finance for All: Powering Inclusive Growth in Emerging Economies,* McKinsey Global Institute, 2016.

[61] *Urban poverty in Asi*a, Asian Development Bank, 2015.

[62] Anu Madgavkar, *Power of parity: Gender equality across ASEAN,* The Straits Times, 2017; and *The power of parity: How advancing women's equality can add $12 trillion to global growth*, McKinsey Global Institute, 2015.

[63] *Sustainable urban infrastructure transitions in the ASEAN region: a resource perspective*, United Nation Environment Programme, 2018.

[64] *Speech by the Senior Minister at the world travel and tourism council's dinner on Monday 13 March 1995 at the Shangri-La hotel,* National Archives, 2013.

[65] *Booming Southeast Asian vehicle sales drive urban congestion*, Nikkei Asian Review, 2017.

[66] *Ibid.*

[67] *Global Traffic Scorecard 2017*, INRIX, 2017.

[68] *Urban Transport*, Asian Development Bank. Accessed: https://www.adb.org/sectors/transport/key-priorities/urban-transport

[69] *Rethinking urban mobility in Indonesia*, AlphaBeta, 2017.

congestion challenge. For example, shared mobility solutions are estimated to potentially reduce travel times by 10 percent on average across Indonesian cities.[70]

TREND 6: INCREASING RESOURCE FOOTPRINT OF CITIES

Another trend in urbanisation in ASEAN and globally has been the increasing resource footprint of cities. It is estimated that by 2025, the amount of waste volume from AMS will increase by 150 percent from 1995 levels.[71] Cities occupy only 3 percent of the world's land but consume 75 percent of natural resources, producing 50 percent of all waste and up to 80 percent of all greenhouse gas (GHG) emissions.[72] Urbanisation could annually consume an estimated two million hectares of land globally (equivalent to four times the size of the island of Bali) with about three-quarters of that being agricultural land.[73] Some of the implications include:

- **Greenhouse gases (GHG).** According to the International Energy Agency (IEA), GHG emissions in Asia (excluding China) increased by 210 percent between 1990 to 2015.[74] In the case of ASEAN, while the urban population has grown by around 3 percent annually, the rate of carbon dioxide (CO2) emissions have increased by 6.1 percent annually.[75] This has been spurred by urban consumption of energy in transport and residential activities.[76] Energy demand in ASEAN is expected to increase even further – from 427-653 million tonnes of oil equivalent (MTOE) by 2025.[77] Moreover, while AMS have made commitments to have 23 percent share of its energy demands supplied by renewable energy, the current share was only 13.6 percent in 2015. [78] It is estimated that US$17 billion in investments will be needed annually in order for ASEAN to achieve its 2025 targets.[79]

- **Waste management.** According to the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), waste generation in the APAC region will more than double, from 1 million tonnes per day in 2012 to around 2.5 million tonnes per day by 2025.[80] Combining this with the United Nations Environment Programme (UNEP) estimate of per capita Municipal Solid Waste (MSW) generation in ASEAN, which is 1.14 kg per capita per day, means ASEAN is generating at least four times the APAC average of waste per person per day.[81] Further, 5 AMS are ranked amongst the top 20 countries by mass of mismanaged plastic waste in 2010, contributing around 28 percent of global annual plastic marine debris.[82] There are financial burdens that result from this, at present, cities are spending between 20-30 percent of their city's budget on waste collection and management.[83] Moreover, even though a large portion of a city's budget is spent on waste management, recycling rates are low. For example, in Quy Nhon (Viet

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[70] *Rethinking urban mobility in Indonesia*, AlphaBeta, 2017.

[71] *Report of ASEAN regional assessment of MDG achievement & post-2015*. United Nations Development Programme, 2015.

[72] *Urbanization and sustainable development in Asia and the Pacific: linkages and policy implications*, United Nations (UN) Economic and Social Commission for Asia and the Pacific, 2016.

[73] Shlomo Angel, Stephen C. Sheppard, and Daniel L. Civco, *The dynamics of global urban expansion*, World Bank, 2005.

[74] International Energy Agency, The Climate Change-Energy Challenge, 2017.

[75] *The effects of urbanization on energy consumption and greenhouse gas emissions in ASEAN countries: Decomposition analysis*, Karlsruhe Institute of Technology, 2017.

[76] *Ibid.*

[77] *The 5th ASEAN Energy Outlook (2015-2040)*, ASEAN Secretariat, 2017.

[78] *Ibid.*

[79] *Ibid.*

[80] *Waste in Asia: Valuing waste, transforming cities*, United Nations (UN) Economic and Social Commission for Asia and the Pacific, 2015.

[81] *Waste Management in ASEAN Countries*, United Nations Environment Programme, 2017.

[82] Jambeck et al., *Plastic waste inputs from land into the ocean*, Science, 2015.

[83] *Waste in Asia: Valuing waste, transforming cities*, United Nations (UN) Economic and Social Commission for Asia and the Pacific, 2015.

Nam), the city only has the capacity to convert 1 percent of its waste generated daily.[84] Even Singapore, a leading city in waste management, only recycles 61 percent of its waste.[85]

- **Climate change.** Many Asian cities are also highly exposed to natural disasters and environmental concerns, particularly rising sea levels as a result of climate change. Climate Central identified that four in five people living in areas that will eventually be flooded at 3 degrees Celsius of global warming, because of rising sea-levels, live in Asia.[86] Cities in ASEAN are particularly at risk. For instance, Jakarta is sinking faster than any other major city on the planet.[87]

TREND 7: EMERGENCE OF NEW PRIORITIES SURROUNDING CRIME AND THE RULE OF LAW

'Rule of law' refers to a principle of governance in which people and public institutions are accountable under clearly publicised laws.[88] Weak rule of law has been identified by the UN as one of the major threats to social and economic growth as well as the realisation of the Sustainable Development Goals.[89] Key to ensuring a strong rule of law is ensuring a reliable and transparent judiciary, and effective public administration to regulate and enforce laws.[90]

A 2013 United Nations Office on Drugs and Crime (UNODC) study on transnational organised crime in East Asia and the Pacific estimated that the value of crime flows in the region was US$90 billion annually. Urbanised areas are particularly at risk due to high income inequality and poverty – both factors have been linked to higher robbery and homicide rates.[91] For example, a study of crime in Malaysia found that crime rates per capita were higher in dense, urbanised areas (like Kuala Lumpur, Johor, Penang) than in less dense ones (e.g. Sabah).[92] The threat of crime reducing rule of law is compounded by the threat of terrorism in the region. This adds additional challenges to ensure safety in densely populated areas. This task will become even more daunting as another 70 million people are expected to move into urban areas by 2025. Cities in ASEAN are stepping up efforts to address this concern by increasing the number of police officers, and cooperation on trans-national crime and terrorism.[93]

Rapid digitisation in cities has increased the threat of cyber-security crimes. These crimes tend to target the confidentiality, integrity, and availability of data, and exacerbates traditional trans-border crimes, such as human trafficking, drug dealing, and piracy. There have been several instances of cyber-attacks in various AMS. For example, in 2017, personal data of 850 account holders were stolen from the Singapore's Ministry of Defence's online database.[94] Similarly, 68 Philippine government websites were hacked simultaneously in 2016.[95]A

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[84] *Waste in Asia: Valuing waste, transforming cities*, United Nations (UN) Economic and Social Commission for Asia and the Pacific, 2015.

[85] See National Environment Agency of Singapore website for more information.

[86] The three-degree world: The cities that will be drowned by global warming, The Guardian, 2017.

[87] *Jakarta Is Sinking So Fast, It Could End Up Underwater,* New York Times, 2017.

[88] *What is the Rule of Law?,* World Justice Project, 2015.

[89] *Remarks at the Bangkok Dialogue on the Rule of Law: Investing in the Rule of Law, Justice and Security for the Post 2015 Development Agenda*, United Nations Office on Drugs and Crime, 2013.

[90] *Ibid.*

[91] *Crime, Violence, and Inequitable Development*, World Bank, 2000.

[92] Mazlan Bin and Che Soh, *Crime and Urbanization: Revisited Malaysian Case*, Social and Behaviour Science, 2012.

[93] *What did ASEAN latest transnational crime meeting achieve*, The Diplomat, 2017; *Philippine police raising budget to deal with crime fears*, The Straits Times, 2015; *and Malaysia steps up security to combat terror threats,* Today, 2017.

[94] *Cyber-risk in Asia Pacific: The case for greater transparency*, Marsh & McLennan, 2017.

[95] *Ibid.*

recent report by Microsoft found that the Asia Pacific region was among the most vulnerable to malware threats, with encounter rates (i.e. the percentage of computers running Microsoft real-time security products that report a malware encounter) across ASEAN were twice the global average.[96] Furthermore, most people in the region are not fully aware of cyber-risks – a recent survey found that 78 percent of internet users in Southeast Asia have not received any formal education on cyber-security.[97]

TREND 8: EMERGENCE OF NON-COMMUNICABLE DISEASES

As highlighted in Trend 6, cities are the primary driver of GHG emissions. Emissions from industrial activity and transportation also have a profound impact on the health of the people living in cities. Urban air pollution is projected to become the top environmental cause of premature mortality by 2050.[98] Due to manufacturing and other industrial activities, Asian countries have some of the highest reported concentrations of air pollutants like PM2.5 and PM10, ozone, sulphur dioxide.[99] According to the World Health Organization (WHO) Global Urban Ambient Air Pollution Database, Southeast Asia had the highest urban ambient air pollution levels worldwide in 2016, with annual mean levels often exceeding 5-10 times WHO limits.[100] Prolonged exposure to these pollutants has been linked to illnesses such as cancer, asthma and bronchitis.

The change in lifestyle in urban living has also affected the health of the urban population. Cities suffer from a rising proportion of adults with obesity and elevated stress levels:

- **Obesity.** The prevalence of obesity in cities is three to four times the rate in rural areas and has been attributed to changes in diets and lack of exercise.[101] Obesity has been associated with many non-communicable diseases, including colorectal cancer, type 2 diabetes, hypertension, coronary heart disease and stroke. In Southeast Asia, the growth in urban living has also increased the incidence rate of obesity across the region. For instance, those living in an urban environment in Malaysia or the Philippines are 1.29 times more likely to suffer from obesity, relative to someone living in a rural environment.[102] Similarly, people living in an urban environment in Viet Nam and Lao PDR were 3.36 times more likely to be obese, relative to those living in rural areas. Aside from ailing health, obesity drains government resources; it is estimated that ASEAN governments spend as much as 19 percent of healthcare spending to combat the prevalence of obesity.[103]

- **Urban stress.** Even though healthcare services and socioeconomic conditions are generally better in cities than in rural areas, research has shown that people in cities suffer from more stress – reducing their quality of life.[104] Social stress is derived from a range of factors, including income disparities, noise, pollution and living in densely populated areas, and leads to several disorders including anxiety and depression. These disorders have been shown to be more prevalent among urban adults than those living in rural areas.

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[96] *Asia Pacific countries among the most vulnerable to malware threats*, Microsoft, 2017.

[97] *Cyber-risk in Asia Pacific: The case for greater transparency*, Marsh & McLennan, 2017.

[98] *Green Growth Cities: Conceptual Frameworks*, Organisation for Economic Co-operation and Development, 2014.

[99] *Ibid.*

[100] *WHO Global Urban Ambient Air Pollution Database*, World Health Organization, 2016.

[101] *How the world could better fight obesity*, McKinsey Global Institute, November 2014.

[102] *Tackling obesity in ASEAN Prevalence, impact, and guidance on interventions*, Economist Intelligence Unit, 2017.

[103] *Ibid.*

[104] Srivastava Kalpana, *Urbanization and mental health*, Industrial Psychiatry Journal, 2009.

III. IMPLICATIONS ON SUSTAINABLE URBANISATION FOR CITIES IN ASEAN

The trends identified have several implications for sustainable urbanisation across cities in ASEAN based on the six areas of the ASUS framework (Exhibit 7).

EXHIBIT 7: ALIGNMENT OF URBANISATION TRENDS AND 6 AREAS OF SUSTAINABLE URBANISATION IN ASEAN

These trends have varying degrees of impact on the areas of sustainable urbanisation

Impact[1] ✓ High ✓ Not high

Key trends		Sustainable urbanisation areas					
		Civic & social	Health & well-being	Security	Quality environment	Built infra-structure	Industry & innovation
1.	Growth of urbanisation	✓	✓	✓	✓	✓	✓
2.	Increasing city autonomy	✓	✓	✓	✓	✓	✓
3.	Technology adoption	✓	✓	✓	✓	✓	✓
4.	Inequality and non-inclusive growth	✓	✓	✓	✓	✓	✓
5.	Congestion driven by urban sprawl	✓	✓	✓	✓	✓	✓
6.	Increasing resource footprint of cities	✓	✓	✓	✓	✓	✓
7.	New priorities surrounding crime and the rule of law	✓	✓	✓	✓	✓	✓
8.	Emergence of non-communicable diseases	✓	✓	✓	✓	✓	✓

1. Areas were scored 'high' if half or more of the sub-areas were affected by the trend, and 'not high' if less than half of the sub-areas were affected. The impact on each sub-area was based on expert interviews and academic literature.

SOURCE: UN Habitat; Team analysis

- **Civic & social.** Continued urbanisation coupled with increasing autonomy of the local government increases pressure to manage social cohesion and address income inequality between recent migrants and existing city residents. Technological innovation creates an opportunity for cities to design programmes that could better target and deliver support to marginalised groups e.g. conditional cash transfers programmes through mobile wallets.[105] The rapid expansion of cities has also added additional pressure for local governments to preserve their cultural and heritage sites – which could be a boost for tourism.

- **Health & well-being.** Rapid urbanisation adds strain on the existing healthcare infrastructure in cities. Ensuring that healthcare facilities are adequate and well-spaced are some of the key challenges to manage additional health risks (i.e. obesity and stress), city population growth, and the geographical expansion of cities.

- **Security.** Increasing risks to maintaining the rule of law (such as cyber-security) will place additional demands on local governments and in many cases, will require new skillsets.

[105] Nuaimi et. al., *Applications of Big Data to Smart Cities*, Journal of Internet Services and Applications, 2015.

- **Quality environment.** The increasing environmental footprint of cities coupled with mounting health concerns increases the pressure for local governments to explore mechanisms and processes to maintain a cleaner environment through better management of air and water pollution (e.g. through stricter emissions codes and emissions monitoring system) and infrastructure to treat solid and liquid waste (e.g. increasing the number of sanitation facilities and landfills).[106] Technological innovations, including wireless sensing, could also provide new solutions for governments to better manage their waste (e.g. using wireless sensors to monitor the level of waste in bins) and deliver access of utilities for a larger share of the city's population.[107]

- **Built infrastructure.** Rapid population growth in cities will increase the importance for cities to have better planning and land-use allocation, i.e. ensuring that informal settlements do not expand further and that green spaces are maintained. There is also an opportunity for local governments to 'leapfrog' development phases through technological innovations in urban planning (such as Geographic Information Systems planning) – which help governments develop more precise spatial mapping of their cities to reduce urban sprawl and congestion woes (e.g. Alicloud's City Brain).

- **Industry & innovation.** The economic growth of cities has led to rising inequality and marginalisation of some groups in society. There is an opportunity for governments to address this through supporting entrepreneurship (among other levers). This is particularly important since over 96 percent of all enterprises in ASEAN are Micro Small and Medium Enterprises (MSMEs) and hire over 68 percent of all working adults across the region.[108] Concerns over inequitable economic growth also increases pressure to enhance the workforce to promote quality employment and ensure that the skills of the workforce remain relevant.

[106] Yuen Belinda and Leong Kong, *Climate Change and Urban Planning in Southeast Asia*, Fifth Urban Research Symposium, 2009.

[107] Omar et al., *Implementation of spatial smart waste management system in Malaysia*, Earth and Environmental Sciences, 2016.

[108] *Asia SME Finance Monitor*, Asian Development Bank, 2014.

2. STOCKTAKE OF EXISTING ACTIONS IN ASEAN TO PROMOTE SUSTAINABLE URBANISATION

2. STOCKTAKE OF EXISTING ACTIONS IN ASEAN TO PROMOTE SUSTAINABLE URBANISATION

A comprehensive assessment of the different actions supporting urbanisation across ASEAN was conducted, drawing on extensive desktop research, analysis of Dialogue Partners and other External Partners (DPs and OEPs) and Multilateral Development Bank programmes, existing city-based networks, and interviews with key stakeholders.[109] The analysis examined the focus of existing actions, the lessons learnt from their experiences to date (e.g. barriers to impact), and the opportunities to build on their efforts in the ASUS (e.g. expanding existing network coverage of cities, or topic coverage).

I. EXISTING SUSTAINABLE URBANISATION ACTIONS IN ASEAN

Sustainable urbanisation actions in ASEAN can be classified based on their geographical coverage and the sustainable urbanisation areas covered. In terms of geographical coverage, existing actions can be classified into five broad groups (see Exhibit 8 for some examples):

- **Global / Asia:** The project, programme or initiative is being implemented at a global or Asia/APAC level, meaning several cities across the globe or region are participating in it, applying the same approaches or using the same technical assistance. For example, the SWITCH-in Asia programme led by the United Nations Educational, Scientific and Cultural Organization (UNESCO), aims to design sustainable concepts to manage water in many cities across Asia, including in Cambodia, Indonesia, Philippines, and Viet Nam by carrying out research, constructing demonstration sites, and building capacity and awareness.[110]

- **ASEAN:** The project, programme or initiative is being implemented at an ASEAN level, meaning either it is an ASEAN-led initiative, such as the ASEAN Initiative on Environmentally Sustainable Cities (AIESC), or a multilateral effort with the same partner organisation that targets a sizeable number of ASEAN Member States (AMS) or cities across ASEAN, utilising similar approaches and technical assistance, such as the Australia-Asia Programme to Combat Trafficking in Persons.

- **Sub-regional:** Projects, programmes or initiatives are classified as sub-regional if their efforts are limited to ASEAN, but only focus on a subset of AMS. For example, the Green Cities Initiative for the Brunei Darussalam-Indonesia-Malaysia-Philippines East ASEAN Growth Area (BIMP-EAGA)[111], is classified under sub-regional, being active in all four countries of the sub-region, and all areas of sustainable urbanisation except for health & well-being and security – the action has a wide scope, aiming to achieve smart, green and liveable cities and attain sustainable urban development through the adoption of Green City Action Plans.[112]

[109] 'Actions' refers to the various urban-focused initiatives, programmes, and projects that have been implemented, or are in the process of implementation across ASEAN cities.

[110] See SWITCH-in-Asia: Sustainable Water Management in Asian Cities website for additional information.

[111] BIMP-EAGA stands for The Brunei Darussalam Indonesia Malaysia Philippines - East ASEAN Growth Area.

[112] *The Green Cities initiative for BIMP-EAGA,* Asian Development Bank, 2016.

- **National:** Projects, programmes or initiatives coordinated at the national government level (i.e. national ministries), unique to an individual AMS and covers multiple cities. For example, the World Bank and Asia Infrastructure Investment Bank (AIIB) support the National Slum Upgrading Project (KOTAKU) in Indonesia which improves access to urban infrastructure and services in targeted slums.

- **Sub-national:** Projects, programmes or initiatives are classified as sub-national if their efforts are limited to one AMS but are either locally administered (i.e. not by national agencies), and/or are exclusive to a subset of cities in that country. For example, the Sunway Smart and Low Carbon Township action is classified as a sub-national action, since it is carried out only in Sunway City, Kuala Lumpur.[113]

EXHIBIT 8: EXAMPLES OF EXISTING ACTIONS AT DIFFERENT GEOGRAPHICAL LEVELS IN ASEAN

Actions with relevance to sustainable urbanisation in ASEAN operate at 5 different geographical levels

NON-EXHAUSTIVE

Level	Examples of existing actions	ASEAN Member States/ Cities involved
Global / Asia	Global Platform for Sustainable Cities	Malaysia (Melaka); Viet Nam (Ha Giang, Hue and Vinh Yen)
	OECD Green Cities Programme	Philippines (Cebu); Viet Nam (Hai Phong); Indonesia (Bandung); Malaysia (Iskandar); Thailand (Bangkok)
ASEAN	ASEAN Smart Cities Network	All ASEAN Member States
	ASEAN Environmental Sustainable Cities Model Cities Programme	41 cities across Malaysia, Indonesia, Thailand, Philippines, Lao PDR, Viet Nam, Cambodia, and Myanmar
	ASEAN-GIZ 'Cities, Environment and Transport'	ASEAN-wide with a focus in Indonesia, Malaysia, Philippines, Thailand, and Viet Nam
Sub-regional	IMT-GT Green Cities initiative	Pilot cities in Malaysia, Indonesia, Thailand
	The Green Cities Initiative for BIMP-EAGA	Pilot cities in Brunei Darussalam, Indonesia, Malaysia, Philippines
National	Sustainable spatial planning	Brunei Darussalam
	UNDP-UNEP Poverty Environment Initiative	Lao PDR
	Solar Nova and Floating Solar Platforms	Singapore
	Indonesia's Smart City Index	98 cities in Indonesia
Sub-national	Cambodia-GCCI Green Urban Programme	Phnom Penh, Cambodia
	Bandung City's low-carbon city plan	Bandung, Indonesia
	Heritage Green Spaces	Yangon, Myanmar
	Go-Green Initiative	Kuala Lumpur, Malaysia
	Metro Manila Urban Transport Integration	Manila, Philippines
	Zero Baht Shop	Bangkok, Thailand
	Hai Phong Green Growth Strategy Action Plan	Hai Phong, Viet Nam

SOURCE: Desk Research; Team analysis

Exhibit 9 provides a breakdown of these actions by geographical coverage and areas of sustainable urbanisation addressed.

[113] See Sunway Smart and Low Carbon Township website for additional information.

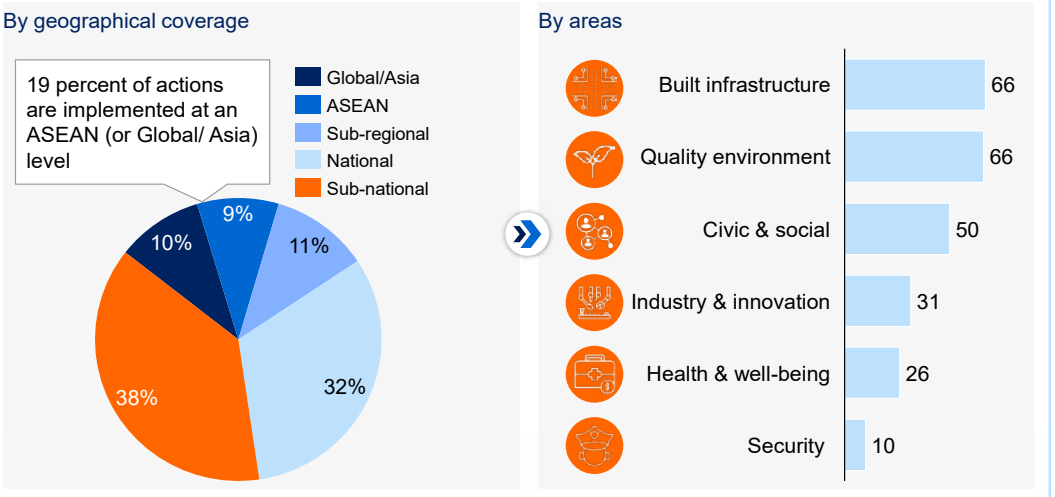
EXHIBIT 9: BREAKDOWN OF ACTIONS IN ASEAN BY GEOGRAPHICAL COVERAGE AND AREAS OF SUSTAINABLE URBANISATION

Stocktake of actions

A stocktake reveals opportunities for further implementation at the ASEAN level plus varying focus across areas of sustainable urbanisation

Existing actions by geographical coverage[1] and sustainable urbanisation areas[2]

Percent of all existing actions



1 Over 190 actions were examined across cities in ASEAN. These actions can be categorised into four levels: national/sub-national (e.g., NewWater programme in Singapore); sub-regional (e.g., BIMP-EAGA); ASEAN-wide (ASEAN Smart Cities Network); and Global/Asia (e.g., 100 Resilient Cities).
2 A large number of actions address more than one area and/or area. For example, building monorails in Phuket helps to increase tourism (in 'Civic & social') and also in mobility (in 'Built infrastructure'). We have counted these actions in both areas to ensure representation.

SOURCE: Desk research; Team analysis

The stocktake reveals that over 70 percent of existing actions currently reside at the national and sub-national level. Only 9 percent of actions are being implemented at an ASEAN and 10 percent at the Global/Asia level. While this reflects a strong impetus to meet sustainable urbanisation needs at a national and/or sub-national level (which might better address the specific needs and national circumstances), it also reveals a potentially large opportunity for more work to be done at the ASEAN level. Actions coordinated at a regional level could support the integration of an ASEAN community and raise awareness of similar sustainable urbanisation challenges faced across the region.

The majority of actions have a strong focus on built infrastructure, quality environment, and civic & social, while health & well-being and security receive less attention. Also, when actions are examined by sub-area instead of by area, significant variations between sub-areas are revealed. For example, while 31 percent of actions address issues around industry & innovation, the majority of them are in the sub-area of 'entrepreneurship & innovation' and only 5 percent of actions are in the area of 'trade and commerce'. The following section provides examples of actions happening across the various sub-areas in ASEAN today. In each of the areas of sustainable urbanisation, there are a number of innovative actions currently underway in ASEAN cities.

CIVIC & SOCIAL

- **Social cohesion.** Actions in this sub-area aim to improve the inclusion and enfranchisement of all groups of the urban population, in particular of women, racial minorities and disenfranchised age groups. As these groups tend to be amongst the

most vulnerable, underserved and poorer groups of society, actions in this sub-area tend to overlap with other sub-areas, such as 'inclusive & equitable growth', 'housing & home', 'healthcare', 'entrepreneurship & innovation' and 'education' but distinguish themselves by putting these groups front in centre, addressing their specific situations. Examples include, the Mekong Women's Entrepreneurship Challenge, in Cambodia, Lao PDR, and Viet Nam which tackled barriers associated with the growth and expansion of women-led businesses or the Urban Youth Empowerment and Ecological Safety Project in Phnom Penh which aims to improve youth livelihoods and access to economic opportunities, including access to green jobs through research, training, mentorship and entrepreneurship development.

- **Inclusive & equitable growth.** Actions in this sub-area range from conditional cash transfer programmes (e.g. Philippines Pantawid Pamilyang Pilipino Programme or the Urban Youth Empowerment and Ecological Safety Project by the UNESCO in Cambodia supporting mechanisms that increase access to finance); establishing savings for community groups (e.g. The Viet Nam Land, Services and Citizenship for the Urban Poor); to supporting local engagement in infrastructure development. An example is the Program Nasional Pemberdayaan Masyarakat – Urban in Indonesia which utilises small grants to communities for local decision making on development priorities. The action is the largest community-driven development programme in the world covering all urban wards in the country with over 8.1 million beneficiaries. Since its inception 99 percent of urban communities reported having improved access to infrastructure and government services as a result of the action.[114]

- **Culture & heritage.** Actions in this sub-area include building cultural awareness in the city (as seen by the George Town Festival in Penang) or physically retaining historical parts of the city. For example, Yangon city is working with the Yangon Heritage Trust and UNESCO to develop a Yangon Urban Heritage Conservation Law, zoning plans, and building codes to preserve heritage building across the city.[115]

- **Tourism.** According to MasterCard's Asia Pacific Destination Index 2017, half of the top 20 most visited destinations in APAC saw more than 10 percent growth in international overnight arrivals from 2015 to 2016.[116] A large portion of actions focuses on building tourism infrastructure – e.g. the introduction of a monorail system in Phuket and various airport expansion projects.[117] Actions in this sub-area also include implementing digital innovations to better manage tourist flows. For example, the Mekong Business Initiative is working with local city governments in Cambodia, Lao PDR, Myanmar, and Viet Nam to develop software to better predict and manage the flow of tourists visiting their cities.[118] Moreover, some actions have included the redevelopment of parts of the city in order to attract tourists; Da Nang in Viet Nam successfully rehabilitated the city's coastal area to become a popular seaside tourist destination. The city's action has generated over US$660 million in tourist revenue in 2016 alone. The city also earned the title of 'one of the most beautiful beaches on the planet' by Forbes.[119]

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[114] *Indonesia: Evaluation of the Urban Community Driven Development Program*, World Bank, 2013.

[115] See Yangon Heritage Trust website for more information

[116] *MasterCard Global Destinations Cities Index,* MasterCard, 2017.

[117] *The Second National Tourism Development Plan (2017-2021)*, The Ministry of Tourism and Sports Thailand, 2017; *Why Singapore Needs Changi Airport Terminal 5 to fly higher,* Channel News Asia, 2018; *Suvarnabhumi gears up for more expansion*, Bangkok Post, 2016; and *Vietnam plans $5.5 bln expansion to double Hanoi airport capacity*, Reuters, 2016.

[118] Interview with Dominic Mellor from the Mekong Business Initiative.

[119] *Coastal Tourism in Da Nang, Vietnam: Promoting a Win-win Situation for Achieving Conservation, Economic and Social Goals*, ICM Solutions for Sustainable Seas, 2016.

HEALTH & WELL-BEING

- **Housing & home.** Actions in this sub-area mostly focus on two channels: upgrading housing or increasing home ownership. An example of the former is Indonesia's ambitious US$1.5 billion slum upgrading project (known more commonly as KOTAKU) which aims to provide improved water sources, sanitation, roads, drainage, and regular solid waste collection across 154 cities.[120] In the case of the latter, Singapore's Housing and Development Board was created in 1960 to address an acute shortage of decent housing. Within two decades, Singapore became the first Asian city free of slums and squatters.[121] More than 90 percent of the population today lives in government-subsidised housing designed to ensure access to affordable housing for all income levels, with multiple financing options and grants available to help citizens build wealth through home ownership.[122]

- **Healthcare.** Actions in this sub-area include capacity training modules – like the 'Japan-ASEAN Health Initiative' which aims to provide human resource training for 8,000 people in AMS across a range of topics including promoting healthy lifestyles, preventing diseases, and raising healthcare standards. Other actions focus on improving the accessibility of healthcare services. For example, Makassar Home Care provides 24-hour healthcare in urban areas through a dedicated hotline service and emergency response team which leverages Mobile Internet to deliver rapid and efficient diagnoses to the city's 1.4 million residents. Finally, more large-scale actions include providing universal healthcare nation-wide which may not have a primary urban focus, but the impact of which is most strongly felt in dense population centres. In 2014, the Indonesian government launched Jaminan Kesehatan Nasional, a scheme to implement universal health care in Indonesia. It is expected that spending on healthcare will increase by 12 percent a year and reach US$46 billion a year by 2019. To date 70 percent of Indonesians have been covered.[123]

- **Other public services.** Actions in this sub-area relate to the delivery other services that improve health and well-being, such as emergency services and nutrition. For example, in September 2016, the Ministry of Education of Education and Training, and the Ministry of Health of Viet Nam introduced the 'School Milk – For Viet Nam's Stature' programme. The action aims to offer milk to all children in kindergartens and disadvantaged districts in the country by 2020.[124] At a sub-national level, Dutch multinational dairy cooperative, Friesland Campina, is working with the local municipal authorities in Ho Chi Minh City to provide education on proper nutrition and other physical activities programme for 65,000 students across 100 schools in the city.[125]

SECURITY

- **Personal safety & security.** This sub-area is focused on actions that safeguard citizens against crime, terrorism, and natural disasters. One such action is Johor's community police post initiative which constructed police posts in crime prone areas. As a result of this action, the incidence of crime in these municipalities dropped by 5 percent

[120] *Indonesia improving infrastructure for millions of urban poor*, World Bank, 2017.

[121] *Liveable and sustainable cities: A framework*, Centre for Liveable Cities and Civil Service College, 2014.

[122] *How to make a city great*, McKinsey Cities Special Initiative, 2013.

[123] *70 percent of the Indonesian Population Joins Universal Healthcare Program*, Indonesia Investments, 2017.

[124] *School milk programme launched targeting children's nutrition improvement*, The Central Organ of the Communist Party of Viet Nam, 2016.

[125] *65,000 children benefit from nutrition education project*, Vietnam News, 2017.

(595 cases) between 2012-2013.[126] Actions have also integrated digital solutions. For example, Phuket's plans to deploy over 1,300 closed-circuit television cameras across busy public areas to support facial scanning of registered felons in real-time as part of its SMART cities plan to safeguard its inhabitants and visitors.[127]

- **Cyber-security.** Actions in this sub-area are mostly at the national level, as most domains are centrally held, and is the least explored directly by actions across the stocktake. However, several SMART city plans – which include exploring IT training, and cyber-security departments (e.g. Cyber-Security Agency of Singapore and Cyber-Security Malaysia), and cyber-security and personal legislation.[128]

QUALITY ENVIRONMENT

- **Water, waste & sanitation.** There is a large diversity of actions in this sub-area, including developing upstream solutions to waste management (e.g. a GIZ project in Da Nang to better manage black and grey water); and promoting environmentally sustainable consumption. For example, Surabaya's Clean and Green Programme promotes competition between neighbourhoods, rewarding the most environmentally virtuous ones who practice reducing, recycling and reusing waste. [129] Since the government introduced the programme, solid waste has reduced by one-third, from a high of approximately 1,500 tonnes per day in 2005 to 1,000 tons by 2009.[130]

- **Energy.** Actions in this sub-area include a strong focus on promotion of renewable energy. For example, the Economic Development Board of Singapore and the Housing Development Board's SolarNova programme, aims to introduce 220MWp (approximately 3 percent of Singapore's projected peak demand in 2030) of solar panels across 5,500 HDB blocks by 2020.[131] Other actions focus on improving energy efficiency. Melaka is working with the ADB to install over 100,000 smart Light-Emitting-Diode (LED) road lamps which will utilise a digital network lighting system. The US$50 million project could potentially save up to 44GWh per year.[132] Other actions include developing substitutes for energy intense products. For example, the Litre-of-Light campaign in the Philippines is a Do-It-Yourself lighting system that has provided indoor lighting from sunlight for over 150,000 households living in informal settlements across 100 cities in the Philippines. Reflecting its innovativeness, Litre-of-Light won the World Habitat Awards 2014.[133]

- **Food.** Actions focusing on this sub-area remain fairly limited at the city-level in ASEAN. One such example is the development of vertical farming in Singapore. Since 2012, the number of vertical farms has increased seven-fold and span growing of vegetables to the rearing of crabs.[134] Other actions focus on food safety, and include Hanoi's food testing inspection and testing programme which introduced three mobile food resting labs as well as randomised inspections on foodstuff in markets and eateries.[135]

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[126] *Johor cops fight crime by moving into the neighbourhood*, The Malay Mail Online, 2013.

[127] *Exclusive: Phuket's smart city vision*, Gov Insider, 2017.

[128] *Cyber-Risk in Asia Pacific: The case for greater transparency*, Oliver Wyman, 2017.

[129] *Surabaya, Indonesia: Green and clean initiative,* Inclusive Cities Observatory, 2010.

[130] Gumelar et al., *Surabaya waste management system through city to city cooperation with Kitakyushu city Japan,* Institute of Technology Bandung, 2012.

[131] *Solar Photovoltaic Systems,* Energy Markets Authority, 2015; and *HDB calls 'largest tender' to install solar panels across government agencies*, Channel News Asia, 2017.

[132] *Mobilizing Private Capital for Energy Efficiency through PPP Structures*, Asian Development Bank, 2017.

[133] *Litre of Light*, World Habitat Awards, 2014.

[134] *Vertical farms on the rise in land scarce Singapore,* The Straits Times, 2016.

[135] *Hanoi ups specialised inspections on food safety*, Vietnam Net, 2018; and *Hanoi launches mobile testing labs to promote food safety*, Saigoneer, 2016.

BUILT INFRASTRUCTURE

- **Mobility.** A key theme of actions in this sub-area includes improving public transport infrastructure and service. For example, GIZ is working with the Ministry of Transportation and the Ministry of National Development Planning/National Development Planning Agency (BAPPENAS) in Indonesia to introduce energy efficient buses and public transport infrastructure across seven cities.[136] Other actions focus on using digital innovations to reduce congestion. For example, in 2011, the World Bank and the Cebu's municipal government worked together to develop an open-source platform for collecting, visualising, and analysing traffic speed data derived from taxi drivers and ride hailing apps. This has helped the government identify congestion choke points and better manage accidents. [137] Its success has supported the expansion of similar platforms to other cities across the world. Some actions aim to get rid of motorised vehicles altogether. For example, the city of Bandung introduced a bike-sharing service, Boseh, in 2017. Boseh features over 270 bicycles for sharing across the municipality and aims to reduce congestion and support access to public transportation.[138]

- **Building & construction.** This sub-area focuses on improving the efficiency and sustainability of building usage and construction. Actions in this sub-area include mainstreaming energy savings into the design of buildings. For example, the International Finance Corporation (IFC) developed a software called 'Excellence in Design for Greater Efficiencies' (EDGE) which helps architects and builders to design climate-smart buildings. Building projects which realise a 20 percent reduction in energy, water and embodied energy in materials will further receive an EDGE certification.[139] The IFC is working with private sector companies in Philippines, Viet Nam and Indonesia to promote EDGE software and certification in cities in the region.[140]

- **Urban resilience.** Actions in this sub-area have a strong focus on flood prevention and mitigation. For example, Ho Chi Minh City's flood prevention programme, 'Moving towards the sea with climate change adaptation', leverages the expertise of the city of Rotterdam to design and invest over US$1 billion in flood prevention infrastructure.[141] Other actions focus on management through better city planning. In 2012, Open DRI (a data collection initiative launched by the Global Facility for Disaster Reduction and Recovery) worked with municipal officials to digitally collect data on 29,230 buildings and structures in Jakarta to be used as flood contingency planning analysis.[142] The data was successfully tested during the 2012 flooding season in Jakarta, and has been subsequently used to train local disaster management agencies in other provinces in Indonesia.[143] Other cities have attempted more innovative ways to mitigate the risk of flooding; Manila city plans to plant 1.6 million hectares of bamboo, and cultivate 600,000 hectares of mangrove in Laguna de Bay (a freshwater lake to the east of Metro Manila) to enhance the city's freshwater supply and reduce flooding in metropolitan Manila.[144]

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[136] See Sustainable Urban Transport Programme Indonesia (SUTRI) website for additional information.

[137] *Open Traffic Big Data Challenge Project Completion Report*, World Bank, 2015.

[138] Yunair, Resto Woro, *Are China's bike sharing services over-sharing?*, South China Morning Post, 2017.

[139] See EDGE buildings website for additional information.

[140] *Buildings account for more than 30 percent of the total energy use in fast-growing economies like Vietnam, Indonesia, and the Philippines—that's why it is critical to improve energy efficiency in new buildings,* International Finance Corporation, 2016.

[141] *Moving towards the sea with climate change adaptation*, Vietnam Climate Adaptation Partnership, May 2013.

[142] Leveraging partnerships globally, nationally and locally to invest in open tools and open data, Open DRI, 2013.

[143] *Ibid.*

[144] *Flood controls in Southeast Asia*, Eco-Business Research, 2017.

INDUSTRY & INNOVATION

- **Entrepreneurship & innovation.** Actions in this sub-area mainly focus on increasing the ease of access to finance and supporting adoption of innovative technologies for MSMEs – which constitutes up to 99 percent of enterprises in some countries. For example, SWITCH-Asia's 'Mainstreaming Energy Efficiency Through Business Innovation' supports the adoption of energy and water saving technologies - including solar cells and two-level sensors in toilets – for over 750 Vietnamese enterprises by designing financial products that enabled enterprises to finance these investments.[145] Other actions focus on equipping entrepreneurs with the relevant skills to negotiate the changes encountered by Industry 4.0. For example, in 2014, Microsoft worked with the Indonesian Business Women Association's 40,000 members to provide training on using Microsoft Office 365 and introduce concepts of 'clean IT cyber-security' across major cities in the country.[146] While not exclusively urban-focused, the IIX Foundation's 'Women's Livelihood Bond' (funded partially by Australia's Department of Foreign Affairs and Trade, DFAT, and the United States Agency for International Development, USAID) aims to provide women led enterprises across Cambodia, Philippines and Viet Nam with access to finance. The bond provides US$8 million to support increased access to credit, market linkages, and to affordable goods and services.[147] Another example is the World Bank's collaboration in Lao PDR with Sacombank, Lao-China Bank, and ST Bank to issue US$15 million in credit lines to support loans to small and medium enterprises based on a stipulation that 1 in 5 loans have to be owned by women.[148]

- **Trade & commerce.** Actions in this sub-area include promoting trade between cities and developing sector specific policies at the city level. These range from developing special economic zones to supporting the sector-specific growth through financial and non-financial incentives. For example, Penang's strong government support and pro-business policies have made the city a tech hub and a hotspot for Fortune 1,000 companies and start-ups in Malaysia.[149] Previous research by AlphaBeta and Nielsen found that economic clusters (e.g. special economic zones) were the main economic growth driver for around 32 percent of middleweight regions in ASEAN.[150] Other actions in this sub-area include developing economic corridors between cities. For example, the 'Malaysia Vision Valley' project is a 153,000-hectare economic zone jointly developed by the public and private sector, namely Sime Darby. The project spans several cities – including Seremban and Port Dickson. [151] It aims to attract high-technology industries, private universities, and research labs worth over RM$400 billion (US$101 billion) by 2045.[152]

- **Education.** This sub-area focuses on producing an appropriately skilled workforce (e.g. technical and vocational education and training (TVET), skills retraining, industry specific skills) – with a focus on vocational training. Examples include vocational training programmes in tourism (e.g. Cebu Vision 2050 and Phuket's SMART Cities initiative have plans to improve training in the hospitality sector) and focusing on social cohesion

[145] See SWITCH-Asia.eu - MEET-BIS Vietnam website for additional information.

[146] *Microsoft partners with Indonesia Business's Women Association (IWAPI) to empower women in Indonesia*, Microsoft, 2014.

[147] *IIX Women's Livelihood Bond - Blueprint Paper*, IIX Foundation, 2017.

[148] *Strengthening Women's Entrepreneurship in ASEAN*, Organisation for Economic Co-operation and Development, 2017.

[149] *Penang is on its way to becoming the Silicon Valley of the East, and IoT is how*, TechinAsia, 2015.

[150] *Rethinking ASEAN: Dispelling 8 myths about consumer markets,* Nielsen-AlphaBeta, 2017.

[151] *KL's ambitious Vision Valley mega project,* The Straits Times, 2016.

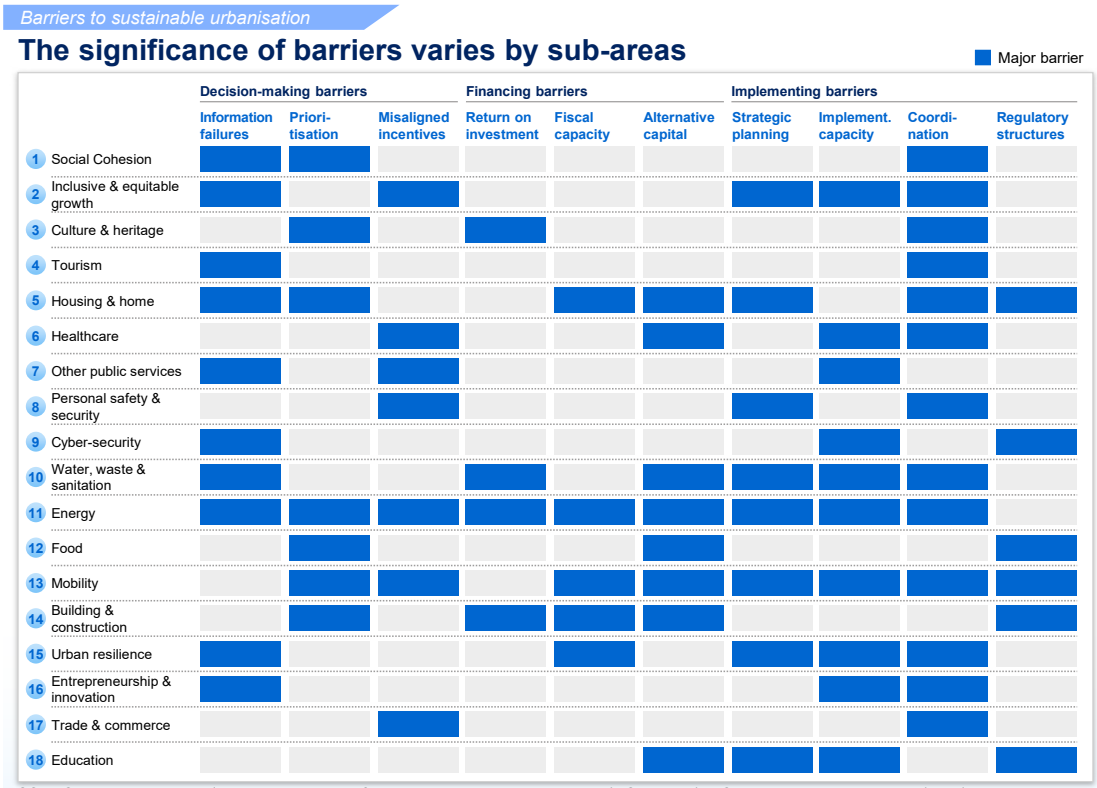
[152] *Ibid.*

such as skills training for urban youth in order to support employment (e.g. the Urban Youth Empowerment and Ecological Safety Project by UNESCO in Cambodia).

II. COMMON BARRIERS TO IMPLENTATION OF SUSTAINABLE URBANISATION ACTIONS

While there are many examples of good practices and innovative approaches to promote sustainable urbanisation in ASEAN, challenges remain. Many cities in ASEAN as well as national governments are facing significant barriers to successful implementation of sustainable urbanisation actions. These barriers can be summarised into three categories: i) decision-making barriers; ii) financial barriers; and iii) implementation barriers. Which barriers are likely to be major obstacles, will strongly depend on the sub-area of sustainable urbanisation in question, as well as the scope and nature of the action (for example, implementing a waste management system is fundamentally different from promoting smart transport solutions and will face very different implementation challenges). However, based on a thorough review of development agency project evaluation reports; surveys of national and city representatives; and interviews with DPs and OEPs, development agencies, multilateral organisations, non-government organisations, national officials, municipal officials and experts; the ASUS has identified some frequent barriers preventing sustainable urbanisation actions from being implemented (Exhibit 10). The more prominent barriers to successful implementation include: a lack of coordination (with other government departments at the city-level, as well as with relevant regional and national agencies), weak implementation capacity, information failures, lack of strategic planning and an inability to access alternative sources of finance.

EXHIBIT 10: COMMON BARRIERS TO IMPLEMENTATION OF ACTIONS BY SUB-AREAS OF SUSTAINABLE URBANISATION



SOURCE: Annual Progress / Evaluation Reports of various development aid agencies (JICA, DFAT); JICA Typical Lessons Learned (2017); Academic literature; Interviews with aid agencies and government officials; Team analysis

DECISION-MAKING BARRIERS

- **Information failures.** This occurs when stakeholders do not have sufficient or adequate information about the availability of actions, the true costs and benefits of actions, or the nature of the technology involved. Often this is tied to a lack of available robust data. For example, when considering the implementation of actions to improve road safety in cities, local authorities are often unaware of the large social and monetary costs traffic accidents are causing in their cities (i.e. they are unable to compute the economic costs of physical damages, not to mention the complex economic costs of human lives lost).[153] Sometimes local governments lack an understanding of alternative business models, such as establishing closed loop waste systems as opposed to traditional waste management approaches.

- **Prioritisation.** This barrier arises when key decision-makers consider an issue to be of low priority in relation to other issues. For example, progress on infrastructure projects at the city-level in ASEAN to date have been overwhelming linked to whether national policymakers have seen this as a national priority and hence in their interests to push.[154] This also relates to political risk from a change in local government, which can lead to a change in priorities. Waste management projects in many cities in ASEAN have been impacted by this given that the payback period for the project (typically around 10 years) is generally much longer than local political cycles (with elections often every 4-5 years).

[153] Discussion with private sector organisations.

[154] *ASEAN Connectivity: Building a PPP pipeline*, The World Bank Group, December 2014.

- **Misaligned incentives.** These relate to a misalignment of incentives between key stakeholders (e.g. national, regional and local government or regulators, investors/ donors, implementation agencies, private sector and local residents). One prominent example relates to residents resisting land acquisition for infrastructure projects.

FINANCIAL BARRIERS

- **Return on investment.** This barrier relates to the lack of a sufficiently attractive return on investment to encourage investment (particularly by the private sector) – despite potentially large social benefits. Even if overall returns are attractive, unacceptable risks (e.g. uncertainty about demand) can undermine the implementation of actions. This challenge is acute in the sub-areas of 'energy' and 'water, waste & sanitation', where tariffs are often set at the national level or governments directly place rate ceilings on private sector companies to keep consumer prices low, potentially undermining the commercial viability of projects.[155] Another example is 'mobility'. While there is a large appetite by private sector players to help cities to drive the electrification of vehicles, this requires sizeable infrastructure investment. The risk from having to invest without knowing the demand first and whether local regulatory structures will be supportive can be a major deterrent for companies.

- **Fiscal capacity.** This challenge revolves around the limited budget of cities which hinders them from seizing opportunities to invest in sustainable urbanisation actions. Many cities find it challenging to raise capital for long-term projects due to lack of direct control of fiscal resources.[156] Infrastructure actions in 'mobility', 'energy', 'water, waste & sanitation' and' building & construction' are particularly impacted by this challenge due to the high upfront capital investments required.[157]

- **Alternative capital sources.** This barrier was mentioned consistently throughout interviews with stakeholders. However, to nuance it further, the challenge is not around the lack of capital sources, but the access to them. Interviews with multilateral lending organisations and private financial institutions suggest that there are three underlying issues. First, cities are often unaware that they can access alternative forms of financing. In response to this, some multilateral organisations have launched focused efforts on teaching cities about how to leverage debt and obtain credit scores.[158] Second, even if they are aware, borrowing from the private sources is not a mainstream concept in Southeast Asia and can be seen as taboo. Third and maybe most crucial, many cities find it challenging to fund projects due to poor project formulation i.e. they do not/ cannot draft a bankable proposal. This is discussed in further detail in the section on implementation barriers.

IMPLEMENTATION BARRIERS

- **Strategic planning.** Many cities lack a clear and robust long-term strategy to support the implementation of their sustainable urbanisation actions, or in fact lack the planning capacity to come up with viable proposals. This leads to a lack of private sector confidence and a shortfall in funding (see above). 'Good projects which are underpinned by capacity

[155] Interview with development agency and sustainable urbanisation experts.

[156] Interview with multilateral organisation.

[157] Interview with DP development implementation agency.

[158] Interview with multilateral organisation.

and planning are few and far between'.[159] Moreover, some actions by cities tend to be reactive, addressing only the immediate issues without thinking about more long-term solutions. For example, while almost all governments are thinking about easing congestion and improving transportation, only a handful are thinking about strategic urban planning and developing people friendly cities instead of building more roads or adding more buses.[160]

- **Implementation capacity.** This barrier refers to the (non-financial) resource gaps that prevent the implementation of an action such as lack of adequate manpower, technology, technical expertise or materials. A recurring theme from interviews with city-level officials, multilateral organisations, and private sector experts is a lack of professional local staff (e.g. city planners, architects, and engineers) which stymies the development of realistic, detailed, and executable plans. Capacity problems can also be a lot more basic than that, such as language issues (i.e. lack of English) preventing cities from drafting proposals and engaging foreign investors. Local regulatory barriers can exacerbate the problem. For example, building codes differ significantly across AMS and professional qualifications (e.g. for architects, engineers, city planners) are not homogenised and broadly recognised across AMS, meaning cities in one country are unable to utilise capacity from another.

- **Coordination.** This relates to a lack of alignment with other actions where there may be important inter-dependencies (such as road infrastructure and public transport initiatives); and alignment across government departments, at the national, sub-national and crosscutting level. For example, it is not uncommon for over 15 distinct decision-making entities to be involved in a typical transport infrastructure project, with limited accountability and mechanisms to attain consensus.[161] This can be exacerbated if involvement from multiple private sector actors is required. Another example is waste and sanitation which often falls under environmental ministries, whereas ownership of utilities tends to be divided between ministries of energy and national planning. This creates coordination woes as both issues are inextricably linked to one another. Lessons learnt by aid development agencies support this. Implementing urban resilience and disaster risk reduction measures are an example of a case where coordination between the national, provincial or city level is crucial. It is indispensable to clarify differences in role of each organisation and to let them cooperate with each other when necessary.[162]

- **Regulatory structures.** A lack of efficient regulatory structures to support implementation (such as lack of relevant standards or protocols or absence of defined property rights, as well as a lack of city autonomy) can act as a barrier. For example, a major issue preventing infrastructure development is the need for a clear process for securing regulatory approvals in many ASEAN cities. Unclear Public Private Partnership (PPP) guidelines or local ownership requirements (which can be up to 70 percent in some AMS) also can serve as a barrier to investment.[163]

[159] Interview with multilateral organisation.

[160] Interview with DP development implementation agency.

[161] *Lifting the barriers roundtable: Infrastructure, power and utilities*, CIMB ASEAN Research Institute (CARI) and McKinsey & Company, 2013.

[162] *JICA Standard Indicator Reference and Typical Lessons Learned in Technical Cooperation Projects*, Japan International Cooperation Agency, 2017.

[163] Input from participants in private sector roundtable discussion.

3. IDENTIFYING OPPORTUNITIES TO PROMOTE SUSTAINABLE URBANISATION IN ASEAN

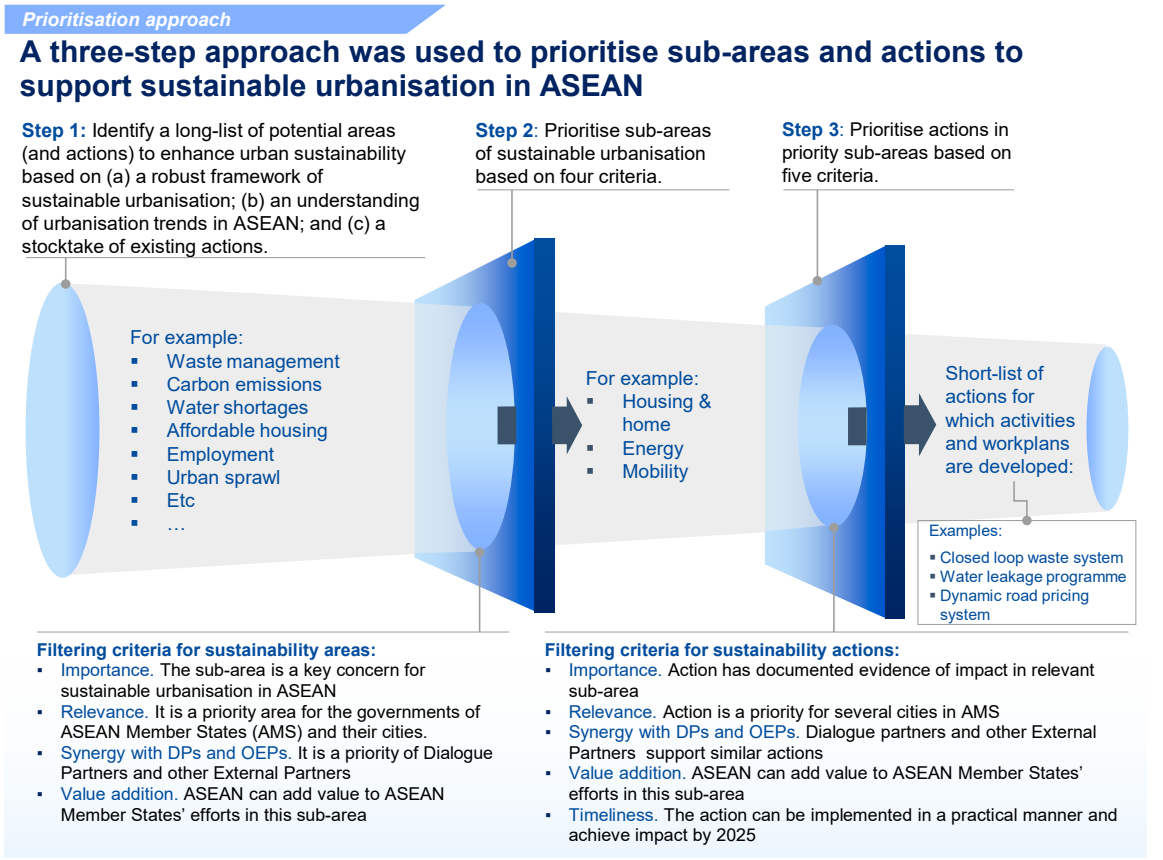
3. IDENTIFYING OPPORTUNITIES TO PROMOTE SUSTAINABLE URBANISATION IN ASEAN

In this chapter, priority sub-areas and actions to support sustainable urbanisation in ASEAN are identified. The analysis in this chapter has been informed by a combination of sources, including interviews and surveys of ASEAN cities, interviews with Dialogue Partners and other External Partners (DPs and OEPs) and sustainability experts, and desktop research. In addition to the exposition in this chapter, two toolkits have been developed as part of the ASEAN Sustainable Urbanisation Strategy (ASUS) that will help cities carry out their own prioritisation and develop best practices actions.

I. OVERVIEW OF APPROACH FOR IDENTIFYING PRIORITY SUB-AREAS AND ACTIONS

Rigorous prioritisation has been a key element of the development of the ASUS. A three-step process was used to identify priority sub-areas and actions to guide sustainable urbanisation in ASEAN on aggregate (Exhibit 11).[164]

EXHIBIT 11: THE ASUS PRIORITISATION APPROACH



[164] See the appendix for a description of the detailed methodology.

One key criterion for identifying priority sub-areas and corresponding actions relates to the value addition of ASEAN. Five broad channels were identified by which ASEAN could help address some of the barriers that were identified in the stocktake analysis in the previous chapter. For an overview of the five channels see Exhibit 12. These include:

- *Information sharing:* Information gaps were identified as a major barrier for actions in half of the sub-areas of sustainable urbanisation in the stocktake analysis. Cities can benefit from sharing lessons learnt and best practices on implementing certain actions related to sustainable urbanisation.

- *Technical expertise:* Over 60 percent of sub-areas of sustainable urbanisation face major barriers related to either strategic planning or implementation capacity. ASEAN can potentially support cities by providing access to technical expertise through ASEAN forums (e.g. ASCN, ASEAN Initiative on Environmentally Sustainable Cities, ASEAN Environmentally Sustainable Cities Model Cities, ASEAN Mayors Forum), which may not otherwise be readily available.

- *Access to finance:* Over 40 percent of sub-areas of sustainable urbanisation face major barriers related to accessing alternative sources of capital to fund projects. By including city-level actions in ASEAN forums (e.g. sustainable infrastructure forum), there is the opportunity for cities to get exposure to sources of financing and improve their ability to secure capital.

- *Common standards / procurement:* Over a quarter of sub-areas of sustainable urbanisation face major barriers related to establishing supporting regulatory structures that are needed to implement projects. ASEAN could potentially support cities to cooperate on standard-setting or even on joint procurement to help lower the costs of implementation.

- *Joint implementation:* Roughly two-thirds of sub-areas of sustainable urbanisation face issues related to coordination. ASEAN could potentially support this by helping cities cooperate on joint implementation when an action span across multiple cities or requires certain scale / breadth to be achievable.

EXHIBIT 12: CHANNELS THROUGH WHICH ASEAN CAN ADD VALUE

There are several channels which ASEAN could add value to the actions of ASEAN Member States

Low collaboration, but easier to implement → High collaboration, but more challenging to implement

	Channels of ASEAN value addition				
	Information sharing	**Technical expertise**	**Access to finance**	**Common standards / procurement**	**Joint implementation**
Barrier addressed	▪ Information failures ▪ Strategic planning	▪ Strategic planning ▪ Implementation capacity	▪ Alternative capital sources	▪ Regulatory structures	▪ Implementation capacity
Description	Cities can benefit from sharing lessons learned and best practices on implementing certain actions related to sustainable urbanisation.	Cities can benefit from access to technical expertise, which may not otherwise be readily available.	By including city-level actions in ASEAN forums (e.g., sustainable infrastructure forum), there is the opportunity for cities to better secure financing.	Cities could cooperate on standards or on joint procurement to help lower the costs of implementation.	Cities cooperate on joint implementation when an action spans multiple cities, or requires certain scale / breadth to be achievable.
Example	Sharing lessons on waste management system design	Sustainable cities forum, including technical experts	MPAC 2025 infrastructure pipeline initiative	Establishing common standards on public transport cards to lower procurement costs	Singapore- Johor-Riau growth triangle

The first toolkit provided as part of the ASUS includes a step-by-step approach for cities to identify their own priority sub-areas – based on their city's local context.

II. PRIORITISATION OF SUB-AREAS AND ACTIONS

Based on the methodology described above, seven priority sub-areas and eight actions have been identified (Exhibit 13). These are a set of initial priority actions and are expected to evolve over time. Rather than prescribing a roadmap of actions at the outset, ASUS will adopt a demand-responsive approach and it envisages that additional actions in these priority sub-areas will be added over time (and potentially additional sub-areas as well) – based on the interest of cities in the different city networks, including the ASEAN Smart Cities Network (ASCN), the ASEAN Sustainable Development Goals (SDG) Frontrunner Cities Programme, and various other city networks in ASEAN, such as those operating under the Brunei Darussalam-Indonesia-Malaysia-Philippines – East ASEAN Growth Area (BIMP-EAGA), and the Indonesia-Malaysia-Thailand – Growth Triangle (IMT-GT).[165]

[165] The specific implementing mechanism will be discussed later in Chapter 4.

EXHIBIT 13: ASUS PRIORITY SUB-AREAS AND ACTIONS

Identifying priority actions

8 priority actions in seven sub-areas of sustainable urbanisation were identified based on the assessment criteria

Criterion score: ✓ High ✓ Medium

Area	Sub-area	Prioritised action	Importance[1]	Relevance[2]	Synergy[3]	Value addition[4]	Timeliness[5]
Civic & Social	Inclusive & equitable growth	1. Introduce and improve access to digital payment solutions to enhance financial inclusion	✓		✓	✓	✓
Health & Well-being	Housing & home	2. Develop and expand affordable housing solutions	✓	✓	✓	✓	✓
Security	Personal safety & security	3. Introduce digital solutions to enhance safety and security in cities	✓	✓	✓	✓	✓
Quality Environment	Water, waste & sanitation	4. Enhance solid waste management systems	✓	✓	✓	✓	✓
Built infrastructure	Mobility	5. Introduce and improve Bus Rapid Transit (BRT) systems	✓	✓	✓	✓	✓
		6. Develop and enhance traffic management systems	✓	✓	✓	✓	✓
	Urban resilience	7. Develop flood management systems	✓	✓	✓	✓	✓
Industry & innovation	Education	8. Develop digital skills through "industry boot camps"	✓		✓	✓	✓

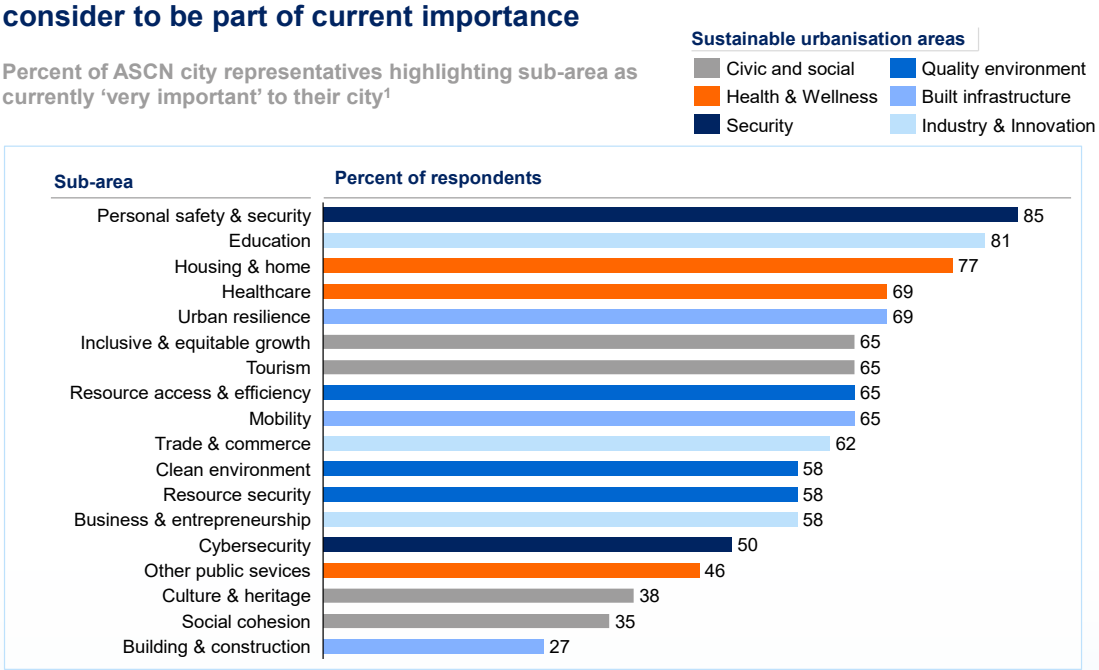
1. Action was scored as 'high' if one or more city in AMS has implemented a similar action with documented positive socio-economic impact. It was scored as 'medium', if there was example outside of the region which showed there was positive socio-economic impact.
2. Action was scored as 'high' if 15% or more of cities surveyed said that this was a priority. If it was 10-14%, it was scored as 'medium'.
3. Action was scored as 'high' if 3 or more Dialogue Partners and other External Partners have completed similar actions in ASEAN. It was scored as 'medium' if at least one Dialogue Partner or other External Partner has implemented a similar action in ASEAN.
4. Action was scored as 'high' if according to expert interviews, more than half of the key barriers for the actions matched to areas where ASEAN could support. An action was scored as 'medium' if 25-50% of key barriers for those actions matched to areas where ASEAN could support.
5. Action was scored as high if similar actions (from the stocktake analysis) were completed in less than 5 years, 'medium' if previous actions took 5-8 years to implement.

EXHIBIT 14: IMPORTANCE OF SUB-AREAS ACCORDING TO ASEAN CITY LEADERS

Criterion 2: Relevance to AMS

A survey of ASEAN city leaders revealed the sub-area which they consider to be part of current importance

Percent of ASCN city representatives highlighting sub-area as currently 'very important' to their city[1]



1 Based on a survey of 27 city and national leaders across ASEAN Member States. While the survey sub-areas 'resource access & efficiency', 'clean environment', and 'resource' security are not identical to sub-areas in this study, these areas share strong thematic links with the sub-areas 'energy', 'water, waste & sanitation', and 'food' respectively.

SOURCE: Survey of ASEAN Smart City Network (ASCN) leaders; Team analysis

The prioritised sub-areas and corresponding actions within them are outlined below. The objectives of each action are summarised in Exhibit 15. The second toolkit provided as part of the ASUS contains detailed action plans for each of these 8 actions. These action plans provide additional detailed information that will help cities customise to their specific context. It also lists out a set of key activities based on global best-practice approaches, and with the help of city representatives, topic experts from development agencies, multilateral organisations, academia, and the private sector.

EXHIBIT 15: OVERVIEW OF ACTION OBJECTIVES

Identifying priority actions

8 priority actions have been identified within the sub-areas with the most need across cities in AMS

Sub-area	Action	Objective
Inclusive & equitable growth	*Introduce and improve access to digital payment solutions to enhance financial inclusion*	Increase the number of city residents with access to financial services through digital financial instruments
Housing & home	*Develop and expand affordable housing solutions*	Improve access to adequate, safe and affordable housing in the city
Personal safety & security	*Introduce digital solutions to enhance safety and security in cities*	Take advantage of relevant digital technologies to help reduce the incidence of crime and threats to public safety
Water, waste & sanitation	*Enhance solid waste management systems*	Improve the overall management of waste collection, segregation, treatment, and recovery in cities
Mobility	*Introduce and improve Bus Rapid Transit (BRT) systems*	Improve the quality and efficiency of public transport and reduce congestion
	Develop and enhance traffic management systems	Reduce traffic congestion and the incidence of traffic accidents in the city
Urban resilience	*Develop flood management systems*	Reduce the incidence, damage and disruption caused by flooding across a city through introducing, or improving, integrated urban flood management and other flood management solutions
Education	*Develop digital skills through "industry boot camps"*	Increase the level of digital skills amongst the population in line with the requirements of the local industry, resulting in a reduction in skills gaps, fewer vacancies, and more placements in higher value-added employment

SUB-AREA 1: INCLUSIVE & EQUITABLE GROWTH

This sub-area includes actions which address economic issues around ensuring that the benefits of city growth are distributed equitably among city residents (e.g. social safety nets, public work programmes creating jobs in impoverished urban areas, etc).

This sub-area is particularly important given rising inequality concerns in ASEAN noted earlier in the trends analysis, and the large upside potential to drive not only more equitable growth, but also benefits for the private sector and governments. For example, by reducing the gaps in financial inclusion, significant new lending could be unleashed, and leakages in government spending and payment collection could be reduced by around US$10 billion in Southeast Asia.[166] It is also a priority focus for many cities in ASEAN. For example, a survey of ASEAN cities that are part of the ASCN found that this sub-area was a focus area for 65 percent of cities (Exhibit 14). Actions supporting inclusive and equitable growth in cities often suffer from information failures, in particular around measuring the extent, the underlying causes and impact of inequality and exclusion. This is especially true for digital financial inclusion, where there is limited political awareness due to a lack of well-structured data and information. Senior government representatives are often unaware of the benefits and means to drive digital financial inclusion at the city level. Further, despite a substantial amount of financial education programmes across the region, there persists a misconception that the cost of accepting digital payment is higher than cash, thus leading to very low usage of digital payments.[167]

[166] *Digital finance for all: Powering inclusive growth in emerging economies,* McKinsey Global Institute, 2016.

[167] Based on interviews with city level officials during the ASUS Forum from 7-8 July 2018.

One priority action has been identified within this sub-area:

- **Introduce and improve access to digital payment solutions to enhance financial inclusion.** Financial inclusion throughout ASEAN has improved steadily in recent years; between 2011 and 2014 alone, the share of adults in ASEAN with a bank account grew from 42 percent to 50 percent of the population.[168] However, there remain wide gaps in access to finance between AMS. For example, in 2014, the proportion of adults with a bank account in Thailand, Malaysia, and Singapore was 78 percent, 81 percent and 96 percent respectively, while the proportion of adults with a bank account in Cambodia, Myanmar and Lao PDR stood at only 22 percent, 23 percent, and 27 percent respectively.[169] Innovative financial services, like digital payments, are a key enabler to address this and improve the number of banked people in cities. These payment instruments have lower barriers to adoption and usage and could enable city populations to access a range of financial services beyond simple savings, like credit, insurance, and remittance which has the potential to considerably improve the overall quality of life. Financial services delivered digitally are also powerful tools to empower women and marginalised groups – who disproportionally lack access to formal finance globally. For example, digital transactions have been shown to support remittance, of which 60 percent of recipients are women.[170]

  There are already some promising examples of innovation in this area. For example, governments are working with the private sector and civil society to identify initiatives to promote usage (for example GrabPay requires and its supports it drivers to open a bank account, thereby promoting access to a broader range of financial services).[171] Similarly, city mayors have been promoting the use of smart cards which can be used for payments as well as for accessing government services. For example, Pekanbaru's Smart Card allows users to access 30 forms of licensing online; saving time and money for small businesses.[172]

  The objective of an action in this sub-area is to increase the number of city residents with access to financial services through digital financial instruments, thereby reducing the incidence of financially excluded residents within the city. An action in this area will better support cities to assess the factors affecting digital financial inclusion (i.e. weak payments infrastructure, low adoption rates by residents, limited options of digital payments, outdated regulatory landscape) and deliver a contextualised solution to address them.

SUB-AREA 2: HOUSING & HOME

This sub-area includes actions focusing on improving the efficiency of public services to provide a pleasant and economically-accessible living environment, including the provision of affordable housing, public spaces and facilities (e.g. public housing, slum upgrading, community centres, green spaces). As a result of rapid rural migration, local governments can struggle with supplying sufficient infrastructure, housing and public services resulting in financial and access problems for urban migrants.[173] This sub-area is of significant importance. For example, the proportion of people living in urban slums in ASEAN cities is

[168] *Financial inclusion in ASEAN: Presentation for the ASEAN working group on financial inclusion*, World Bank, 2016.

[169] *Ibid.*

[170] *Financial inclusion and consumer empowerment in Southeast Asia*, OECD, 2018.

[171] *City Financial Inclusion Efforts: A National Overview*, National League of Cities, 2015.

[172] *Smart City Pekanbaru Bukan Ekspektasi Tapi Implementasi*, SeRiau.com, 2018.

[173] *Urbanisation, rural–urban migration and urban poverty*, International Institute for Environment and Development, 2015.

one of the highest in the region with 6 out of 7 urban areas in AMS having a larger proportion of urban population living in slums than the average in Asia (25 percent).[174] Hence, not surprisingly, the sub-area is an overwhelming priority for many AMS as expressed through their national plans and Habitat III reports: Brunei Darussalam, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, and Viet Nam.

One priority action has been identified within this sub-area:

- **Develop and expand affordable housing solutions.** The objective of this action is to improve access to adequate, safe and affordable housing in cities. 'Affordable housing' can be broadly defined as 'dwellings which are adequate in quality and location and do not cost so much as to prohibit their occupants from meeting other basic living expenses or threatens their enjoyment of basic human rights' [175] At present, many ASEAN cities suffer from a shortage of affordable housing which is often exacerbated by rapid urbanisation. The resulting pressure on the cost of housing means residents are forced to substitute housing expenses for expenditure on other basic needs, including food, health care, and schooling for children. Limited access to affordable housing can also lead to the formation of informal settlements (i.e. slums); 28 percent of the urban population lives in informal settlements in cities across AMS.[176] People living in these settlements often do not have access to water and sanitation, and other public services (e.g. schools).[177] This can have a disproportionate impact on women and minorities as large gender pay gaps in most AMS can exacerbate housing concerns for women.[178] Tackling affordable housing issues can also help open up additional economic opportunities for women while saving up to US$16 billion annually as a result of more efficient operations and maintenance.[179]

  City governments play a crucial role in delivering affordable housing solutions as they are in the best position to work with the public, national government agencies, and the local private sector.[180] An affordable housing action would concentrate effort on ensuring identified solutions are appropriate for the local circumstances. These solutions include unlocking private and public land supply for affordable housing through measures such as transport-oriented development, idle-land policies (e.g. taxes on undeveloped land, property tax exemptions for new developments); integrating industrial approaches to improve built quality while keeping costs low; achieving scale and efficiency for operations and maintenance work, including using the private sector to manage operations and installing energy efficiency retrofits; and reducing costs through improving financing policies to ensure that prices are reasonable.[181] A best practice approach is to think about a ladder of housing aspirations, with rising standards for floor space per unit and amenities which can be met over time.

SUB-AREA 3: PERSONAL SAFETY & SECURITY

This sub-area includes actions that safeguard citizens against crime, terrorism, and natural disasters. This could include smart solutions to policing, disaster relief, and potential

[174] *Population living in slums (percent of urban population)*, World Bank Open Data.
[175] *Affordable land and housing in Asia,* UN Habitat, 2011.
[176] *Smart Cities in Southeast Asia*, McKinsey Global Institute, 2018.
[177] *ASEAN social progress,* ASEAN Statistics Office, 2017.
[178] *The Power of Parity: Advancing women's equality in Asia Pacific*, McKinsey Global Institute, 2018.
[179] *Smart Cities in Southeast Asia*, McKinsey Global Institute, 2018.
[180] *A blueprint for addressing the global affordable housing challenge,* McKinsey Global Institute, 2014.
[181] *Ibid.*

measures to combat other transnational issues (e.g. human and drug trafficking). Urbanised areas are particularly at risk of crime and safety issues due to high income inequality, poverty, as well as the large influxes of people (whether migrants or tourists). 12 out of 21 ASEAN cities are ranked in the bottom one-third of cities in Numbeo's Global Crime Index which measures crime rates across 327 cities.[182] 85 percent of cities indicated that this sub-area was of utmost importance to the sustainable development of their city – the highest proportion for any sub-area in the survey conducted by the ASCN.[183]

One priority action has been identified within this sub-area:

- **Introduce digital solutions to enhance safety and security in cities.** Initiatives to improve 'public safety and security' can be defined as steps to ensure that the basic needs of residents (such as food, health, shelter) are met and that they are protected from crime and natural hazards.[184] Crime, in particular, is a burden that falls disproportionately on urban populations globally.[185] Women and children are particularly vulnerable to becoming victims of crime – especially human trafficking, intimate partner violence, and sexual assault.[186] The prevalence of these crimes could exacerbate gender economic inequalities as women might be discouraged to work or travel for fear of being victims of crime. In Southeast Asia, crime and violence remain pressing policy issues; in a recent global report, several (5 out of 7) cities in AMS were ranked in the bottom half on an index measuring personal security in cities, behind other crime-prone cities like Sao Paolo, Istanbul and Mexico City.[187] The effects of rapid urbanisation, poor urban planning, and population density increase – as experienced in many cities in AMS – are some of the main factors contributing directly to increased incidence of crime and violence.[188]

  The objective of this action is to take advantage of relevant digital technologies to help reduce the incidence of crime and threats to public safety, specifically through enhancing the ability of cities to police and strengthen first response; improving channels and reducing disincentives for communities to report criminal activity; and strengthening urban planning to reduce pockets of crime and improve crime prevention. While several AMS cities have also begun exploring the use of technology to enhance public safety across the three areas (for example, Singapore is improving its passive policing capabilities by piloting its 'smart nation sensor' initiative which will equip over 110,000 lampposts with facial recognition cameras to detect unruly crowds and/or illegal gathering of people) [189], many cities continue to face challenges around understanding the most relevant digital solution available, coordination between agencies and limited capacity to operate and maintain these system and would benefit from an action to address these issues.

SUB-AREA 4: WATER, WASTE & SANITATION

This sub-area includes actions which address the challenges of accessing and increasing the efficiency of water delivery, waste management, and sanitation. An example could be

[182] *Global Crime Index by City 2018*, Numbeo. Available at: https://www.numbeo.com/crime/rankings.jsp

[183] Based on priority projects emerging from the May 2018 workshop in Singapore of the ASCN.

[184] *Enhancing urban safety and security: Global report on human settlements*, United Nations, 2007.

[185] While urban crime rates generally exceed those in rural areas, there is some evidence that data may suffer from a number of biases. See for example, *Urban Violence or Urban Peace: Why Are Some Cities Safer than Others?*, Mc Evoy & Hideg, Small Arms Survey, Medium, 2017.

[186] *Indonesia to add hundreds of counter-terrorism police to monitor IS,* Reuters, 2017.

[187] *Smart Cities Index,* The Economist Intelligence Unit, 2017.

[188] *Global report on human settlements 2007: Crime & violence at a glance,* UN-Habitat, 2008.

[189] *Updates on Smart Nation Sensor platform – connecting all 110,000 lamppost in the city*, OpenGov Asia, 2017.

the creation of closed loop waste systems which seek to reduce, recycle, and reuse waste components. The sub-area is of high importance to ASEAN as, for example, 6 out of 7 AMS scored in the bottom one-third proportion of countries for mismanaged plastic waste globally.[190] It is further a priority sub-area for a range of DPs and OEPs, including Australia, Canada, Germany Japan and Korea. Cities often struggle with access to alternative sources of funding for actions in this sub-area as they may not be aware how private sector providers can play a role in this area. One priority action has been identified within this sub-area:

- **Enhance solid waste management systems.** The global growth in solid waste is a serious side effect of the twin forces of urbanisation and economic development. There has been a rapid increase in municipal solid waste being generated (~150 million tons in 2016) since 2000 in ASEAN cities.[191] The challenge of managing solid waste is likely to get more difficult, as solid waste generation in ASEAN is expected to increase by approximately 50 percent from 1995 levels in 2025.[192] While cities in ASEAN have taken steps to improve solid waste management, according to the United Nations Environment Protection agency, existing collection, treatment and transportation of solid waste remains inefficient or backdated.[193] Barriers to projects include a lack of access to capital (only 4 percent of the largest 500 developing world cities have a globally recognised credit rating to access international capital markets), lack of high quality project proposals, inability to guarantee feedstock volumes undermining project economics, and safeguarding projects against risk associated with changes in political leadership.[194] Cities are aware of the need to establish sustainable solid waste management systems, supported by the fact that 19 percent of cities in the ASCN have indicated that a specific project to address solid waste management is a priority action for their city.[195]

  An action in this sub-area will be to improve the overall management of waste collection, segregation, treatment, and recovery in cities. These include preventing/discouraging the use of certain types of solid waste; building reliable collection and separation systems to optimise treatment across the value chain; preventing collected waste from being mismanaged; and accelerating the demand for recycled waste and introducing treatment innovation. The action would have to consider the concerns of various stakeholders in the supply chain – including those in the informal waste picking sector – to promote broad endorsement. The action will also have to identify potential financing opportunities, improve market information and ensure accountability and mechanisms to support enforcement. Further, to ensure the long-term sustainability of the action, the project should include activities to support knowledge transfer to local operators and agencies.[196]

SUB-AREA 5: MOBILITY

This sub-area includes actions promoting the access, affordability and efficiency of transport as well as reducing transport-related pollutants (such as greenhouse gas emissions). It includes the development of public transport infrastructure, ride sharing, smart transport solutions, and more efficient internal combustion engines. Mobility is an area of key importance to ASEAN. Not only is congestion a major concern, but according to the WHO,

[190] Jambeck et al., *Plastic waste inputs from land into the ocean*, Science, 2015.

[191] Waste management in ASEAN countries, United Nations Environment Programme, 2017.

[192] *Report of ASEAN regional assessment of MDG achievement & post-2015*. United Nations Development Programme, 2015.

[193] Waste management in ASEAN countries, United Nations Environment Programme, 2017.

[194] *The Rockefeller Foundation, World Bank Group Innovate to Improve Cities' Access to Funding for Low-Carbon Infrastructure*, World Bank. 2015.

[195] Based on priority projects emerging from the May 2018 workshop in Singapore of the ASCN.

[196] *The next wave*, Ocean Conservancy, 2017

the average number of road fatalities across AMS is higher (18 per 100,000) than the global average (15.8 per 100,000) based on a study of 193 countries globally.[197]

Two priority actions have been identified within this sub-area:

- **Introduce and improve Bus Rapid Transit (BRT) systems.** At present, many public transport systems in cities across AMS are underdeveloped; only serving a small section of the community and leave large swathes of underserved areas.[198] Of increasing concern, the use of public transport across many large cities in ASEAN is declining, with many citizens switching to private modes of transportation (e.g. motorcycles) instead.[199] Should this trend continue, cities in ASEAN are likely to face even greater pressure on their road infrastructure and rising congestion. Constructing BRT system is viewed as one of the most promising approaches to improve public transport availability. A BRT mimics a metro system by using high-capacity buses on city streets on dedicated lanes (ranging from 15-60 kilometres) that travel at high average speeds.[200] The concept prioritises public transport on urban roads at a fraction of the cost of a metro or rail system. BRT systems have been shown to have a significant impact on traffic congestion and daily commute times. For example, Jakarta's BRT system has helped to save commuters 20 minutes daily while reducing 170,000 tonnes of carbon dioxide emissions and 70 million litres of fuel consumption annually. [201] [202]

  While several promising BRT programmes have started across AMS, many cities still face the challenge of a lack of consensus between stakeholders (national governments, transport operators, mayors, etc); poor integration with other existing public transport modes; and developing affordable fares for commuters. The objective of this action is to improve the quality and efficiency of public transport and reduce congestion through the BRT. A well planned and contextualised BRT system could improve the overall effectiveness of public transport while reducing the total proportion of underserved areas in the city.

- **Develop and enhance traffic management systems.** Traffic congestion is a growing problem across cities in AMS. For example, the average number of hours that a commuter spends in traffic jams per annum in Bangkok and Jakarta is estimated to be 64 and 63 hours respectively.[203] Congestion is also starting to affect smaller cities like Bandung, Kuching, and Chiang Mai.[204] There is a significant economic cost to this; for example, the total time-related cost of commuting in Indonesian cities is currently estimated at IDR 498 trillion (US$37 billion) per year and could increase by over 41 percent by 2020.[205] Several cities across various AMS are exploring opportunities to leverage technology to improve the responsiveness and the adaptiveness of their traffic management based on the shifting road conditions. These include interconnected intersection controls, leveraging crowdsourced data sharing platforms (such as the collaboration between

[197] *Global Health Observatory: Number of road traffic deaths*, World Health Organization, 2013.

[198] Past research has defined 'underserved' areas as having a distance of 1.5km or more to the nearest transit stop. See *Rethinking urban mobility in Indonesia: The role of shared mobility services*, AlphaBeta, 2017.

[199] *Current status of public transportation in ASEAN Megacities,* The Korea Transport Institute, 2014.

[200] *Factsheet on Bus Rapid Transit System*, Uemi Solutions, 2017.

[201] Sayeg, Philip, *Post evaluation of a decade of experience with Jakarta's Transjakarta Bus Rapid Transit System*, 2015.

[202] *Saving time and energy through Bus Rapid Transit*, Institute for Transportation & Development Policy and San Francisco Country Transportation Authority.

[203] *Global Traffic Scorecard 2017*, INRIX, 2017.

[204] *Traffic congestion in Kuching is getting worse and little is being done about it*, The Star, 2015; *Incorporating Air Quality Improvement at a Local Level into Climate Policy in the Transport Sector: A Case Study in Bandung City, Indonesia*, Gunawan et al., Environments, MDPI, 2017; *Catalysing sustainable tourism: The case of Chiang Mai, Thailand*, Climate & Development Knowledge Network, 2014

[205] *Rethinking urban mobility in Indonesia*, AlphaBeta, 2017.

ridesharing firm Grab and the World Bank in Cebu), fleet management systems for public transport (in Bangkok and Hanoi), and introducing integrated traffic command centres (such as the City Brain project in Kuala Lumpur). However, some cities face challenges around coordination between relevant government agencies and weak technical support to manage the system once it has been introduced.

An action in this prioritised sub-area aims to reduce traffic congestion and the incidence of traffic accidents in the city. A well planned and contextualised traffic management system and/or technology could potentially improve traffic flows and reduce overall congestion by improving the monitoring of traffic flows, improving the sharing of traffic information with drivers and relevant agencies; and enhancing Traffic Demand Management (TDM) approaches in real-time. The data gathered from this system could also be used in the longer term to rethink urban planning, including road development, public transport accessibility, and congestion charges. A sustainable action in this spaced will also pay special attention to other TDM approaches which help to reduce the number of journeys taken, shift traffic to non-peak times, or non-privates and non-motorised transport options.

SUB-AREA 6: URBAN RESILIENCE

This sub-area focuses on promoting urban resilience against disaster risks and potential impacts of climate change (e.g. city flood defences, early warning systems). Many ASEAN cities are also highly exposed to natural disasters and environmental concerns, particularly rising sea levels as a result of climate change. Unsurprisingly urban resilience is a key priority for four AMS as well as three DPs and OEPs, who have very deep expertise in the field.

One priority action has been identified within this sub-area:

- **Develop flood management systems.** Cities in AMS are facing growing threats from climate change, especially flooding. A study by the OECD found that 6 out of 12 ASEAN cities are in the top one-third of global cities most prone to flooding.[206] Cities are implementing various plans to reduce inundation from flooding; these solutions range from cleaning rivers to enhance drainage (Kuala Lumpur's river of life programme), tracking rising water levels of drains and canals in real-time (Singapore's SMART water-grid system). However, rapid population growth and poor maintenance has led to the deterioration of flood management systems, reducing their functionality. This is a crucial priority for many ASEAN cities – 11 percent of cities in the ASCN have indicated that developing flood management approaches is a priority action for their city.[207] Flood management also has larger gender inclusiveness implications as women tend to be disproportionately affected by national catastrophes such as floods. For example, women accounted for 61 percent of deaths in Cyclone Nargis in Myanmar and 70 percent of deaths in the Aceh tsunami.[208]

  Moreover, despite bringing unique experiences and skills to disaster risk reduction and management, these skills are often not acknowledged or tapped into sufficiently. That is because women tend to have lower rates of decision-making in disaster management activities and their efforts are sometimes overlooked by the local community.[209]

[206] *Ranking Port Cities with High Exposure and Vulnerability to Climate Extremes: Exposure Estimates*, Organisation for Economic Cooperation and Development, 2008.

[207] Based on priority projects emerging from the May 2018 workshop in Singapore of the ASCN.

[208] *Gender and disaster risk reduction*, Global Gender and Climate Action – UNDP, 2013.

[209] *Ibid.*

Some key barriers surrounding the implementation of such actions involve a lack of prioritisation, limited strategic planning and implementation capacity meaning ASEAN can play a role of linking cities with the right technical expertise and solutions. Further barriers include legislative challenges, such as acquiring land of infrastructure, a lack of data and weak coordination across government departments. The aim of this action is to help cities assess existing flood management infrastructure and develop a comprehensive integrated flood management master plan that considers increasing infrastructural pressures, and capacity building to maintain these systems. Best practice approaches ensure that food management occurs in a way that is highly integrated with other areas of urban planning such as transport and develops holistic solutions for the entire watershed, not isolated measures. Further, legislation needs to be considered as a viable flood management solution such as adapting building codes, zoning laws and protecting natural catchment. Cities should also consider their ability to 'live with floods' rather than focussing solely on prevention (e.g. currency of emergency responses services, financial reserves set aside to deal with the flood fallout, ability of buildings and infrastructure to deal with flood impact). Innovative solutions such as hybrid infrastructure and flood preventing construction techniques should also be trialled.

SUB-AREA 7: EDUCATION

This sub-area focuses on producing an appropriately skilled workforce that can be resilient to changing industry needs and automation. It includes skills retraining, digital skills development, and vocational training programmes (with the exception of education covered in other areas such as for tourism and healthcare professionals). Education is of high importance to the ASEAN region. According to the UNDP's Human Development Index education component, ASEAN scores below the global and Asia Pacific average of 0.638 and 0.635 out of 1.[210] Further, job creation is a key concern for many ASEAN cities. According to the MGI disruptive technologies (e.g. Mobile Internet, big data, IoT, automation, and cloud technology) could displace 12-17 million non-farm jobs in ASEAN alone, by 2030. [211] 6 AMS see education as at least a medium priority when it comes to generating employment. On top of this, several DPs and OEPs extensively support education in the ASEAN region.

One priority action has been identified within this sub-area:

- **Develop digital skills through 'industry boot camps'.** In Southeast Asia, the Internet economy is estimated to grow to US$200 billion by 2025 and Mobile Internet growth alone is estimated to boost GDP by US$58 billion.[212] Cities across ASEAN are therefore looking to develop their digital economies by establishing themselves as 'techhubs'. However, a large majority of these techhubs are limited to capitals at present. For example, of the 38 techhubs in Thailand, 27 are in Bangkok.[213] This creates the risk that as the internet economy develops in ASEAN, there could be growing inequalities in economic outcomes between these digital hubs and other cities. Building digital skills has been identified as the policy lever which matters the most to developing a vibrant digital ecosystem.[214] For example, in a bid to prepare its population for the global digital workforce, Ho Chi Minh City's Department of Education and Training adopted Internet Computing Core (IC3) Digital Literacy certification in all primary, secondary and

[210] *Human Development Data*, United Nations Development Programme, 2015.

[211] *No Ordinary Disruption: The Forces Reshaping Asia*, McKinsey Global Institute, 2015

[212] *E-Conomy SEA Spotlight 2017 - Unprecedented growth for Southeast Asia's $50B internet economy*, Google-Temasek, 2017 and *One million opportunities: The impact of mobile internet on the economy of Southeast Asia*, Oxford Economics, 2016.

[213] *Asia Pacific: a look at the 565 active tech hubs of the region's emerging economies,* GSMA, 2018.

[214] *Digital Nation: Policy levers for investment and growth*, AlphaBeta, 2017.

post-secondary schools.[215] However, many cities experience a shortage of such digital skills. Academic research on Indonesia, Malaysia, Thailand, Philippines and Singapore has identified the 'inability of educational institutions to meet industry demands', and 'weakness in Science, Technology, Engineering and Mathematics (STEM) and Technical and Vocational Education and Training (TVET) programs' as among the key challenges facing these countries.[216]

A second challenge related to the growth of digital technologies is managing the potential disruption in the labour market. Technological advances such as automation and AI will require a radical shift in education and training. For instance, it has been projected that over 50 percent of students are being trained in jobs that will be radically changed by automation.[217] Women could be particularly impacted by these changes. 57 percent of jobs which are projected to be displaced between now and 2026, will belong to women.[218] Key barriers in this area include a high dependency on national policy and curricula and limited capacity of Local Government Units (LGUs), local training providers and trainers to transfer digital skills. The digital economy is still relatively new territory to many AMS and it is also constantly evolving. This means cities as well as national governments often lack the technical know-how as well as resources to provide the population with adequate digital training, for example a lack of teachers or trainers with adequate digital skills themselves. There can also be significant shortcomings on basic ICT infrastructure required.

Further, a lack of industry coordination leads information failures as it is hard for cities to determine the skill needs of an everchanging industry looking from the outside in. [219] Cities can leverage private sector partnerships to overcome these barriers and equip their citizens with the appropriate digital skills to meet modern industry needs.[220] Cities in ASEAN have partnered with private sector companies to design programmes to advance their citizens into a digital workforce. Singapore's national SkillsFuture programme partners with Microsoft to provide courses on software development, data analysis, cloud technologies, and online facilitation.[221] In Indonesia, Google partners with local universities in a number of cities as part of their Indonesia Android Kejar initiative that aims to train 100,000 Indonesians in Android app development by 2020.[222] Google further supports 'Google developer community groups' in 7 Indonesian cities and several other cities in ASEAN which are community led groups exchanging knowledge, organising study jams and hackathons.

'Industry boot camps' are an innovative approach to bridge the skills gap between industry needs and skills taught, as well as integrating industry into the education process. These boot camps are industry-led training programmes, each two to three months long, which teach practical skills needed within specific sectors. The boot camps also provide individual support to the participants, such as job interview preparation, and guaranteed interviews with potential employers. Similar programmes have been successfully undertaken by Infrastructure Leasing and Financial Services in India and the Generation programme which operates across over 70 locations in over 65 cities.[223]

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[215] *Ho Chi Minh City in Vietnam Launches IC3 Digital Literacy Certification for All Primary, Secondary and Post-Secondary Students*, Certiport, 2014.

[216] *Managing skills challenge in ASEAN-5*, Tan & Tang, SMU - J.P. Morgan, 2016.

[217] *The New Work Order*, AlphaBeta, 2015.

[218] *Towards a Reskilling Revolution: A Future of Jobs for All*, World Economic Forum, January 2018.

[219] *Managing skills challenges in ASEAN-5*, SMU-J.P. Morgan, 2017.

[220] *ASEAN needs vocational skills boost – now*, Bangkok Post, 2018.

[221] See the SkillsFuture – Digital Workplace website for more details.

[222] Interview with Google representative.

[223] Worldwide, more than 75 million young people are unemployed. But many employers can't find people with the skills they need for entry-level jobs. Generation is a non-profit founded in 2014 by McKinsey & Company to help bridge the skills gap between unemployed and employers who cannot find people with the skills they need for entry-level jobs – at speed and scale. For further information, see https://www.generation.org/

While industry boot camps vary in design depending on the sectors involved, the ASEAN programmes would need to have a heavy emphasis on digital skills that cut across all sectors of the economy.

III. INCLUSIVENESS IMPLICATIONS OF ACTIONS

It is important to note that urbanisation trends, as well as the implementation of sustainable urbanisation actions may impact different population groups differently presenting challenges and opportunities alike. In other words, there can be significant social inclusiveness implications of sustainable urbanisation (i.e. on gender, disability as well as youth and the elderly). For example, women's usage of public transport or commuting patterns differs significantly to that from men. On the flipside, marginalised population groups can bring unique perspectives and contributions to sustainable urbanisation practices. There is a range of evidence highlighting that women have significant roles to play in the implementation of sustainable urbanisation solutions, for example, in waste and flood management. [224] Sustainable urbanisation efforts need to be aware of this in order to avoid entrenchment of marginalisation and growing exclusion.

The ASUS addressed this by consulting with leading gender inclusiveness development expert and best practices to promote inclusiveness (such as compiling Gender Action Plans or having individual consultations with local NGOs and women's groups) were included in action plan templates. Exhibit 16 gives some examples of inclusiveness challenges and opportunities associated with the 8 priority actions.

EXHIBIT 16: SOCIAL INCLUSIVENESS CHALLENGES AND OPPORTUNITIES

All of the prioritised actions have a large potential impact on social inclusiveness

NON-EXHAUSTIVE - EXAMPLES

Sub-area	Prioritised action	Challenges	Opportunities
Inclusive & equitable growth	Introduce and improve access to digital payment solutions to enhance financial inclusion	• Only **51%** of women have access to financial services in ASEAN which is more than men	• Digital finance could give 1.6 billion individuals access to a financial account for the first time, and **880 million** of them would be women
Housing & Home	Develop and expand affordable housing solutions	• **Large gender pay gaps** in most AMS exacerbate housing concerns for women. Women-led households suffer disproportionately from inadequate housing.	• Create affordable housing, close to business centres, opening up economic opportunities for women.
Personal safety & security	Introduce digital solutions to enhance safety and security in cities	• In some AMS **44% of women** have been victims of violence.	• Provide digital solutions to enhance emergency responses (e.g. smartphone emergency buttons) and reporting/conviction of crimes against women
Water, waste & sanitation	Enhance solid waste management systems	• Children are particularly vulnerable to environmental health risk caused by waste. • Other studies detected presence of dioxins from hazardous waste in breast milk of women.	• Inclusion of women in solid waste management ensures proper sanitation behaviour is observed by the community and contributions in cash, kind or labour are used
Mobility	Introduce and improve Bus Rapid Transit (BRT) systems	• Lack of efficient public transport systems can have a significant impact on women and people with disabilities, by limiting their economic opportunities • For example, a survey of Indonesian women found that **31% women** who have ever turned down a job did so because of transport constraints	• Reduced commute times opening up available economic opportunities for women and people with disabilities
	Develop and enhance traffic management systems		• A Rand survey of Indonesian women asked for the main reasons for not using public buses. For non-BRT buses **31% cited inconvenience and 55% slowness while only 4% and 6%** said the same about BRT buses
Urban resilience	Develop flood management systems	• Women are disproportionately affected by national catastrophes such as floods. For example, women accounted for **61% of deaths** in Cyclone Nargis in Myanmar, **70% of deaths** in the Aceh tsunami.	• Case studies demonstrate that women have a crucial role to play in local flood management systems
Education	Develop digital skills through "industry boot camps"	• In Philippines and Vietnam, women are **2x as likely** to occupy jobs at high risk of automation as males. In Indonesia and Thailand, they are **1.5x more likely** • **Only 34%** of computer science undergraduates in ASEAN are women	• Equip ASEAN workforce, particularly women, with the digital skills they need to secure future employment (potentially increasing salaries by 30% on average)

Source: McKinsey Global Institute, United Nations, Rand Corporation.

[224] *Gender and disaster risk reduction*, Global Gender and Climate Action – UNDP, 2013

4. MAKING IT HAPPEN

4. MAKING IT HAPPEN

The ASEAN Sustainable Urbanisation Strategy (ASUS) includes two types of 'toolkits':

1. **Prioritisation toolkit:** This toolkit aims to provide cities with a practical guide for how they can prioritise key sub-areas of sustainable urbanisation (and associated actions) on which to focus.

2. **Action plan toolkit:** This toolkit provides implementation templates for 8 priority actions[225] that cities can then customise to their specific contexts. This can help cities fast-track the process of developing high-quality implementation plans for actions they have decided to prioritise. It is envisaged that cities will use the action plan toolkit in different ways, depending on the context. For example, some cities may use the toolkit to refine their implementation plans. Other cities may use the toolkit to develop high quality proposals to engage Dialogue Partners and other External Partners (DPs and OEPs) and other implementation partners.

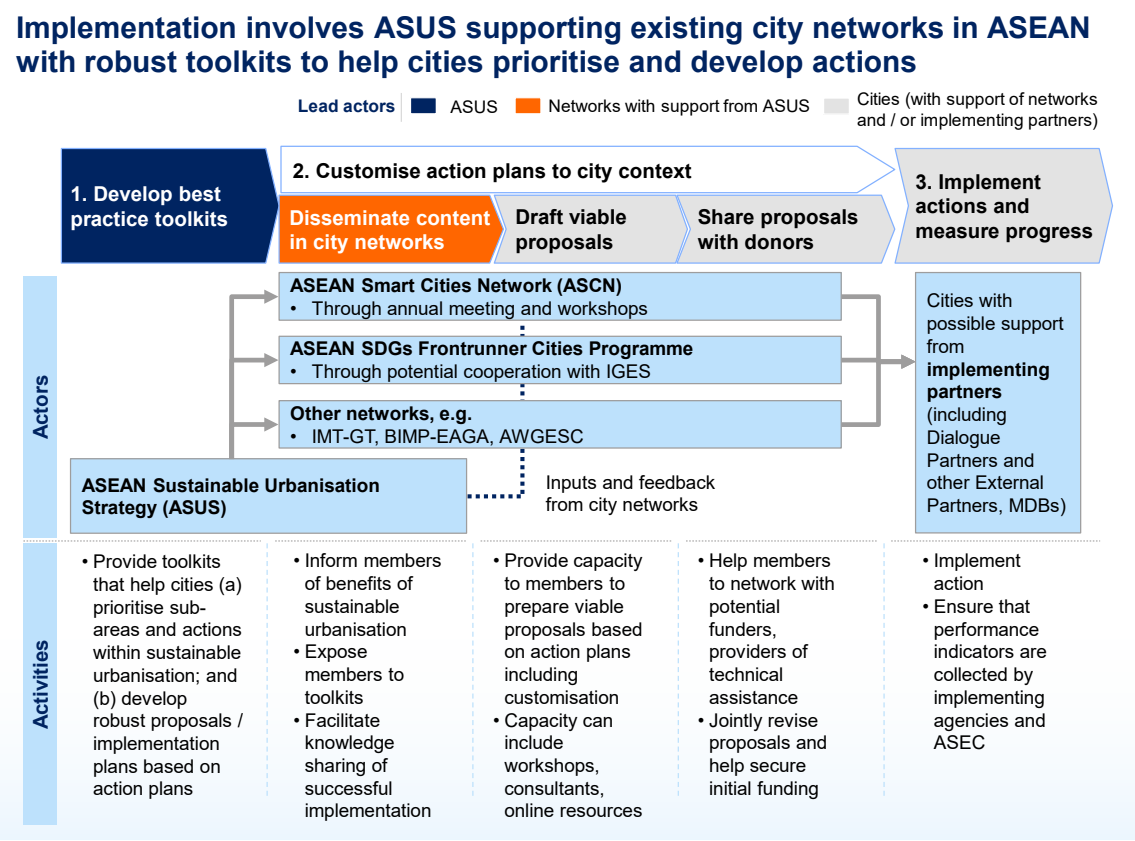
To ensure effective utilisation of these toolkits, it will be vital to develop strong implementing and monitoring mechanisms, and to consider how to address key risks. This is particularly important given that the ASUS is not an implementing body in itself, but rather focuses on providing high quality content (in these toolkits) for cities to utilise.

I. IMPLEMENTING MECHANISMS FOR THE ASUS

The stocktake of urbanisation actions in ASEAN completed as part of the ASUS development (see Chapter 2) revealed that one of the key gaps facing cities is a lack of strategic capabilities to support the development of credible action plans and/or project proposals that can then attract funding from other parties (e.g. DPs and OEPs, multilateral development banks, private sector). The ASUS helps to address this by providing toolkits that help cities prioritise sub-areas and actions, and then to develop high-quality, or improve existing, implementation plans for certain actions. Exhibit 17 describes the envisaged implementation approach. To disseminate these toolkits as well as to receive ongoing input, the ASUS will work closely with city networks in ASEAN, such as the ASEAN Smart Cities Network (ASCN), the ASEAN Sustainable Development Goals (SDG) Frontrunner Cities Programme, ASEAN Mayors Forum, and various other city networks in ASEAN, such as those operating under the Brunei Darussalam-Indonesia-Malaysia-Philippines – East ASEAN Growth Area (BIMP-EAGA), and the Indonesia-Malaysia-Thailand – Growth Triangle (IMT-GT). This dissemination could involve presentations at the meetings of these city networks and sharing information through the networks' official channels (e.g. newsletters, links on websites).

[225] The eight priority actions are : 1) 'Introduce and improve access to digital payment solutions to enhance financial inclusion'; 2) 'Develop and expand affordable housing solutions; 3) 'Introduce digital solutions to enhance safety and security in cities'; 4) 'Enhance solid waste management systems'; 5) 'Introduce and improve Bus Rapid Transit (BRT) systems'; 6) 'Develop and enhance traffic management systems'; 7) 'Develop flood management systems'; 8) 'Develop digital skills through industry boot camps'.

EXHIBIT 17: THE ASUS IMPLEMENTING MECHANISM



As outlined in Exhibit 17 above, there are several steps involved in implementing city-level actions:

- **Step 1: Develop best-practice toolkits.** An initial set of toolkits have been developed as part of the formulation of the ASUS. The 'prioritisation toolkit' will help cities prioritise relevant sub-areas and actions. The 'action plan toolkit' will help cities develop robust implementation plans for priority actions. The action plan toolkit includes detailed activities, timelines, monitoring mechanisms, and lessons learnt on implementation. Based on city-level demand, toolkits may be developed for additional sustainable urbanisation actions in the future. The action plan toolkit is sufficiently detailed to provide cities a thorough understanding of what is required to implement the respective sustainable urbanisation actions, while broad enough to be applied to a variety of city contexts (e.g. level of development, technical sophistication, etc).

- **Step 2: Customise action plans to city context.** It is envisioned that cities can customise the provided action plan templates for their city context and based on their needs. Subsequently these templates can be used to develop credible proposals to help engage DPs and OEPs, multilaterals and the private sector to secure financing and technical assistance. To facilitate customisation, the ASUS will work closely with existing city networks (e.g. ASCN, ASEAN SDG Frontrunner Cities Programme), providing them with the developed toolkits, as well as sharing the content of the ASUS in this document (e.g. informing cities about trends, barriers to implementation, etc). These city networks can then help disseminate this content among their member cities (e.g. raising awareness of the action plans, providing access through online channels) as well as provide capacity to help cities transform templates into viable project proposals (e.g.

through workshops and technical assistance), ready to engage with potential donors (e.g. DPs and OEPs, multilaterals, private sector). Note: the ASUS actions will only be a subset of the total actions being pursued in these city networks.

- **Step 3: Implement actions and measure progress.** Implementing partners (which could include DPs and OEPs, multilateral development banks, and the private sector) can provide support for implementation of the city action plans and proposals (if needed), potentially also refining the implementation plan further, and gather information on agreed input / output / performance indicators (see monitoring and evaluation mechanisms below).

II. MONITORING AND EVALUATION MECHANISMS

It is vital that the monitoring and evaluation (M&E) mechanisms for the ASUS are rigorous, practical, and coordinated with the relevant city networks in ASEAN, in order to avoid wasteful duplication of efforts.

There are two basic criteria that city actions must fulfil in order for them to be considered under the scope of the ASUS:

1. **The implementing city is part of a city network in ASEAN.** This is important as it will help with gathering data on progress related to the agreed progress metrics.

2. **The action relates to one of the ASUS priority actions.** Initially, this relates to one of the eight prioritised actions discussed in the previous chapter. Over time, additional actions may be added based on interest from cities and other key stakeholders (e.g. DPs and OEPs).[226]

For those city actions which come under the scope of the ASUS, progress will be measured at the outcome and output levels. Exhibit 18 outlines the metrics that will be monitored under the ASUS. Outcome metrics has previously been outlined in the MPAC 2025, however, due to challenges of measuring performance indicators on a frequent basis a simple set of additional outcome metrics will be monitored that are designed to allow the tracking of progress of sustainable urbanisation in ASEAN, in particular during the early stages of action implementation.

[226] The ASUS is designed to be adaptive and dynamic, meaning over time periodic reprioritisation may occur which could lead to the inclusion of further priority sub-areas and actions. If this occurs, whether or not pre-existing actions related to these new priorities would be considered under the scope of ASUS would need to be decided in coordination with the respective networks in ASEAN, cities and action administrators on an individual basis.

EXHIBIT 18: METRICS USED FOR MONITORING AND EVALUATION OF THE ASUS

To provide a holistic measure of the progress of the ASUS a set of metrics are collected at two levels

Metrics	Description
Outcome	i. Improvement in city-level urbanisation performance indicators ii. Number of ASUS-related actions that have been commenced by cities in ASEAN, including those utilising ASUS toolkits iii. Number of implementation plans and/or project proposals that have been finalised for ASUS-related actions by cities in ASEAN iv. Number of ASUS-related actions for which implementation (or pilot) has started
Output	i. Platform for sharing best practices established ii. Diagnostics for city-level performance in urbanisation conducted

SOURCE: MPAC 2025; ASUS

The approach to measurement of these metrics will be as follows:

OUTCOME METRICS

i. Improvement in city-level urbanisation performance indicators

The application of a single performance index to measure city-level sustainable urbanisation is not feasible for three reasons. First, each city has very different contexts and so metrics may not be suitable across all cities. Second, given the variety of actions that cities may choose to pursue, it will prove difficult to comprehensively measure performance across the full scope of city-level activities. Third, gathering data in a timely fashion can prove difficult across a large number of cities.

Instead, an 'outcome harvesting' approach will be used to measure changes in urbanisation performance for cities pursuing actions related to the ASUS, and how the action has contributed to the observed changes. 'Outcome Harvesting' is an evaluation approach in which evaluators, grant makers, and/or programme managers and staff identify, formulate, verify, analyse, and interpret 'outcomes' in programming contexts where relations of cause and effect are not fully understood. Key stakeholders in cities will be interviewed and desktop research completed as part of such analysis. To allow for sufficient time to observe changes in performance, the assessments would take place over a relatively long-time interval (e.g. every 5 years).

Outcome Harvesting approaches have proven to be especially useful in complex situations when outcome metric data can be difficult to gather, and cause and effect can be challenging to discern. For the eight priority actions, Section V of the Appendix provides a list of potential performance indicators that could form part of the evaluation.

A range of suggested performance indicators are provided to give flexibility to cities in their measurement approach (e.g. allowing for different measurement capacities). To assist the evaluation process, cities and their implementing parties will be asked to include gathering of the suggested performance indicators into their project design. These performance indicators have been included in the ASUS action toolkits provided to cities.

Over time, these indicators could be used to form an index of city-level urbanisation performance with sub-indices in each of the 18 sub-areas of the ASUS framework. Further, existing indexes could be utilised to inform outcome tracking (e.g. EIU liveability index, SDG index, UN-Habitat City Prosperity Index), however many of these existing indices currently have limited coverage of cities in ASEAN and also suffer from a lack of specificity (in terms of measuring performance related to specific urbanisation actions).

Additional outcome metrics were chosen as they are easily generalisable across actions and different city contexts. This is important for ensuring the monitoring mechanism can be practically implemented. The ASUS would defer to the respective city network/ or each participating city / relevant sectoral bodies' assessment frameworks in measuring these outcome metrics.

ii. *Number of ASUS-related actions that have been commenced by cities in ASEAN, including those utilising ASUS toolkits*

The term 'commencement' is used to keep the outcome metric flexible, hence not be too prescriptive on how cities may want to approach or implement actions. For example, some cities may already have secured funding or conducted early feasibility studies while others may start from the ground up. The minimum requirement for commencement is that city representatives to their respective networks have committed to pursuing an action that satisfies the two criteria outlined above.

iii. *Number of implementation plans and/or project proposals that have been finalised for ASUS-related actions by cities in ASEAN*

iv. *Number of ASUS-related actions for which implementation (or pilot) has started*

Different to commencement, this metric would require an action to have started 'physical' implementation. Again, ASUS is not prescriptive on how cities may choose to implement actions. However, it would be required that funding and technical solution providers for the action (or at least a pilot) are in place and implementation has kicked off.

OUTPUT METRICS

i. *Platform for sharing best practices established*

As part of the development of the ASUS, a stocktake of existing actions to promote sustainable urbanisation in ASEAN was conducted and the insights shared at an ASUS Forum in Singapore in July 2018. The meetings of the existing city networks in ASEAN could provide ongoing platforms for sharing best practices.

ii. *Diagnostics for city-level performance in urbanisation conducted*

A diagnostic of city-level performance in urbanisation was conducted as part of the development of the ASUS. The 'outcome harvesting' approach described earlier could provide an opportunity for updating this analysis at periodic intervals.

The process for monitoring & evaluation will be conducted as follows:

- City (and relevant national-level) implementing agencies and implementing partners will drive the implementation of actions and be responsible for reporting information on the input metrics every year (or based on the respective city network's M&E mechanism).
- The city networks in ASEAN, with support from the ASEAN Secretariat (ASEC) as needed, will gather this information from cities. This could be done through a short online survey (as previously used with cities in the development of the ASUS) and/or as part of the discussions during the meetings of these networks. It is noted that some city networks would already have or are planning to develop their own M&E mechanism, meaning any M&E conducted for ASUS should be integrated and come at no additional burden to cities or networks.
- ASEC will then aggregate this information across the different city networks through their M&E mechanism, where applicable, and then communicate the results to the Lead Implementing Body for Sustainable Infrastructure (LIB-SI) and the ASEAN Connectivity Coordinating Committee (ACCC).

III. ADDRESSING KEY RISKS TO IMPLEMENTATION

As part of this process, it will be important to manage certain risks:

- *Lack of coordination between the ASUS and cities in different ASEAN networks on reporting.* If there is a lack of coordination between the ASUS and the different city networks in ASEAN, as well as the cities who are part of these networks, in terms of monitoring and evaluation processes, this will reduce the likelihood that information is reported in a consistent manner. To guard against this, the reporting requirements (in terms of input and output metrics) have been designed to be as practical as possible for cities and their respective city networks to gather and would need to take into consideration any M&E mechanism that is already in place or planned to be developed in these city networks. In addition, representatives from each of these different city networks have been actively involved in the preparation of the ASUS, including in the stakeholder forums conducted. Going forward, it is proposed that ASEC representatives interact regularly with representatives from the different city networks in ASEAN during their respective meetings, to update on progress and raise potential concerns.
- *Cities not using toolkits.* There is a risk that ASEAN cities do not draw upon the ASUS toolkits. The toolkits have been designed with strong city input. To further mitigate this concern, it will be important for ASEC to work closely with city networks to ensure the toolkits are shared and socialised in their respective networks, and that further actions are added to ASUS over time based on demand (from cities as well as DPs and OEPs). It should be noted however, that ASUS priority actions would cover various city networks and comprise only a subset of the all actions implemented by network member cities.
- *Lack of capacity for cities to customise plans.* A potential concern is that cities lack the resources or capacity to customise the ASUS action plans to their city context. While some technical support is provided through the various city networks in ASEAN, further resources may be needed to help cities develop proposals ready to engage potential implementing partners. ASEC will work with the city networks and implementing partners (e.g. DPs and OEPs, private sector) to identify ways to provide additional support to cities as needed.

METHODOLOGICAL APPENDIX

METHODOLOGICAL APPENDIX

I. METHODOLOGY FOR CONDUCTING STOCKTAKE OF SUSTAINABLE URBANISATION ACTIONS

To gain a robust understanding of the ongoing actions to promote sustainable urbanisation in ASEAN cities, a comprehensive assessment of the different actions was conducted.[227] Drawing on desktop research, analysis of Dialogue Partners and other External Partners (DPs and OEPs) and Multilateral Development Bank programmes, existing city-based networks, and interviews with key stakeholders, the analysis examined the focus of existing actions, linking it to the sub-areas of the ASUS framework, and the lessons learnt from their experiences to date (e.g. barriers to impact). Sustainable urbanisation actions in ASEAN were also classified based on their geographical coverage into five broad groups: Global/ Asia, ASEAN, sub-regional, national, sub-national (see exposition in Chapter 2 for details).

197 individual actions were sampled. Many of these actions span a range of sub-areas. To compute the insights on geographical coverage and focus by area of sustainable urbanisation, a simple average of actions was used.

II. METHODOLOGY FOR IDENTIFYING COMMON BARRIERS

The categories for barriers to implementation faced by different sustainable urbanisation actions in ASEAN were chosen in accordance with the established framework in the Master Plan on ASEAN Connectivity (MPAC) 2025, with the addition of 'strategic planning' which emerged as a key barrier during the discussions with experts. Barriers were identified in the following ways: i) by reviewing the annual progress and/or evaluation reports of various development aid agencies such as from the Japan International Cooperation Agency (JICA) or Australia's Department of Foreign Affairs and Trade (DFAT); ii) surveying the academic literature; iii) conducting targeted interviews with aid agencies, multilateral organisations, and government officials; and iv) through surveys disseminated across city networks in ASEAN (e.g. the ASCN).

III. METHODOLOGY FOR PRIORITISATION OF SUB-AREAS

Prioritisation of sub-areas of sustainable urbanisation was achieved by scoring each sub-area against four criteria:

1. IMPORTANCE

Approach: Relevant performance metrics were identified to assess the current overall performance of ASEAN and ASEAN cities in the 18 sub-areas. The performance was then compared to similarly developed regions and countries globally. In order for a sub-area to be considered of 'High' or 'Some' importance (i.e. requiring additional support to address**)** the majority of cities in ASEAN / ASEAN Member States (AMS) covered by the metric had to be in the bottom or mid-third of performers respectively amongst all cities/countries

[227] 'Actions' refers to the various urban-focused initiatives, programmes, and projects that have been implemented, or are in the process of implementation across ASEAN cities.

sampled, or if ASEAN as a whole scored worse than Asia Pacific average, or better than Asia Pacific but worse than the global (the next highest aggregation) average respectively.

Data sources: Where available, data for AMS cities provided by their respective national statistics offices was used. However, since some metrics were part of a larger global study, or an index which had city data, we used the data from that database/index to allow for comparison. Metrics used were selected according to the following criteria:

- **Timeliness.** Recent data is available and updated at regular intervals
- **Robustness.** Metrics obtained from reliable sources and provide accurate measurements
- **Availability.** Only metrics/ indicators which included 6 or more AMS and their cities were considered
- **Relevance.** Metric/ indicator is relevant to urban issues rather than just general national indicators

Scoring: Scoring of performance across these metrics was conducted as follows:

- If the majority of ASEAN cities/ Member States sampled scored in the top one-third of cities/countries sampled, or if ASEAN as a whole measured better than the global and Asia Pacific average, the performance was defined as 'strong'
- If the majority of ASEAN cities/ Member States sampled scored in the middle-third (i.e. top 66th percentile but did not reach top 33th percentile,) or if ASEAN as a whole measured above the Asia Pacific average, but lower than the global average, the performance was defined as 'average'
- If the majority of ASEAN cities/ Member States sampled scored were in the bottom one-third of cities/countries sampled, or if ASEAN as a whole measured below the Asia Pacific (the next highest aggregation) average, the performance was gauged as 'weak'
- If there was no distinctive pattern across AMS– the performance was defined as 'average' i.e. neither a strong nor weak performance

When gauging overall performance, sub-areas which were scored overall 'weak' were considered of 'High'; importance, whereas 'average' performing sub-areas were considered of 'Some' importance. In instances where two or more metrics were used, the overall assessment was based on the worst performance i.e. if the performance of one metric is strong and the other is weak, the overall assessment for sub-area was 'weak'. This is because, that since indicators within sub-areas can differ significantly, we need to mitigate the risk of potentially important sub-areas being excluded simply because they scored high for one indicator. Exhibit 19 provides an overview of the metrics used, ASEAN's performance and sources.

EXHIBIT 19: METRICS USED TO ASSESS 'IMPORTANCE' OF SUB-AREA AND ASEAN'S AGGREGATE PERFORMANCE

Criterion 1: Importance

Importance of different areas to sustainability outcomes in cities in ASEAN

Performance of ASEAN cities[1] — Strong | Average | Weak | Data unavailable

Area	Metrics used	Performance	Description	Source
Social cohesion	Quality female labour participation		Female labour force participation was approximately **61%** across ASEAN exceeding the global average of 51%.	ILO
	Gender Gap Index		6 out of 10 ASEAN Member States are in the **middle one-third of countries** in WEF's gender gap Index.	World Economic Forum
Inclusive & equitable growth	Financial inclusion		Financial inclusion in ASEAN is approximately **50 percent** – much lower than the Asia Pacific average of 70 percent	World Bank
	Under the poverty line (% of urban population)		The proportion of the urban poor that live below the poverty line is relatively low compared to other urban areas – 6 out of 7 ASEAN Member States are in the **top one-third** of 52 countries sampled. Urban areas in ASEAN have **1-13 percent** of their urban population under the poverty line – compared to other middle – income countries in the group (e.g. Pakistan, 18 percent; Honduras 60 percent)	World Bank
Culture & heritage	EIU Liveability Index 2015 – Culture and environment		**7 out of 9 ASEAN cities** sampled are in the **bottom one-third of countries in** of EIU's Liveability Index of 144 cities– behind cities like Mexico City, Mexico; Bratislava, Slovakia; and Praetoria, South Africa	EIU
Tourism	Number of overnight visitors		**4 out 7 ASEAN cities** considered, are ranked in the **top one-third of countries in MasterCard's Global Destination Cities Index (2016)** - which measures the number of overnight visitors and per visitor spend in 135 cities globally	Master-Card
	Visitor spend			
Housing and home	Slums (% of urban population)		The proportion of people living in urban slums in ASEAN cities is one of the highest in the region; **6 out of 7 urban areas** in ASEAN Member States have a **larger proportion of urban population living in slums** than the average in Asia (25%)	World Bank
Healthcare	Mortality from cancer		The average **likelihood of death after developing cancer** is higher in ASEAN (76%) than in Asia Pacific (73%) and the World (65%)	WHO
	EIU Liveability Index 2015 – Healthcare		**8 out of 9 ASEAN cities** are in **the bottom one-third of countries sampled in** EIU's Liveability Index in 2015 sub-index for healthcare – which sampled over 144 global cities	EIU
Other public services	Life expectancy		**5 out of 7 ASEAN cities** were in the **bottom one-third** of the EIU Safe Cities Index (2017) study of 60 global for life expectancy – with 3 of them being in the bottom 5.	EIU
	Number of doctors (per 1000)		**6 out of 7 ASEAN cities** sampled in the EIU's Safe Cities Index (2017) study of 60 global cities were in the **bottom one-third** of the index	EIU
Personal safety & security	Nuembo's Global Crime Index		**12 out of 21 ASEAN cities** are ranked in the **bottom one-third of cities** in Nuembo's Global Crime Index which measures crime rates across 327 cities	Nuembo
Cyber-security	Malware encounter rates		**6 out of 7 ASEAN Member States** recorded the most malware encounters globally **(bottom one-third of countries when measure from 'least' to 'most' encounters)** (111 sampled) in Q1/2017 – averaging more than twice the encounter rate compared to the global average	Microsoft
Water, waste & sanitation	Access to improved sanitation (% of urban population)		**5 out of 9 ASEAN Member States** and their urban areas show access to improved sanitation that is in the **middles one-third of countries** sampled globally (195 in total)	WHO
	Mismanaged plastic waste		**6 out of 7 ASEAN Member States** recorded the **worst (bottom one-third)** proportion of mismanaged plastic waste globally (192 countries studied)	Jambeck et. al
Energy	PM2.5 Pollution		In a global study of urban areas in 179 countries, air quality in urban areas in 5 out 10 ASEAN countries are in the **middle-one third of countries**	World Bank
	Access to electricity (% of urban pop.)		**9 out of 10 ASEAN Member States** and their urban areas are above the global average (96%) in access to electricity	World Bank
Food	EIU Global Food Security Index		**5 out of 9 ASEAN Member States** are ranked in the **top two-thirds of countries sampled in** EIU's Global Food Security, which measures the affordability , availability and quality of food across a 113 countries	EIU
Mobility	Road fatalities (per 100,000)		The average number of road fatalities across ASEAN Member States is **higher (18 per 100,000) than the global average** (15.8 per 100,000) based on a study of 193 countries globally.	WHO
	Urban Mobility Index 2.0		**ASEAN cities** performed lower (average score of 39.5) than the global average (average of 43.9) in Arthur D. Little's Urban Mobility Index 2.0 which sampled 84 cities globally	Arthur D. Little
Building & construction	EIU Liveability Index 2015 – Infrastructure		**6 out of 9 ASEAN cities** sampled are in the **bottom one-third** of countries sampled in EIU's Liveability Index of 144 cities sub-index for infrastructure	EIU
Urban resilience	Risk of flooding		**6 out of 12 ASEAN** cities are in the **bottom one-third** of global cities at least risk from flooding at present– 5 of them are in the bottom 20	OECD
Entrepreneurship & innovation	Access to finance as a barrier		The proportion of enterprises surveyed that reported access to finance as a barrier to business in **7 out of 7 ASEAN Member States** was lower than the global average (10.7% across ASEAN versus 26.3% globally)	World Bank
Trade & commerce	Citibank-EIU Competitiveness 2025 Index		**5 out of 9 ASEAN Member States** sampled in Citibank-EIU's Competitiveness 2025 Index were in the **top two-thirds** (120 cities were sampled in total)	Citibank and EIU
	Ease of doing business Index		There is significant variation between ASEAN Member States – with **4 in the top one-third, 3 in the middle one-third and 3 in the bottom one-third**	OECD
Education	Human Development Index - Education		According to the UNDP's Human Development Index Education component, ASEAN scores **below the global and Asia Pacific average of 0.638 and 0.635 out of 1**	UNDP

SOURCE: Desk research; Team analysis

2. RELEVANCE

Approach: Official and publicly-available documents and information were consulted to identify the indicative key priorities for AMS in the field of sustainable urbanisation, urban development and urban planning. The language in these documents was evaluated to assess the commitment by AMS to these priorities and how they aligned with the sub-areas in the ASUS framework. Based on these documents the priority of a sub-area for each country was classified into 'high' (1 point), 'some' (0.5 points) and 'low' (0 point). In order for a sub-area to be considered of 'High' or 'Some' relevance in ASEAN overall**,** the total score needed to be at least 5 or 3 out of 10 respectively, i.e. to obtain 'High' relevance a sub-area needed to be a 'high' priority for 5 AMS or at least a 'some' priority for all 10 AMS. These national priorities were then cross-referenced with the results from a survey of ASEAN cities, asking them how important individual sub-areas of sustainable urbanisation were for their cities (see Exhibit 14 in Chapter 3). In the cases where survey results indicated a strong emphasis on sub-areas that received less focus in the national documents, their relevance was 'upgraded' from none to 'Some' or 'Some' to 'High'.

Data sources: AMS Habitat III reporting as well as national development, urban development and/or sustainability plans were reviewed. The first point of reference was AMS' public statements made during the Habitat III conference. Where these did not clearly identify priorities, or required more detail, the Habitat III reports were consulted. In cases when there was no Habitat III reporting available (e.g. Brunei Darussalam), or where AMS had released more recent national strategy documents (e.g. National development plan, Urban development plan such as Malaysia's New Urban Agenda), the latter documents were consulted instead.

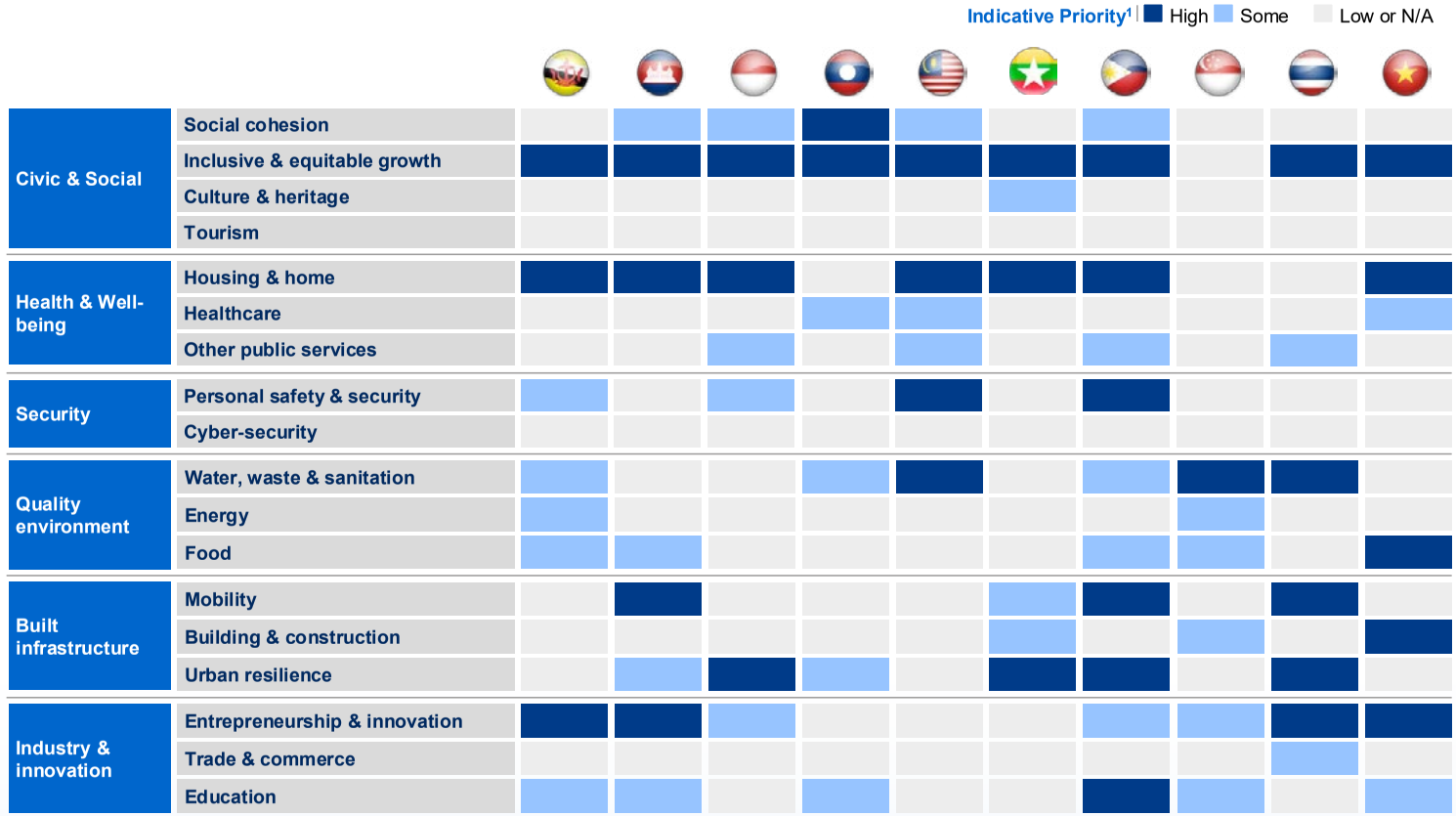
Scoring: In order to be considered a 'high' priority, documents had to explicitly mention a sub-area to be a key priority / concern / issue / challenge and mention the same sub-area explicitly or indirectly (i.e. in the discussion of another priority) at least one additional time throughout the document. In order to be considered of 'some' priority, a sub-area had to be explicitly mentioned by the document to be a key priority / concern / issue / challenge. Sub-areas that were not mentioned or only mentioned as either a later item in a long list, or indirectly only, were considered 'low' priorities. Exhibit 20 gives an overview of AMS' indicative priorities.[228]

[228] It should be noted that the priorities of cities within AMS may differ from those of their respective AMS' national governments.

EXHIBIT 20: OVERVIEW OF ASEAN MEMBER STATES' SUSTAINABLE URBANISATION PRIORITIES

Criterion 2: Relevance to AMS

Relevance of sustainable urbanisation areas to AMS indicative priorities



1 Based on Habitat III statements and national reports, national development plans and interviews with government officials.

SOURCE: Habitat III statements and national reports (Cambodia, report only; Indonesia; Malaysia; Myanmar; Philippines; Singapore; Thailand; Vietnam, report only); national development plans (Brunei Darussalam, Lao PDR) and interviews with government officials; Team analysis

1

3. SYNERGY WITH DIALOGUE PARTNERS AND OTHER EXTERNAL PARTNERS

Approach: Research was conducted to identify the sustainable urbanisation priorities, expertise and key activities of DPs and OEPs in ASEAN (both on a bilateral and multilateral level). To be considered priorities, DPs and OEPs had to express their focus on sub-areas publicly (e.g. in mission statements or strategies) or evidently work on a number of related actions as apparent from the stocktake of existing sustainable urbanisation actions in ASEAN. Interviews with government officials and aid agencies further informed the assessment and sub-areas for which dialogue/ development partners expressed interest to support AMS in the future were included alongside current priorities. Sub-areas that were a priority for at least three of the dialogue and development partners were considered to have 'High' synergy with DPs and OEPs, whereas sub-areas of priority for at least one were considered 'Some' synergy.

Data sources: Examination was made to the annual reports of respective DPs' and OEPs' development agencies; the strategy's stocktake of existing sustainable urbanisation actions in ASEAN; as well as interviews with government officials and aid agencies.

Scoring: Given technical specialisation and the interests of their domestic businesses, it is unlikely that all DPs and OEPs will prioritise the same sub-areas, meaning a lower threshold was opted for to award a 'High' synergy score compared to other criteria: Sub-areas that were a priority for at least three of the dialogue and development partners were deemed to have 'High' synergy with DPs and OEPs, whereas sub-areas of priority for at least one were considered to have 'Some' synergy. Exhibit 21 gives an overview of DPs' and OEPs' priorities and key activities for sustainable urbanisation in ASEAN.[229]

[229] Note that some sub-areas may not be a priority with regards to sustainable urbanisation, however, DPs and OEPs have substantial expertise in working in these fields more broadly which is why they are included (e.g. 'energy', 'education')

EXHIBIT 21: OVERVIEW OF DPS' AND OEPS' SUSTAINABLE URBANISATION PRIORITIES IN ASEAN

Criterion 3: Synergy with DPs and OEPs

NON EXHAUSTIVE – AS OF JULY 2018

Areas of priority or key activity for Dialogue Partners and other external Partners

Dialogue Partner / other External Partner	Areas of priority and/or key activity	Examples of actions	
	▪ Social Cohesion ▪ Inclusive & equitable growth ▪ Water, waste & sanitation ▪ Entrepreneurship & innovation ▪ Mobility ▪ Education	▪ ASEAN-Australia Smart Cities ▪ Mekong Business Initiative ▪ Shaping Inclusive Finance Transformations (SHIFT) in Southeast Asia countries ▪ Identification of Poor Household Programme in Cambodia	▪ ASEAN-Australia Smart Cities initiative ▪ ASEAN Sustainable Urbanisation Strategy
	▪ Building & construction ▪ Water, waste & sanitation	▪ TBD	
	▪ Building & construction ▪ Housing & home ▪ Urban resilience ▪ Energy	▪ Hanoi Highway Ringroad III: Mai Dich - Southern Thang Long (Vietnam) ▪ Ho Chi Minh City urban transport - Ring road no.3: Tan Van - Nhon Trach (Vietnam)	▪ Regional Infrastructure Development Fund Project (Indonesia) – through AIIB ▪ National Slum Upgrading Project (Indonesia) – through AIIB ▪ Metro Manila Flood Management Project – through AIIB
	▪ Entrepreneurship & innovation ▪ Urban resilience ▪ Cyber-security	▪ MEET-BIS Cambodia ▪ MEET-BIS Vietnam	▪ Myanmar Climate Change Alliance (MCCA) ▪ Global Action on Cybercrime extended (GLACY+)
	▪ Education ▪ Personal safety & security	▪ Training of English Language for Law Enforcement Officers in CLMV countries	
	▪ Mobility ▪ Water, waste & sanitation ▪ Building & construction ▪ Healthcare ▪ Energy ▪ Education	▪ Phnom Penh Urban Transport Master Plan ▪ Road development policy and strategy ▪ Mass Transit System Project in Bangkok (Purple Line) ▪ Establishment of Waste Material Circulation System Based on Marine Transportation in Ha Long Bay	▪ Mega Cebu Vision 2050 ▪ Bandung Low Carbon City Plan ▪ Hai Phong Green Growth Strategy Action Plan ▪ Japan-ASEAN Health Initiative ▪ Yangon Power Distribution Improvement Project
	▪ Mobility ▪ Water, waste & sanitation ▪ Energy	▪ Support for the Master Plan for Transport Infrastructure Development ▪ Indonesia SMART City Index	▪ Drainage/Sewerage System and Water Environment in Siem Reap ▪ Water Management Programme
	▪ Limited direct focus on sustainable urbanisation in actions across ASEAN[1]		
	▪ Social Cohesion ▪ Energy ▪ Education	▪ Women's Livelihood Bond ▪ Lower Mekong Initiative ▪ Clean Power Asia Programme	
	▪ Mobility ▪ Energy ▪ Water, waste & sanitation ▪ Urban resilience ▪ Building & construction ▪ Education	▪ Transport & Climate Change / Energy efficiency and climate change mitigation in the land transport sector in the ASEAN region (TCC) ▪ Sustainable Urban Transportation Improvement Project (SUTIP) ▪ Sustainable Urban Transport Programme Indonesia – NAMA (Nationally Appropriate Mitigation Actions)	▪ Indonesian bus rapid transit corridor development project (INDOBUS) ▪ Advancing transport climate strategies (TraCS) ▪ Clean Air for Smaller Cities ▪ NAMA – Green chillers and industrial energy efficiency ▪ ASEAN-German Energy Programme (AGEP) ▪ Cities Development Initiative for Asia (CDIA) ▪ Waste, water & solid waste management for provincial centres

1 While there is limited focus on sustainable urbanisation to date, these DPs have strong focus and experiences in relevant topics, such as education and disaster management with a non-urban focus.

SOURCE: Annual reports of respective development agencies; Study's stocktake of existing sustainable urbanisation actions in ASEAN; interviews with government officials and aid agencies; Team analysis

2

4. VALUE ADDITION

Approach: The potential for ASEAN to play a role in these sub-areas was determined based on an examination of the barriers in these sub-areas (see above and Exhibit 10 in Chapter 2). If ASEAN could help address more than 4 barriers in the sub-area, value addition was considered 'High'. For at least 2 barriers ASEAN was considered to be able to add 'Some' value.

Data sources: The five channels through which ASEAN can add value are by providing information sharing, technical expertise, access to finance, common standards/procurement, and joint implementation (see Chapter 3 for details). We counted the number of barriers that could be addressed through these channels to assess value addition.

Scoring: If ASEAN could help address more than 4 barriers, value addition was considered 'High'. For at least 2 barriers it was considered 'Some'. The assessment is summarised in Exhibit 22.

EXHIBIT 22: ASSESSMENT OF ASEAN'S ABILITY TO ADD VALUE BY SUB-AREA

Criterion 4: Value addition

Existing ASEAN strategies and workplans support several areas in sustainable urbanisation

Opportunity for ASEAN to add value[1] | High Some Limited

Area	Barriers addressed	How can ASEAN add value
Civic & social		
Social cohesion	Information failures	Enhancing the rights of women and children in the ASCC and AEC blueprints. ASEAN could support issues arising in this area through knowledge sharing
Inclusive growth	Information failures, Strategic planning, Implementation capacity	There is a strong emphasis on developing inclusive growth and financial inclusion in the AEC blueprint and poverty eradication in ASCC blueprint. ASEAN has a poverty eradication and gender division which could support knowledge sharing and join implementation of best practice
Culture & heritage	Information failures	Treated largely similarly. ASEAN has a Tourism Strategic Action Plan 2016-2025 which will support knowledge sharing between cities on best ways to improve the tourism sector
Tourism	Information failures	
Health & well-being		
Housing & home	Information failures, Alternative capital, Strategic planning, Regulatory structures	ASEAN could play a vital role in knowledge sharing between ASEAN cities, and also support joint implementation of housing programmes across AMS – especially since this is a salient issue across several AMS
Healthcare	Implementation capacity	There is a strong emphasis in the ASCC blueprint and ASEAN Post-2015 Health Development agenda to promote universal access to health. ASEAN could help to improve implementation by improving technical capacity of agencies in AMS
Other public services	Information failures, Implementation capacity	Strong emphasis in the ASCC blueprint and ASEAN Post-2015 Health Development agenda to develop resilient health systems. ASEAN could help to improve implementation by improving technical capacity of agencies in AMS and also inform policy makers of key issues in service delivery
Security		
Personal safety & security	Strategic planning, Information failures	ASEAN could support the sharing of best practice security mechanisms implemented by cities to improve over all safety and reduce crime
Cyber-security	Information failures, Implementation capacity	Strong emphasis in the APSC blueprint to develop appropriate laws and capacities to address cyber-crime – ASEAN has a working group on cyber-crime which could promote capacity building and international collaboration
Quality environment		
Water, waste & sanitation	Information failures, Alternative capital, Strategic planning, Implementation capacity	ASCC blueprint advocates promoting access to sanitation as part of a broader goal of promoting clean environment (i.e., clean air, clean and safe water, and public spaces). ASEAN could play a pivotal role to share best-practices around waste solutions, while also supporting agencies in AMS with capacity building and joint implementation
Energy	Information failures, Alternative capital, Strategic planning, Implementation capacity	ASEAN's Plan of Action for Energy Cooperation 2016-2025 has detailed implementation plans to promote clean coal technology; renewable energy; and energy efficiency and conservation. ASEAN could play an important role to share best-practices around waste solutions, while also supporting agencies in AMS with capacity building and joint implementation
Food	Alternative Capital, Regulatory structures	The AEC and the ASCC blueprints focus on strengthening food security. ASEAN has already developed regional guidelines on food security and nutrition
Built infrastructure		
Mobility	Alternative capital, Strategic planning, Implementation capacity, Regulatory structures	ASEAN could support the development of knowledge sharing to reduce congestion and also support technical training in order for cities to implement plans to promote non-motorised vehicle and public transport – as emphasised in the ASEAN Transport Strategic Action Plan
Building & construction	Alternative capital, Regulatory structures	Limited strategies and initiatives for construction at present. However, ASEAN could help to development common standards / procurement as well as joint implementation
Urban resilience	Information failures, Strategic planning, Implementation capacity	ASCC Blueprint and ASEAN Committee on Disaster Management's workplan highlights the need to improve institutional capacity and climate change adaptation which could be supported through ASEAN
Industry & innovation		
Entrepreneurship & innovation	Information failures, Implementation capacity	AEC blueprint strongly advocates for the development of MSMEs in ASEAN. The Strategic Action Plan for SME Development emphasises the importance of strengthening financing infrastructure
Trade & commerce	Implementation capacity	ASEAN could provide technical capacity to improve trade (e.g., National Single Windows initiative)
Education	Strategic planning, Regulatory structures	ASEAN could improve institutional capacity to promote vocational education and support qualifications referencing

SOURCE: ASEAN Secretariat, Team analysis

Based on these criteria and a requirement to have coverage across the six areas of sustainable urbanisation, the following sub-areas were prioritised (Exhibit 23).

EXHIBIT 23: PRIORITISATION SCORE BY SUB-AREA

Identifying priority sub-areas

Each sub-area was scored against the four criteria

✓ High ✓ Some

Areas	Sub-areas	Score ranking	Importance	Relevance	Synergy with DPs / OEPs	Value addition
Civic & social	Social cohesion	15	✓	✓	✓	
	Inclusive & equitable growth	5	✓	✓	✓	✓
	Culture & heritage	16	✓			
	Tourism	18				
Health & well-being	Housing & home	1	✓	✓	✓	✓
	Healthcare	13	✓		✓	
	Other public services	14	✓			✓
Security	Personal safety & security	6	✓	✓	✓	✓
	Cyber-security	12	✓		✓	✓
Quality environment	Water, waste & sanitation	4	✓	✓	✓	✓
	Energy	8	✓		✓	✓
	Food	10	✓	✓	✓	✓
Built infrastruc-ture	Mobility	3	✓	✓	✓	✓
	Building & construction	9	✓		✓	✓
	Urban resilience	2	✓	✓	✓	✓
Industry & innovation	Entrepreneurship & innovation	11		✓	✓	✓
	Trade & commerce	17	✓			
	Education	7	✓	✓	✓	✓

SOURCE: Team analysis

IV. METHODOLOGY FOR PRIORITISATION OF ACTIONS

Prioritisation of actions within the prioritised sub-areas of sustainable urbanisation was achieved by scoring each action against five criteria. As a result, 8 sustainable urbanisation actions were prioritised and included in the ASUS. A summary of how these actions scored against the five criteria can be found in Exhibit 13 in Chapter 3.

1. IMPORTANCE

Approach: In order to be considered 'important' the action had to directly address a priority sub-area in sustainable urbanisation with documented evidence of impact i.e. there exist regional or global case studies of impact.

Data sources & scoring: The literature was examined for case studies of similar actions having measurable impact on relevant indicators in the sub-area of sustainable urbanisation. The action was considered of 'High' importance if one or more cases studies were identified where a city in AMS had implemented a similar action with documented positive socio-economic impact. It was scored as 'Medium' importance, if there were no cases within ASEAN, however an example outside of the region existed, which showed there was positive socio-economic impact from implementing such an action. Exhibit 24 provides some examples of impact.

EXHIBIT 24: EXAMPLES OF EVIDENCE OF IMPACT BY PRIORITY ACTION

Criterion 1: Importance

There is evidence of impact on sustainable urbanisation for all prioritised actions

NON-EXHAUSTIVE - EXAMPLES

Sub-area	Prioritised action	Case studies
Inclusive & equitable growth	Introduce and improve access to digital payment solutions to enhance financial inclusion	The Philippines is **implementing a National Retail Payment System and national ID system** which would the support opening of digital mobile money accounts for the poor
Housing & Home	Develop and expand affordable housing solutions	The Housing Development Board (HDB) in Singapore has **achieved home ownership for over 90 percent of the population** – one of the highest in the world
Personal safety & security	Introduce digital solutions to enhance safety and security in cities	Phuket intends to build in **facial recognition into its network of 1,300 CCTVs** across the cities in order to efficiency identify would-be criminals
Water & waste management	Enhance solid waste management systems	Surabaya's Clean and Green Programme **reduced the total amount of solid waste generated in the city by 33 percent**; from 1500 tons/day to 1000 tons/day within five years of its implementation
Mobility	Introduce and improve Bus Rapid Transit (BRT) systems	Hangzhou in China, where city brain was first deployed, has experienced a **reduction in peak time congestion by 12.5 percent** (between 2016 to 2017) Digital solutions like Grab-World Bank's collaboration has supported policy makers to **better identify congestion chokepoints in Manila and Cebu**
	Develop and enhance traffic management systems	It is estimated by the United Nations Environment Programme (UNEP) that Jakarta's Bus Rapid Transit system has helped to save **its commuters 10 minutes per trip (~20 minutes daily)**
Urban resilience	Develop flood management systems	Phnom Penh flood control management system implemented with JICA would help to **water inundation by 80 percent**, **reducing flooding depth from 1m to 0.2m**
Education	Develop digital skills through "industry boot camps"	Penang's strong government support and pro-business policies has made the city a tech hub and a hotspot for start-ups in Malaysia. **The city houses 39 Fortune 1000 companies. It also has the 5th largest GDP in the country**

2. RELEVANCE

Approach: To assess relevance, the action needed to be stated as a priority action by a large proportion AMS cities through the various city networks (e.g. surveys from ASEAN Smart Cities Network, ASEAN Environmentally Sustainable Cities, BIMP-EAGA, IMT-GT) or had to be a prominent and reoccurring action in the stocktake.

Data sources & scoring: During the first Smart City Governance Workshop of the ASCN in May 2018, ASCN member cities were asked to identify 2 priority actions for their city they were planning to pursue in the immediate future. An action was classified as of 'High' relevance if 15 percent or more of cities surveyed said that it was a priority. If it was 10-14 percent, it was the score was 'Medium'. Exhibit 25 gives on overview of the priority actions for ASCN member cities.

EXHIBIT 25: RANKING OF ASEAN SMART CITIES NETWORK PRIORITY ACTIONS

Criterion 2: Relevance

Cities surveyed placed a strong emphasis on these actions

Source: ASEAN Smart Cities Network survey

3. SYNERGIES WITH DIALOGUE PARTNERS AND OTHER EXTERNAL PARTNERS

Approach: The stocktake of existing sustainable urbanisation actions in ASEAN cities as well as direct engagement with DPs and OEPs were utilised to identify whether they had previous experience implementing similar actions successfully. The synergies were scored according to the number of DPs and OEPs who had prior experience working on or were in the process of implementing similar actions in AMS cities.

Data sources & scoring: Based on the stocktake, an action was scored as having 'High' synergies if three or more DPs and OEPs had completed similar actions in ASEAN. It was scored as having 'Medium' synergies if at least one DP or OEP had implemented a similar action in ASEAN. Exhibit 26 summarises the experience of DPs and OEPs with regards to the prioritised actions.

EXHIBIT 26: DIALOGUE PARTNERS' AND OTHER EXTERNAL PARTNERS' SUSTAINABLE URBANISATION EXPERIENCE BY PRIORITY ACTION

Criterion 3: Synergy with DPs and OEPs

Dialogue partners and other External Partners have experience working on similar projects in ASEAN

Priority | Existing projects | N/A

Actions											
Introduce and improve access to digital payment solutions to enhance financial inclusion	■									■	■
Develop and expand affordable housing solutions			■								
Introduce digital solutions to enhance safety and security in cities	■	■									
Enhance solid waste management systems			■	■		■					■
Introduce and improve Bus Rapid Transit (BRT) systems			■	■		■	■				■
Develop and enhance traffic management systems			■	■		■	■				■
Develop flood management systems	■		■	■		■	■			■	■
Develop digital skills through "industry boot camps"	■										

Source: Based on team's stocktake of over 200 actions across AMS since 2010

4. VALUE ADDITION

Approach: The actions were assessed as to the common barriers they faced. These barriers were then compared to ASEAN's ability to add value through the five channels discussed in Chapter 3 (see Exhibit 12).

Data sources & scoring: The barriers commonly encountered by actions were identified through literature research as well as interviews with stakeholders. An action was scored as having 'High' potential for value addition if according to expert interviews[230], more than half of the key barriers could be addressed through one of more of the five channels through which ASEAN could support. An action was scored to have 'Medium' potential for value addition if 25-50 percent of key barriers for those actions matched to areas where ASEAN could support.

[230] During the development of the ASUS a large number of experts were consulted. The experts ranged from representatives from national and international development agencies (including multiple representatives from 10 Dialogue Partners' and other External Partners' agencies), multilateral development banks, city network representatives, private sector solution providers, city representatives, to academics and think tanks. In addition, input was collected from a Forum on Sustainable Urbanisation for cities in ASEAN Member States (AMS) as well as additional stakeholders including Dialogue Partners and other External Partners, multilaterals, solution providers and experts. The Forum was held in Singapore with a total of 137 participants across two days (7-8 July 2018).

5. TIMELINESS

Approach: Based on the stocktake of existing sustainable urbanisation actions in ASEAN cities, the average length of actions was identified. Actions were scored with the studies goal in mind, that all prioritised actions needed to be implementable and deliver impact by 2025.

Data sources & scoring: An action was scored as having 'High' timeliness if similar actions (from the stocktake) were completed in less than 5 years, and 'Medium' if previous actions took 5-8 years to implement.

V. SUMMARY OF PERFORMANCE INDICATORS FOR PRIORITY ACTIONS

TABLE 2: OVERVIEW OF PERFORMANCE INDICATORS FOR ASUS PRIORITY ACTIONS

#	Action	Suggested performance indicators
1	Introduce and improve access to digital payment solutions to enhance financial inclusion	• Number of affordable homes built[231] • Proportion of living space that is > $7m^2$ • Occupancy rates of affordable homes built • Number of people with access to improved sanitation • Number of people who live more than 1km from nearest transit stop[232] • Average commute times from home to work • Changes in household income for impacting groups (particularly women)
2	Develop and expand affordable housing solutions	• Proportion of adults (including split by gender, age, and race) that have a bank account • Frequency of withdrawals and deposits (including split by gender, age, and race) from those with a bank account • Proportion of adults using mobile banking
3	Introduce digital solutions to enhance safety and security in cities	• Share of city area with coverage from digital surveillance • Change in crime rates (in areas where solutions implemented) • Number of convictions (through digital solutions)

[231] There are different definitions used to define what is affordable housing. For example, McKinsey Global Institute (2014), defines affordable housing as housing costs (including rental or loan repayments) representing less than 30 percent of household income, with a focus on those households earning 50 percent (or less) of area median income. A city would need to define its measure of affordability as part of this action.

[232] Based on definition used by the Institute for Transportation and Development Policy.

4	Enhance solid waste management systems	• Percent of waste collected • Percent of waste recycled or reused • Percentage of operated covered vehicles for transporting waste on a daily basis • Percentage of the reduction in total waste generated a year
5	Introduce and improve Bus Rapid Transit (BRT) systems	• Number of people using BRT • Satisfaction rates of users • Average travel times of BRT users (compared to other modes of transport)
6	Develop and enhance traffic management systems	• Average traffic speed during peak and non-peak hours • Average commute times
7	Develop flood management systems	• Frequency of flooding incidents[233] • Proportion of population impacted by flooding • Net cost of flood damage
8	Develop digital skills through 'industry boot camps'	• Number of participants in programme • Proportion of participants that complete programme • Number of participants that are placed in full-time employment after completing the programme • Changes in income levels for participants that complete programme

[233] Defined as water levels causing inundation in areas that are not normally covered by water.

ANNEX A – ASEAN SUSTAINABLE URBANISATION STRATEGY TOOLKIT 1: PRIORITISING FOCUS AREAS AND ACTIONS FOR ENHANCING SUSTAINABLE URBANISATION

ANNEX A – ASEAN SUSTAINABLE URBANISATION STRATEGY TOOLKIT 1: PRIORITISING FOCUS AREAS AND ACTIONS FOR ENHANCING SUSTAINABLE URBANISATION

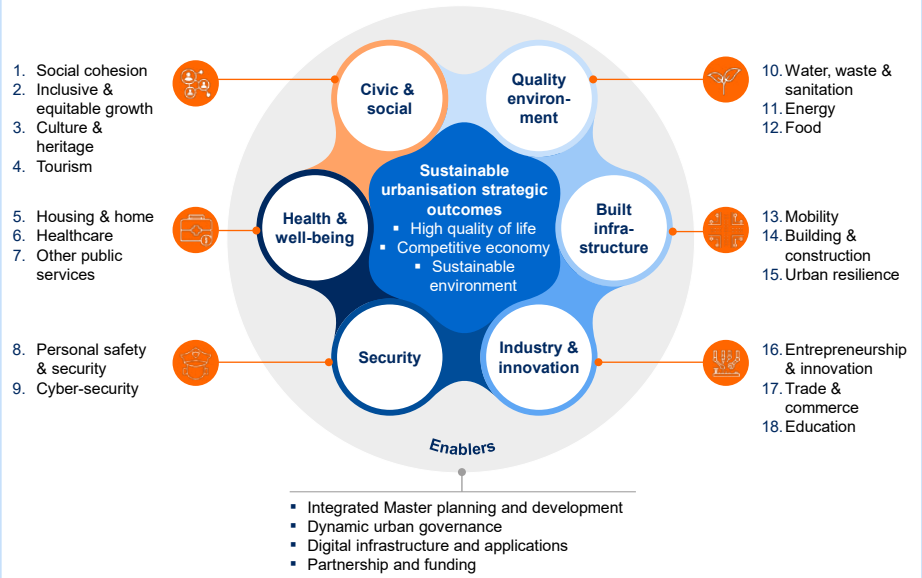
Cities are keen to promote sustainable urbanisation, but often it is difficult to know where to start. Strong prioritisation approaches are needed to ensure that planners are focusing on those sub-areas and actions which have the greatest potential to transform their city. This toolkit provides cities with a practical guide for how they can prioritise key sub-areas of sustainable urbanisation (and associated actions) on which to focus. It should be noted that this toolkit uses a similar, but not identical, approach to that of the ASEAN Sustainable Urbanisation Strategy (ASUS) in prioritising sub-areas and actions. The reasons for the differences relate to the fact that the ASUS had some criteria specific to the design objectives of the strategy (e.g. a requirement for impact by 2025), and that more specific criteria may be relevant when viewed from an individual city perspective, as opposed to the ASUS perspective of being focused across all cities in ASEAN.

I. A FRAMEWORK FOR SUSTAINABLE URBANISATION

The ASUS has identified six broad areas of sustainable urbanisation for cities to consider, each with several sub-areas (Exhibit A - 1):

EXHIBIT A - 1: THE ASUS FRAMEWORK

The strategy employs a framework of sustainable urbanisation centred around 6 areas and 18 sub-areas



SOURCE: Centre for Liveable Cities (CLC), Team analysis

1. CIVIC & SOCIAL

This relates to factors influencing the civil and social health of a city, and covers four sub-areas:

- **Social cohesion.** This sub-area includes actions promoting social cohesion, such as female empowerment initiatives, racial integration efforts, and youth or elderly 'focused' initiatives. Meaning, these actions will touch on 'inclusive & equitable growth', 'housing & home', 'healthcare', 'entrepreneurship & innovation' and 'education' but are included here, since they put specific social groups front and centre of their activities, catering towards their specific needs.
- **Inclusive & equitable growth.** This sub-area includes actions which address economic issues around ensuring that the benefits of city growth are distributed equitably among city residents (e.g. social safety nets, public work programmes creating jobs in impoverished urban areas, etc).
- **Culture & heritage.** This sub-area includes actions to preserve historical sites in cities and to promote local cultures as well as to help minorities retain their cultures.
- **Tourism.** This sub-area includes actions which promote the tourism sector, including infrastructure and talent development and supporting policies (e.g. promotion efforts to key overseas markets).

2. HEALTH & WELL-BEING

This relates to factors influencing the health and well-being of urban residents and covers three sub-areas:

- **Housing & home.** This sub-area includes actions focusing on improving the efficiency of public services to provide a pleasant and affordable living environment, including the provision of affordable housing, public spaces and facilities (e.g. public housing, slum upgrading, community centres, green spaces).
- **Healthcare.** This sub-area includes actions promoting access to affordable, high-quality healthcare for residents.
- **Other public services**. This sub-area includes actions supporting the broader delivery of other services that improve health and well-being, such as emergency services and nutrition (e.g. food programmes, school meals, etc).

3. SECURITY

This relates to ensuring the security of urban residents and covers two sub-areas:

- **Personal safety & security.** This sub-area includes actions that safeguard citizens against crime, terrorism, and natural disasters. This could include smart solutions to policing, disaster relief, and potential measures to combat other transnational issues (e.g. human trafficking).
- **Cyber-security.** This sub-area includes actions supporting the protection of networked infrastructure against cyber-crime and cyber-terrorism.

4. QUALITY ENVIRONMENT

This relates to ensuring a high-quality urban environment and covers three sub-areas:

- **Water, waste & sanitation.** This sub-area includes actions which address the challenges of accessing and increasing the efficiency of water delivery, waste management, and sanitation. An example could be the creation of closed loop waste systems which seek to reduce, recycle, and reuse waste components.
- **Energy.** This sub-area includes actions promoting access to energy, higher energy efficiency, and switching to less polluting sources of energy. It includes smart grid developments in cities, the promotion of renewable energies (such as rooftop solar projects), and energy efficiency initiatives (outside buildings and vehicles which are covered in separate sub-areas).
- **Food.** This sub-area includes actions to enhance urban food supply, including promotion of urban agriculture, food traceability systems, and reduction of food waste or loss. Note: food nutrition issues are covered under the health and well-being area.

5. BUILT INFRASTRUCTURE

This relates to ensuring efficient, resilient, and environmentally-friendly built infrastructure and covers three sub-areas:

- **Mobility.** This sub-area includes actions promoting the access, affordability and efficiency of transport as well as reducing transport-related pollutants (such as greenhouse gas emissions). It includes the development of public transport infrastructure, ride sharing, smart transport solutions, and more efficient internal combustion engines.
- **Building & construction.** This sub-area focuses on improving the efficiency and sustainability of building usage and construction (e.g. optimising building space through shared offices, building energy efficiency, modular buildings, sustainable construction materials, smart buildings and construction).
- **Urban resilience.** This sub-area focuses on promoting urban resilience against disaster risks and potential impacts of climate change (e.g. city flood defences, early warning systems).

6. INDUSTRY & INNOVATION

This relates to encouraging a strong and innovative business environment, and includes three sub-areas:

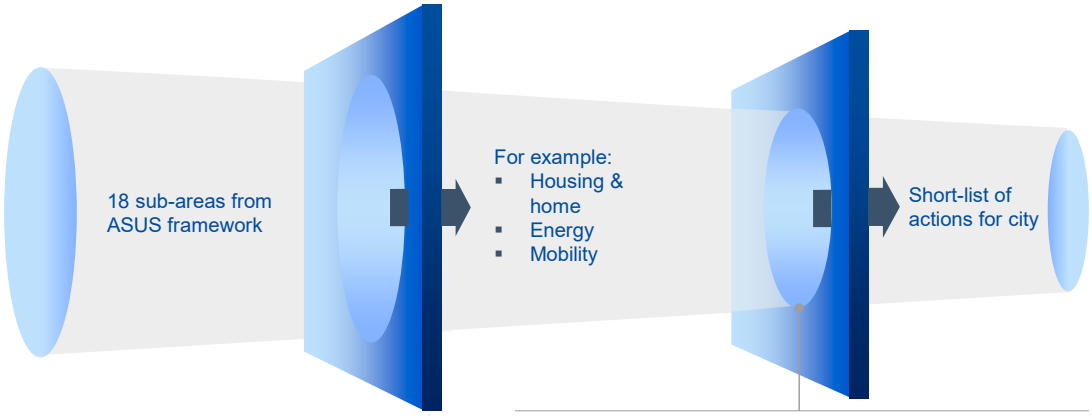
- **Entrepreneurship & innovation.** This sub-area focuses on promoting entrepreneurship and innovation (e.g. digital hubs, support for MSMEs).
- **Trade & commerce.** This sub-area focuses on promoting trade between cities through special economic zones and sector-specific development plans.
- **Education.** This sub-area focuses on producing an appropriately skilled workforce that can be resilient to changing industry needs and automation. It includes skills retraining, digital skills development, and vocational training programmes (with the exception of education covered in other areas such as for tourism and healthcare professionals).

II. PRIORITISATION OF SUSTAINABLE URBANISATION SUB-AREAS

To prioritise sub-areas and ultimately actions, a two-step approach can be used by cities (as described in Exhibit A - 2), where first sub-areas are prioritised, then specific actions are prioritised within those sub-areas.

EXHIBIT A - 2: PRIORITISATION APPROACH

A two-step approach can be used by cities to prioritise sub-areas and actions to support sustainable urbanisation



Step 1: Prioritise sub-areas based on…
- Importance. The sub-area is a key concern for the city.
- Relevance. It is a priority area for the national and city-level government.
- Synergy with DPs and OEPs. It is a priority of Dialogue Partners and other External Partners.

Step 2: Prioritise actions in priority sub-areas based on…
- Importance. Action has documented evidence of impact in relevant sub-area.
- Relevance. Action is a priority the city.
- Synergy with DPs and OEPs. Dialogue Partners and other External Partners support similar actions.
- Feasibility. There is a high likelihood of successful implementation of the action in the local city context.

Three criteria could be considered by cities in prioritising sub-areas:

1. **Importance.** The sub-area should be a key concern for the city in terms of actual performance (i.e. there is clear evidence of a need to improve performance in that sub-area).
2. **Relevance.** The sub-area must be a priority for relevant national and city-level governments.
3. **Synergy with Dialogue Partners and other External Partners (DPs and OEPs)[234].** Given DPs and OEPs are often key initial funders of many sustainable urbanisation initiatives, it is important to ensure alignment where possible with their priorities. Below are further details on how cities can assess the 18 sub-areas of the ASUS framework against these criteria.

[234] The term Dialogue Partner refers to a country, or organisation with which an organisation or country has a consultative relationship in agreed areas of common interest. In the ASEAN context Dialogue Partner status can further be divided into Dialogue Partners (10), Sectoral Dialogue Partners (4) and Development Partners (1). For the context of this toolkit, Dialogue Partner can be synonymous with the respective development agencies of ASEAN's Dialogue Partners. For more information see https://asean.org/asean/external-relations/.

1. IMPORTANCE

Appendix A outlines a set of selected potential metrics that cities could consider assessing their city's performance against each of the 18 sub-areas. This list is not exhaustive as other metrics could also be considered by cities in their assessment. When selecting metrics, it is useful to consider four factors:

- **Timeliness.** Recent data is available and updated at regular intervals
- **Robustness.** Metrics obtained from reliable sources and provide accurate measurements
- **Coverage.** Data is available at city level (or a reasonable proxy such as regional level) and benchmark data can be obtained (ideally for other cities in the country or region to enhance comparability but could also be national level proxies or international benchmarks).
- **Relevance.** Metric/ indicator is relevant to urban issues rather than just general national indicators

Data availability will vary significantly across metrics, AMS and cities. The metrics collated in Appendix A were selected because of broad data availability at a subnational level across the majority of AMS, at the time of publication. Subnational, refers to measurement of indicators at 1 or 2 degrees below the national level (the exact classification varies by AMS). In some cases this could be at the regional/ state level (as in the case of Viet Nam, Thailand and Malaysia) or the provincial level (as in the case of Indonesia). Sources of metrics are summarised in Appendix A.

In order to understand the importance of each sub-area, performance can be compared to other cities in the country, ASEAN, or even to global best practice (where data is available) using a 'distance to frontier' measurement. A distance to frontier measurement computes the percentage difference between the city and the relevant benchmark on performance in that metric. This could be transformed into a three-point scale of 'high' importance (more than 70% distance from the frontier); 'medium' (within 30-70% of the frontier) and 'low' (less than 30% distance from the frontier).

2. RELEVANCE

It is important to understand the relevance of sub-areas for different ministries at the city-level, but also at the national-level (given these stakeholders often have important decision-making rights at the city-level). Interviews and desktop review of relevant government documents could be conducted to gather this evidence. In addition, AMS Habitat III reporting as well as national development, urban development and/or sustainability plans could be used.

In order to understand the relevance of each sub-area, a three-point scale could be used: 'high' relevance (a key priority at both the national and city levels); 'medium' relevance (a priority at the national or city levels, but not both); and 'low' relevance (neither a priority at the national or city levels).

3. SYNERGY WITH DIALOGUE PARTNERS AND OTHER EXTERNAL PARTNERS

It is important to align priorities with DPs and OEPs who may be important funders of these initiatives. As part of the development of the ASUS, research was conducted to identify the sustainable urbanisation priorities, expertise and key activities of DPs and OEPs in ASEAN

(both on a bilateral and multilateral level). To be considered priorities, DPs and OEPs had to express their focus on sub-areas publicly (e.g. in mission statements or strategies) or work on a number of related actions as apparent from the stocktake of existing sustainable urbanisation actions in ASEAN. Interviews with government officials and aid agencies further informed the assessment and sub-areas for which DPs and OEPs expressed interest to support AMS in the future were included alongside current priorities.

In order to understand the synergy with DPs and OEPs of each sub-area, a three-point scale could be used: 'high' (sub-area is a priority for two or more DPs and OEPs); 'medium' (sub-area is a priority for a least one DPs or OEPs); and 'low' (sub-area is not a priority for any DPs or OEPs). Exhibit A - 3 provides an overview of DPs' and OEPs' priorities and activities as of July 2018. Cities may wish to engage with DPs and OEPs to test whether priorities have shifted since this analysis was conducted, or whether priorities vary for DPs and OEPs in their specific country.

EXHIBIT A - 3: OVERVIEW OF DPS' AND OEPS' SUSTAINABLE URBANISATION PRIORITIES IN ASEAN

Criterion 3: Synergy with DPs and OEPs

NON EXHAUSTIVE – AS OF JULY 2018

Areas of priority or key activity for Dialogue Partners and other external Partners

Dialogue Partner / other External Partner	Areas of priority and/or key activity	Examples of actions	
	▪ Social Cohesion ▪ Inclusive & equitable growth ▪ Water, waste & sanitation ▪ Entrepreneurship & innovation ▪ Mobility ▪ Education	▪ ASEAN-Australia Smart Cities ▪ Mekong Business Initiative ▪ Shaping Inclusive Finance Transformations (SHIFT) in Southeast Asia countries ▪ Identification of Poor Household Programme in Cambodia	▪ ASEAN-Australia Smart Cities initiative ▪ ASEAN Sustainable Urbanisation Strategy
	▪ Building & construction ▪ Water, waste & sanitation	▪ TBD	
	▪ Building & construction ▪ Housing & home ▪ Urban resilience ▪ Energy	▪ Hanoi Highway Ringroad III: Mai Dich - Southern Thang Long (Vietnam) ▪ Ho Chi Minh City urban transport - Ring road no.3: Tan Van - Nhon Trach (Vietnam)	▪ Regional Infrastructure Development Fund Project (Indonesia) – through AIIB ▪ National Slum Upgrading Project (Indonesia) – through AIIB ▪ Metro Manila Flood Management Project – through AIIB
	▪ Entrepreneurship & innovation ▪ Urban resilience ▪ Cyber-security	▪ MEET-BIS Cambodia ▪ MEET-BIS Vietnam	▪ Myanmar Climate Change Alliance (MCCA) ▪ Global Action on Cybercrime extended (GLACY+)
	▪ Education ▪ Personal safety & security	▪ Training of English Language for Law Enforcement Officers in CLMV countries	
	▪ Mobility ▪ Water, waste & sanitation ▪ Building & construction ▪ Healthcare ▪ Energy ▪ Education	▪ Phnom Penh Urban Transport Master Plan ▪ Road development policy and strategy ▪ Mass Transit System Project in Bangkok (Purple Line) ▪ Establishment of Waste Material Circulation System Based on Marine Transportation in Ha Long Bay	▪ Mega Cebu Vision 2050 ▪ Bandung Low Carbon City Plan ▪ Hai Phong Green Growth Strategy Action Plan ▪ Japan-ASEAN Health Initiative ▪ Yangon Power Distribution Improvement Project
	▪ Mobility ▪ Water, waste & sanitation ▪ Energy	▪ Support for the Master Plan for Transport Infrastructure Development ▪ Indonesia SMART City Index	▪ Drainage/Sewerage System and Water Environment in Siem Reap ▪ Water Management Programme
	▪ Limited direct focus on sustainable urbanisation in actions across ASEAN[1]		
	▪ Social Cohesion ▪ Energy ▪ Education	▪ Women's Livelihood Bond ▪ Lower Mekong Initiative ▪ Clean Power Asia Programme	
	▪ Mobility ▪ Energy ▪ Water, waste & sanitation ▪ Urban resilience ▪ Building & construction ▪ Education	▪ Transport & Climate Change / Energy efficiency and climate change mitigation in the land transport sector in the ASEAN region (TCC) ▪ Sustainable Urban Transportation Improvement Project (SUTIP) ▪ Sustainable Urban Transport Programme Indonesia – NAMA (Nationally Appropriate Mitigation Actions)	▪ Indonesian bus rapid transit corridor development project (INDOBUS) ▪ Advancing transport climate strategies (TraCS) ▪ Clean Air for Smaller Cities ▪ NAMA – Green chillers and industrial energy efficiency ▪ ASEAN-German Energy Programme (AGEP) ▪ Cities Development Initiative for Asia (CDIA) ▪ Waste, water & solid waste management for provincial centres

1 While there is limited focus on sustainable urbanisation to date, these DPs have strong focus and experiences in relevant topics, such as education and disaster management with a non-urban focus.

SOURCE: Annual reports of respective development agencies; Study's stocktake of existing sustainable urbanisation actions in ASEAN; interviews with government officials and aid agencies; Team analysis

2

This assessment could then be transformed into heatmap of the sub-areas against the criteria. Exhibit A - 4 below provides an illustrative version of this end output. Cities should use this as a basis for selecting priority sub-areas. The number of sub-areas chosen will depend on city context, but typically most cities would need to prioritise no more than five sub-areas in order to maximise the probability of successful implementation.

EXHIBIT A - 4: ILLUSTRATIVE ASSESSMENT

Cities can use the criteria to assess the different sub-areas in order to guide prioritisation

Sub-area assessment against criteria
High Medium Low

ILLUSTRATIVE END PRODUCT

Areas	Sub-areas	Importance	Relevance	Synergy with DPs & OEPs
Civic & social	Social cohesion			
	Inclusive & equitable growth			
	Culture & heritage			
	Tourism			
Health & well-being	Housing & home			
	Healthcare			
	Other public services			
Security	Personal safety & security			
	Cyber-security			
Quality environment	Water, waste & sanitation			
	Energy			
	Food			
Built infrastruc-ture	Mobility			
	Building & construction			
	Urban resilience			
Industry & innovation	Entrepreneurship & innovation			
	Trade & commerce			
	Education			

III. PRIORITISATION OF SUSTAINABLE URBANISATION ACTIONS

After prioritising sub-actions, the next step for cities is to prioritise actions within those sub-areas. Four criteria can be useful to guide this prioritisation exercise (three of which are the same criteria as were applied to prioritise sub-areas):

1. **Importance.** Action has documented evidence of impact in relevant sub-area.
2. **Relevance.** Action is a priority the city.
3. **Synergy with DPs and OEPs.** Dialogue Partners and other External Partners support similar actions.
4. **Feasibility.** There is a high likelihood of successful implementation of the action in the local city context.

Below is further information on how each action can be assessed against the different criteria.

1. IMPORTANCE

In order to be considered 'important', the action must directly address a priority sub-area in sustainable urbanisation with documented evidence of impact i.e. there exist regional or global case studies of impact. There are too many possible actions to provide a comprehensive database of case study evidence, however, Exhibit A - 5 provides examples of impact for a select number of actions.

EXHIBIT A - 5: EXAMPLE ACTIONS WITH SIGNIFICANT IMPACT

Examples of actions with significant impact on sustainable urbanisation sub-areas

EXAMPLES – NOT EXHAUSTIVE

Areas	Sub-areas	Action	Impact
Civic & social	**Social cohesion**	Access to Finance project (Vientiane, Lao PDR)	World Bank collaborated with Sacombank, Lao-China Bank, and ST Bank to issue **US$15 million** in credit lines to support loans to small and medium enterprises. The action stipulates that **1 in 5 loans** have to be owned by women
	Inclusive & equitable growth	Program Nasional Pemberdayaan Masyarakat – Urban (Indonesia)	**Largest Community Driven Development programme in the world** covering all urban wards in the country with over **8.1 million beneficiaries.** Since its inception **99 percent** of urban communities reported having improved access to infrastructure and services for the urban poor as a result of the programme
	Culture & heritage	Yangon city heritage preservation (Yangon, Myanmar)	Yangon city is working with the Yangon Heritage Trust and UNESCO to develop a **Yangon Urban Heritage Conservation Law, zoning plans,** and **building codes** to preserve heritage building across the city
	Tourism	Coastal tourism in Danang (Danang, Viet Nam)	Danang Implemented an ambitious action to rehabilitate the city's coastal area to become a seaside tourist destination. This has generated the city **US$660 million in tourist revenue** (2016) and the title 'one of the most beautiful beaches on the planet' by Forbes
Health & well-being	**Housing & home**	Housing Development Board (Singapore)	Achieved home ownership for **over 90 percent of the population** – one of the highest in the world
	Healthcare	Makassar Home Care (Makassar, Indonesia)	The city provides **24 hour** healthcare in urban areas through a dedicated hotline service and emergency response team which leverage mobile internet to deliver rapid and efficient diagnosis to the city's **1.4 million residents**
	Other public services	School Feeding Programme (Ho Chi Minh City, Viet Nam)	School feeding programme in the city **reduced incidence of obesity by over five percent** (from 43.5 to 37.8 percent) after a six month nutrition intervention.
Security	**Personal safety & security**	CCTV network (Phuket, Thailand)	To better ensure the safety of its inhabitants and visitors, Phuket intends to deploy over **1600 CCTV** cameras across busy public areas to support facial scanning of registered felons in real-time

SOURCE: ASUS analysis

Additionally, there are several databases which cities could consult to identify case studies on the potential impact:

- **Smart Cities Council.** This is a network of leading companies advised by top universities, laboratories and standards bodies that are engaged in promoting smart city technologies.[235]
- **Global Platform for Sustainable Cities.** The Global Platform for Sustainable Cities (GPSC) is a forum for knowledge sharing and partnership to achieve urban sustainability.[236]
- **100 Resilient Cities** – Pioneered by the Rockefeller Foundation (100RC) is dedicated to helping cities around the world become more resilient to physical, social and economic challenges providing cities with the resources necessary to develop a roadmap to resilience.[237]

[235] Additional information available at: https://smartcitiescouncil.com/

[236] Additional information available at: http://www.thegpsc.org/

[237] Additional information available at: https://www.100resilientcities.org/

- **The Centre for Cities**. Supports the growth of UK city economies by producing evidence-based research.[238]
- **UrbanTide.** Supports cities with smart city design and master planning, assisting them in data collection and analysis.[239]
- **Inter-American Development Bank (IDB).** The Korea Research Institute for Human Settlements (KRIHS), in association with the IDB, produced smart city case studies, for the cities of Anyang, Medellin, Namyangju, Orlando, Pangyo, Rio de Janeiro, Santander, Singapore, Songdo, and Tel Aviv.[240]
- **World Health Organization (WHO).** The WHO healthy cities initiative published case studies on pilot projects.[241]
- **World Bank (WB).** The WB Open Knowledge repository contains several publications of case studies of sustainable cities globally.[242]
- **C40.** The C40 is a network that facilitates dialogue amongst city officials to share lessons and best practice on issues regarding urbanisation. This includes research and case studies on issues regarding transportation, climate action, food, and water and waste.[243]
- **CityNet.** CityNet is an association of urban stakeholders committed to sustainable development in the Asia Pacific region. The network has research material around transportation, water and waste, and urban resilience.[244]
- **Seoul Solutions.** Seoul solution is a platform which shares knowledge on the impact of sustainable development policies on Seoul. Issues range from affordable housing, transportation, urban resilience, and tourism.[245]
- **World Habitat.** World Habitat is an international independent charity focused on improving housing and urbanisation globally. It's annual 'World Habitat Awards' showcase the most innovative and impactful programmes globally.[246]
- **Cities Development Initiative for Asia (CDIA).** CDIA is an international partnership initiative established in 2007, by the Asian Development Bank (ADB) and the Government of Germany. It also has a set of city case studies and good practice principles.[247]

In order to understand the importance of each action, performance can be assessed on a three-point scale: 'high' importance (a number of case studies of significant impact on the sub-area in similar contexts); 'medium' importance (limited number of case studies of significant impact on the sub-area, or impact is in contexts different from city's context); and 'low' importance (no case studies of significant impact on the sub-area).

[238] Additional information available at: http://www.centreforcities.org

[239] Additional information available at: https://urbantide.com/

[240] Additional information available at: https://publications.iadb.org/discover?query=international+case+studies+of+smart+cities&submit=&sort_by=score&order=desc

[241] Additional information available at: http://www.who.int/sustainable-development/cities/en/

[242] Additional information available at: https://openknowledge.worldbank.org/handle/10986/23580

[243] Additional information available at: https://www.c40.org/case_studies

[244] Additional information available at: https://citynet-ap.org/category/publications-all/

[245] Additional information available at: https://seoulsolution.kr/en/newsletteren

[246] Additional information available at: https://www.world-habitat.org/world-habitat-awards/

[247] Additional information available at: http://cdia.asia/what-we-do/col-good-practices/

2. RELEVANCE

It is important to understand the relevance of different actions for different ministries at the city-level, but also at the national-level (given these stakeholders often have important decision-making rights at the city-level). Interviews and desktop review of relevant government documents could be conducted to gather this evidence. In order to understand the relevance of each action, a three-point scale could be used: 'high' relevance (a key priority at both the national and city levels); 'medium' relevance (a priority at the national or city levels, but not both); and 'low' relevance (neither a priority at the national or city levels).

3. SYNERGIES WITH DIALOGUE PARTNERS AND OTHER EXTERNAL PARTNERS

As with the sub-area prioritisation approach, it is important to align priorities on actions with Dialogue Partners who may be important funders. The review conducted of DPs' and OEPs' priorities as part of ASUS could be used as a guide, and this could be supplemented with further interviews with key DPs and OEPs for the city / country to test their willingness to support different actions.

In order to understand the synergy with DPs and OEPs of each action, a three-point scale could be used: 'high' (action is a priority for two or more dialogue and development partners); 'medium' (action is a priority for a least one dialogue and development partner); and 'low' (action is not a priority for any dialogue or development partner).

4. FEASIBILITY

The feasibility of actions should also be considered. To measure this, it is useful for cities to understand the typical barriers encountered by cities in implementing these actions and the likelihood of successful implementation given the specific city context.

The ASUS identified barriers in three main areas related to city actions to promote sustainability:

Decision-making barriers

- **Information failures.** This occurs when stakeholders do not have sufficient or adequate information about the availability of actions, the true costs and benefits of actions, or the nature of the technology involved. Often this is tied to a lack of available robust data. For example, when considering the implementation of actions to improve road safety in cities, local authorities are often unaware of the large social and monetary costs traffic accidents are causing in their cities (i.e. they are unable to compute the economic costs of physical damages, not to mention the complex economic costs of human lives lost).[248] Sometimes local governments lack an understanding of alternative business models, such as establishing closed-loop waste systems as opposed to traditional waste management approaches.
- **Prioritisation.** This barrier arises when key decision-makers consider an issue to be of low priority in relation to other issues. For example, progress on infrastructure projects at the city-level in ASEAN to date has been overwhelmingly linked to whether national policymakers have seen this as a national priority and hence in their interests to push.[249] This also relates to political risk from a change in local government, which can lead to

[248] Discussion with private sector organisations.

[249] *ASEAN Connectivity: Building a PPP pipeline*, The World Bank Group, December 2014.

a change in priorities. Waste management projects in many cities in ASEAN have been impacted by this given that the payback period for the project (typically around 10 years) is generally much longer than local political cycles (with elections often every 4-5 years).

- **Misaligned incentives.** These relate to a misalignment of incentives between key stakeholders (e.g. national, regional and local government or regulators, investors/ donors, implementation agencies, private sector and local residents). One prominent example relates to residents resisting land acquisition for infrastructure projects.

Financial barriers

- **Return on investment.** This barrier relates to the lack of a sufficiently attractive return on investment to encourage investment (particularly by the private sector) – despite potentially large social benefits. Even if overall returns are attractive, unacceptable risks (e.g. uncertainty about demand) can undermine the implementation of actions. This challenge is acute in the sub-areas of 'energy' and 'water, waste & sanitation', where tariffs are often set at the national level or governments directly place rate ceilings on private sector companies to keep consumer prices low, potentially undermining the commercial viability of projects.[250] Another example is 'mobility'. While there is a large appetite by private sector players to help cities to drive the electrification of vehicles, this requires sizeable infrastructure investment. The risk from having to invest without knowing the demand first and whether local regulatory structures will be supportive can be a major deterrent for companies.
- **Fiscal capacity.** This challenge revolves around the limited budget of cities which hinders them from seizing opportunities to invest in sustainable urbanisation actions. Many cities find it challenging to raise capital for long-term projects due to lack of direct control of fiscal resources.[251] Infrastructure actions in 'mobility', 'energy', 'water, waste & sanitation' and' building & construction' are particularly impacted by this challenge due to the high upfront capital investments required.[252]
- **Alternative capital sources.** This barrier was mentioned consistently throughout interviews with stakeholders. However, to nuance it further, the challenge is not around the lack of capital sources, but the access to them. Interviews with multilateral lending organisations and private financial institutions suggest that there are three underlying issues. First, cities are often unaware that they can access alternative forms of financing. In response to this, some multilateral organisations have launched focused efforts on teaching cities about how to leverage debt and obtain credit scores.[253] Second, even if they are aware, borrowing from the private sources is not a mainstream concept in Southeast Asia and is seen as taboo. Third, and most crucially, many cities find it challenging to fund projects due to poor project formulation i.e. they do can not draft a bankable proposal. This is discussed in further detail in the section on implementation barriers.

Implementation barriers

- **Strategic planning.** Many cities lack a clear and robust long-term strategy to support the implementation of their sustainable urbanisation actions, or in fact lack the planning capacity to come up with viable proposals. This leads to a lack of private sector confidence

[250] Interview with development agency and sustainable urbanisation experts.

[251] Interview with multilateral organisation.

[252] Interview with DP development implementation agency.

[253] Interview with multilateral organisation.

and a shortfall in funding (see above). 'Good projects which are underpinned by capacity and planning are few and far between'.[254] Moreover, some actions by cities tend to be reactive, addressing only the immediate issues without thinking about more long-term solutions. For example, while almost all governments are thinking about easing congestion and improving transportation, only a handful are thinking about strategic urban planning and developing people-friendly cities instead of building more roads or adding more buses.[255]

- **Implementation capacity.** This barrier refers to the (non-financial) resource gaps that prevent the implementation of an action such as lack of adequate manpower, technology, technical expertise or materials. A recurring theme from interviews with city-level officials, multilateral organisations, and private sector experts is a lack of professional local staff (e.g. city planners, architects, and engineers) which stymies the development of realistic, detailed, and executable plans. Capacity problems can also be a lot more basic than that, such as language issues (i.e. lack of English) preventing cities from drafting proposals and engaging foreign investors. Local regulatory barriers can exacerbate the problem. For example, building codes differ significantly across AMS and professional qualifications (e.g. for architects, engineers, city planners) are not homogenised and broadly recognised across AMS, meaning cities in one country are unable to utilise capacity from another.

- **Coordination.** This relates to a lack of alignment with other actions where there may be important inter-dependencies (such as road infrastructure and public transport initiatives); and alignment across government departments, at the national, sub-national and crosscutting level. For example, it is not uncommon for over 15 distinct decision-making entities to be involved in a typical transport infrastructure project, with limited accountability and mechanisms to attain consensus.[256] This can be exacerbated if involvement from multiple private sector actors is required. Another example is waste and sanitation which often falls under environmental ministries, whereas ownership of utilities tends to be divided between ministries of energy and national planning. This creates coordination woes as both issues are inextricably linked to one another. Lessons learnt by aid development agencies support this. Implementing urban resilience and disaster risk reduction measures are an example of a case where coordination between the national, provincial or city level is crucial. It is indispensable to clarify differences in role of each organisation and to let them cooperate with each other when necessary.[257]

- **Regulatory structures.** A lack of effective regulatory structures to support implementation (such as lack of relevant standards or protocols or absence of defined property rights, as well as a lack of city autonomy) can act as a barrier. For example, a major issue preventing infrastructure development is the need for a clear process for securing regulatory approvals in many ASEAN cities. Unclear Public Private Partnership (PPP) guidelines or local ownership requirements (which can be up to 70 percent in some AMS) also can serve as a barrier to investment.[258]

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[254] Interview with multilateral organisation.

[255] Interview with DP development implementation agency.

[256] *Lifting the barriers roundtable: Infrastructure, power and utilities*, CIMB ASEAN Research Institute (CARI) and McKinsey & Company, 2013.

[257] *JICA Standard Indicator Reference and Typical Lessons Learned in Technical Cooperation Projects*, Japan International Cooperation Agency, 2017.

[258] Input from participants in private sector roundtable discussion.

In order to assess this criterion, the city could assess the number of these barriers that represent significant obstacles in the local city context. Again, a three-point scale could be used to assess performance of the action on the criterion: 'high' (no major obstacles identified); 'medium' (1 or more obstacles identified but considered addressable); and 'low' (1 or more obstacles that are considered to be difficult to address).

This assessment could then be transformed into heatmap of the actions against the criteria. Exhibit A - 6 below provides an illustrative version of this end output. Cities should use this as a basis for selecting priority actions (within their priority sub-areas). The number of actions chosen will depend on city context, but typically most cities would need to prioritise no more than ten actions in order to maximise the probability of successful implementation.

EXHIBIT A - 6: ILLUSTRATIVE PRIORITY ACTIONS

Priority actions (within prioritised sub-areas) can be identified based on the four criteria

ILLUSTRATIVE END PRODUCT

Sub-area assessment against criteria

High Medium Low

Area	Sub-area	Prioritised action	Importance	Relevance	Synergy with DPs	Feasibility
Civic & Social	Inclusive & equitable growth	1. Introduce and improve access to digital payment solutions to enhance financial inclusion				
Health & Well-being	Housing & home	2. Develop and expand affordable housing solutions				
Security	Personal safety & security	3. Introduce digital solutions to enhance safety and security in cities				
Quality Environment	Waste, water & sanitation	4. Enhance solid waste management systems				
Built infrastructure	Mobility	5. Introduce and improve Bus Rapid Transit (BRT) systems				
		6. Develop and enhance traffic management systems				
	Urban resilience	7. Develop flood management systems				
Industry & innovation	Education	8. Develop digital skills through "industry boot camps"				

IV. ALIGNMENT OF THE ASUS WITH OTHER TOOLKITS

This prioritisation toolkit was designed specifically for cities in ASEAN and to align as closely as possible with other sustainable urbanisation efforts and frameworks in the region. It also draws reference from and aligns closely with other international best-practices. Below is a non-exhaustive list of other toolkits referenced in the development of the toolkit and which cities may choose to draw upon:

- **ADB's Green City Development Tool Kit.** This comprehensive toolkit uses a priority matrix to create a needs assessment. It identifies gaps in information, service delivery, and overall performance.[259] The matrix begins with an assessment of the city across several sectors (similar to 'sub-areas' in the ASUS) including geography, land-use composition, financial position, availability of infrastructure services (e.g. public transport capacity, access to sanitation, waste generated), housing supply, green initiatives, urban management systems, and disaster management and mitigation plans. A majority of

[259] *Green City Development Tool Kit*, ADB, 2015.

these sectors is in the ASUS. Thereafter, projects in each sector are assessed across four themes: policy and governance (i.e. who are the relevant stakeholders required for projects to be approved); financial capacity; project implementation mechanism (i.e. where are the implementation deficiencies and opportunities for improvement); and environmental and resource management. The criteria 'policy and governance' and 'financial capacity' from the ADB's toolkit are captured in the 'feasibility' criteria in the ASUS. The ADB toolkit is therefore slightly more complex in its application but could potentially be used for a deep dive following the prioritisation with the ASUS toolkit.

- **IDB's Emerging & Sustainable Cities Initiative (ESCI).** The ESCI was created by the IDB in 2010 to address rapid and unregulated urbanisation in Latin American and Caribbean cities.[260] Part of the initiative required the IDB to develop a set of 120 indicators to support rapid-assessment. There is significant overlap between the indicators used by the ESCI and the toolkit. The findings from these indicators are then used to identify the most pressing areas for sustainable development. Areas which are classified as 'red' or 'critical' are further evaluated based on their vulnerability to climate change (impact of climate change on this topic or mitigation problems associated with this topic); public perception (i.e. how important this issue is to the citizens); economic impact (i.e. what are the socioeconomic benefits of resolving the problem); and cross-cutting impact (i.e. would an intervention have a broader effect on the city). The ESCI then develops action plans for these most pressing areas. The criteria around 'cross-cutting impact' and 'public perception' are similar to the 'importance' and 'relevance' criteria used in the ASUS, respectively.
- **CDIA's City Infrastructure Investment Programming & Prioritisation Toolkit.** This toolkit employs a systematic approach to assist cities and municipalities in Asia to improve their urban infrastructure planning, prioritisation, and programming. It adopts a 3-step prioritisation process which first examines the general financial capacity of a city (what financial resources are available for the city to fund/ finance a project), then the importance of the project (this is based on 40 questions to assess project purpose, public response, environmental impact, socio-economic impacts, and feasibility of implementation), and finally the development of an investment package with a 5-year horizon (based on inputs from the previous steps). The ASUS's framework shares several similarities to CDIA's approach – particularly in the second step; elements including 'public response' 'feasibility of implementation' and 'purpose' are closely linked to the criteria on 'importance', 'feasibility' and 'relevance' in the ASUS respectively.
- **Local Government for Sustainability's (ICLEI) and OECD's Green Cities Programme Methodology.** Similar to the approach adopted by the ASUS, the methodology uses a two-step process to identify challenges (termed in the ASUS 'sub-areas') and corresponding actions.[261] The Green Cities Programme uses the Pressure-State-Response (PSR) framework and indicators to benchmark the performance of cities. 'Pressure' in this context refers to indicators measuring the sources of pressure and adverse impacts on the environment from human activity the environmental performance of the city. 'State' refers to indicators which measure the state, condition or quality of the city's environment 'State' indicators also measure the stock and quality of natural resources. Finally, 'response' indicators measure beneficial impacts of actions to reduce pollution or consumption of resources or investment in environmental protection. A traffic light screening (green for high performance, amber of the medium, and red for low) is applied to identify the most prominent challenges. Finally, actions to the address these

[260] *Indicators of the Emerging and Sustainable Cities Initiative (ESCI)*, Inter-American Development Bank, 2013.

[261] Green cities programme methodology, European Bank for Reconstruction and Development, 2016.

challenges are prioritised through another filtering process which asses the action's the economic, environmental and social impact. In assessing the importance and relevance of sub-areas, the ASUS also focuses on the 'pressure' and 'state' indicators. ICLEI further provides a range of tools and platforms that can help cities in their planning activities across several topics such as 'Low Carbon', 'Sustainability and Resilience', 'BiodiverCity', 'EcoMobility' and 'Procurement'.[262]

- **World Bank's CityStrength Diagnostic.** The World Bank's CityStrength Diagnostic process works by sector to identify needs and develop actions.[263] The findings in each sector are then brought together and analysed using a series of lenses. These lenses aim to understand the interdependencies between different urban services and systems, incorporate a holistic perspective on resilience, and ensure overall alignment with local goals. The CityStrength Diagnostic: Methodological Guidebook contains a number of templates and detailed instructions to carry out the diagnostic.[264] The framework is also used to facilitate agenda-setting sessions in cities selected to participate in the 100 resilient cities challenge.
- **Smart Cities Council's Smart Cities Readiness Guide.** The Readiness Guide helps cities craft a 'vision' of a smart city and construct roadmaps. The Readiness Guide is intended for mayors, city managers, city planners and their staffs to help them assess different smart city technologies.[265]

[262] *Tools & Platforms*, ICLEI. Available at: http://eastasia.iclei.org/resources/tools-platforms.html and *Tools*, ICLEI. Available at: http://southasia.iclei.org/resources/tools.html

[263] *The CityStrength Diagnostic: Promoting Urban Resilience,* World Bank, 2015. Available at: http://www.worldbank.org/en/topic/urbandevelopment/brief/citystrength

[264] *CityStrength Diagnostic: Methodological Guidebook*, World Bank Group and the Global Facility for Disaster Reduction and Recovery, May 2015.

[265] *Smart Cities Readiness Guide*, Smart Cities Council. Available at: https://rg.smartcitiescouncil.com/

APPENDIX A: POTENTIAL METRICS TO MEASURE RELATIVE IMPORTANCE OF SUB-AREA – AT A SUBNATIONAL LEVEL

The table below outlines a set of selected potential metrics that cities could us to assess their city's performance against each of the 18 sub-areas of sustainable urbanisation in the ASUS framework and to prioritise sub-areas according to the criteria on 'Importance' (see Exhibit A - 2). This list is not exhaustive as other metrics could also be considered by cities in their assessment and cities are encouraged to expand on the recommendations below. The table provides sources for national proxies and / or international benchmarks. Data on these were collected mostly from national statistics agencies, multilateral institutions and relevant international organisations or associations.[266] The final column contains information on the data availability, as well as potential data sources for subnational data in AMS. Subnational refers to data points that reflect the performance of a province/ region/ district within a single country. In most instances, these indicators were collected through the online portals of the respective statistics offices.[267] In some cases, however, particular ministries or third party (e.g. third-party reports, data aggregators) data sources were used – the sources for these indicators have been included for easy reference. Where data for the identified metric is not available in an AMS, proxies were provided and highlighted in ***blue**. Where no close proxies were available or coverage of data was severely limited, indicators were highlighted in ****red**. No subnational data was available / collected for Singapore and Brunei Darussalam.

[266] National source links : International Labour Organisation (ILOSTAT) https://www.ilo.org/ilostat/faces/ilostat-home/home?_adf.ctrl-state=xyq1gf53z_4&_afrLoop=84689027617938#! ; World Bank Education statistics http://datatopics.worldbank.org/education/ ; World Bank –World Development Indicators database http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators ; Master card global destination cities index https://newsroom.mastercard.com/wp content/uploads/2017/10/Mastercard-Destination-Cities-Index-Deck.pdf ; World tourism organisation – Compendium of Tourism Statistics http://statistics.unwto.org/content/compendium-tourism-statistics ; World Bank millennium development goals database https://datacatalog.worldbank.org/dataset/millennium-development-goals ; United Nations millennium development goals database http://mdgs.un.org/unsd/mdg/default.aspx ; World Bank – Health nutrition and population statistics https://datacatalog.worldbank.org/dataset/health-nutrition-and-population-statistics ; EIU Safe cities index http://safecities.economist.com/safe-cities-index-2017 ; World Bank - Universal Health coverage http://datatopics.worldbank.org/universal-health-coverage/ ; UL safety index https://ulsafetyindex.org/ ; WB: Global review of solid waste management https://openknowledge.worldbank.org/handle/10986/17388 ; Waste Atlas http://www.atlas.d-waste.com/ ; World Bank – SDGs database & Sustainable Energy for All (SE4ALL) database http://databank.worldbank.org/data/source/sustainable-energy-for-all/ ; OECD Data https://data.oecd.org/ ; World Health Organization (WHO) – Global Health Observatory Data Repository http://apps.who.int/gho/data/node.imr ; United Nations International Strategy for Disaster Reduction – Desinventar https://www.desinventar.net/; World Bank National Accounts Data https://data.worldbank.org/indicator/NY.GDP.MKTP.CD ; United Nations Development Programme (UNDP) – Human Development Reports http://hdr.undp.org/en ; FAO Database http://www.fao.org/faostat/en/#data

[267] Data from local office statistics links: Cambodia https://www.nis.gov.kh/index.php/en/; Indonesia https://www.bps.go.id/; Lao https://www.lsb.gov.la/en/#.W4UAXegzY2x; Malaysia https://newss.statistics.gov.my/newss-portalx/ep/epLogin.seam; Myanmar http://www.csostat.gov.mm/ ; Philippines http://psa.gov.ph/ ; Vietnam https://www.gso.gov.vn/default.aspx?tabid=714

TABLE 3: SOURCES OF PRIORITISATION METRICS

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
Social cohesion	Female labour participation (% of urban pop.)	International Labour Organisation – ILOSTAT	The ILO conducts labour force surveys as well as aggregates data from a variety of sources. The database covers all 10 AMS, however, the currentness of data and intervals of data collection can vary significantly. Similar data at the subnational level include: Cambodia: 'Employment status: Women', available at the state level by the local statistics office - Cambodia demographic and health survey *** Indonesia: 'Women as professional workers', available at the province level by the local statistics database** Lao PDR: 'Total number and percentage distribution of working-age population (15+) by sex', available at the province level by the local statistics office - Lao PDR labour force survey Malaysia: 'Total employed population aged 15-64 years by sex', available at the state level by the local statistics office - population and housing census Myanmar: 'Female labour force participation rate', available at the state level by the local statistics office - statistical yearbook Philippines: 'Labour Force Participation Rate (LFPR) of Women', available at a regional level by the Department of Labour and Employment – labour force participation of women in the Philippines Thailand: 'Labour force participation rate by sex', available at the regional level by the local statistics office - statistical yearbook Viet Nam: 'Labour force at 15 years of age and above by sex', available at an urban and rural level by the local statistics office database
	Primary education attainment (proportion of female)	World Bank – Education Statistics	Data available for 6 AMS (excluding Brunei Darussalam, Lao PDR, Myanmar and Vietnam). The timeliness of data varies significantly Similar data at the subnational level include: Cambodia: 'Percent distribution of women age 15-49 by level of schooling attended and level of literacy', available at a state level by the local statistics office - demographic and health survey

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
			Indonesia: 'Percentage of Population Aged 15 Years and Over by Gender, and the Highest Level of Education Completed', available at an urban and rural level by the local statistics database Lao PDR: 'Population Aged 6 years Old and Over by Highest Level of Education Attained by Sex', available at a province level by the local statistics office - population and household census survey Malaysia: 'Population ever been to school by highest level of education attained, age group, sex', available at a state level by the local statistics office – population and housing census Myanmar: 'Percent distribution of women age 15-49 by highest level of schooling attended or completed', available at state level by the local statistics office – demographic and health survey Philippines: 'Cohort Survival Rate in Elementary Schools by Gender', available at a regional level by the local statistics office – statistical yearbook Thailand: 'Number and percentage of children of secondary school (aged 12 - 17 years) attending secondary school or higher, net attendance ratio (NAR) by age, sex', available at a regional level by the local statistics office – child and youth survey Viet Nam: 'Number of primary, secondary and high school female students', available at a province level by the local statistics office database
Inclusive and equitable growth	Under the poverty line (% of urban pop.)	World Bank –World Development Indicators database	Data is available for 8 AMS (excluding Singapore and Brunei Darussalam), however, currentness of data varies significantly Similar data at the subnational level include: Cambodia: 'Percentages of persons below the poverty line according to the New Poverty Line', available at an urban and rural level (Phnom Penh as well) by the local statistics office – Cambodia socio-economic survey Indonesia: 'Percentage of Poor Population', available at a district level by the local statistics office database

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
			Lao PDR: 'Poverty headcount ratio', available at a province level by the local statistics office – Lao PDR labour force survey [268] Malaysia: 'Incidence of Poverty', available at a State level by the local statistics office - Household income and basic amenities survey report Myanmar: 'Poverty headcount rate', available at an urban and rural status and agro-zone by the World Bank [269] Philippines: 'Annual Per Capita Poverty Thresholds and Incidences Among Population', available at a province level by the local statistics office – statistical yearbook *** Thailand: 'Private households by total income per month', available at a regional level by the local statistics office – Report on population characteristics** Viet Nam: 'Percentage of poor households', available at a province level by the local statistics office database
	Income distribution	World Bank –World Development Indicators database	Data is available for 7 AMS (excluding Singapore, Cambodia, and Brunei Darussalam), however, currentness of data varies significantly Similar data at the subnational level include: Cambodia: 'Percent distribution of the population by wealth quintiles', available at a state level by the local statistics office – Demographic and health survey *** Indonesia: 'Gini ratio', available at a province level by the local statistics office database** Lao PDR: 'Average monthly income from employment', available at a province level, by the local statistics office – Lao PDR labour force survey

[268] *Country Analysis Report: Lao PDR*, United Nations, 2015. Additional information available at: http://www.la.one.un.org/images/Country_Analysis_Report_Lao_PDR.pdf

[269] *An analysis of poverty in Myanmar*, World Bank group and Ministry of Planning and Finance, 2017. Additional information available at: http://documents.worldbank.org/curated/en/829581512375610375/pdf/121822-REVISED-PovertyReportPartEng.pdf

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
			*** Malaysia: 'Gini Coefficient of monthly household gross income', available at a district level, by the local statistics office - Household income and basic amenities survey** Myanmar: 'Measures of inequality (including Gini and Theil Index)', available at an urban and rural level by the World Bank Philippines: 'Income Gap, Poverty Gap, and Severity of Poverty by Province', available at a province level by the local statistics office – statistical yearbook *** Thailand: 'Gini index', available at a regional level by the National Economic and Social Development Board[270]** Viet Nam: 'The difference of monthly income per capita between the highest income group and the lowest income group at current prices', available at a province level by the local statistics office database
Culture & heritage	Sporting and cultural events available	**** N/A**	Similar data at the subnational level include: Cambodia: 'Distribution of restaurants, massages and sporting clubs', available at a state level by the local statistics office – statistics and tourism information department[271] Indonesia: 'Number of Villages According to Availability of Sports Field, Number of Villages According to Availability of Open Public Space, Cinema Building, Pub / Discotheque / Karaoke, and Fitness Centre', available at a province level by the local statistics office database Lao PDR: 'Number of Hotels, Guesthouse, Resorts, Entertainment', available at a province level by the local statistics office – statistics yearbook Malaysia: 'Mean Monthly Expenditure Per Household on Recreation Services and Culture', available at an urban and rural level by the local statistics office – statistical yearbook

[270] *Thailand: A labour market profile*, International Labour Organisation, 2013. Additional information available at: https://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/documents/publication/wcms_205099.pdf

[271] *Tourism Statistics Annual Report*, Ministry of Tourism, 2008. Additional information available at: http://www.tourismcambodia.org/mot/index.php?view=statistic_report#comp

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
			Myanmar: 'Number of sports grounds, cinemas and total number of seats', available at a state level by the local statistics office – statistical yearbook **** Philippines: No close indicator available** Thailand: 'Number and percentage of population, aged 13 years and over by participating in activities beneficial in local community, donation', available at a regional level by the local statistics office - conditions of society, culture, and mental health Viet Nam: 'Number of local libraries', available at a province level by the local statistics office database
Tourism	Total visitors (domestic and/or international)	MasterCard - Global Destination Cities Index	The index is released annually, and data is available for 5 AMS cities (excluding cities from Brunei Darussalam, Cambodia, Philippines, Myanmar and Lao PDR) Similar data at the subnational level include: *** Cambodia: 'Foreign visitor arrivals to the region', available at a regional level by the local statistics office – statistics and tourism information** Indonesia: 'Number of Indonesian and Foreign Guests in Classified and Non-Classified Hotel', available at a province level by the local statistics office database **** Lao PDR: 'Number of tourist sites in Lao PDR', available at a province level by the local statistics office – statistics yearbook** *** Malaysia: 'Number of domestic visitors by state visited', available at a state level by the local statistics office – domestic tourism survey** Myanmar: 'Visitor arrivals by entry points', available at a regional level by the Ministry of Hotels & Tourism - Myanmar tourism statistics[272] Philippines: 'Distribution of travellers', available at a city level by the Department of Tourism – tourism statistics[273]

[272] *Tourism Statistics Annual Report*, Ministry of Tourism, 2017. Additional information available at: http://tourism.gov.mm/wp-content/uploads/2018/06/Myanmar-Tourism-Statistics-2017-Final.pdf

[273] *Summary by Province*, Department of Tourism, 2011. Additional information available at: http://e-services.tourism.gov.ph:8080/didcs/Static%20Documents/revised%20summarybyprovince%202011.pdf

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
			Thailand: 'Average guest per day in the restaurant by type of guest, size of establishment and region', available at a regional level by the local statistics office – tourism survey **** Viet Nam: No close indicator available**
	Number of hotels	World Tourism Organisation - Compendium of Tourism Statistics	Data available annually for all 10 AMS (subscription is required) Similar data at the subnational level include: Cambodia: 'Distribution of hotels and guesthouses', available at a state level by the local statistics office – statistics and tourism information department Indonesia: 'Number of Accommodations, Rooms, and Beds Available in Classified Hotel and average length of stay of foreign guests at star and non-star hotels', available at a province level by the local statistics office database Lao PDR: 'Number of Hotels, Guesthouse, Resorts, Entertainment', available at a province level by the local statistics office – statistics yearbook Malaysia: 'Number of establishments in accommodation sector by state and average same day expenditure per trip and average overnight expenditure per trip of domestic visitors', available at an urban and rural level by the local statistics office – domestic tourism survey Myanmar: 'Number of hotels, motels and inns and number of rooms and beds', available at a state level by the local statistics office database Philippines: 'Number of Accommodation Establishments and Room Per Region, Province and City/Municipality', available at a city level by the Department of Tourism[274] Thailand: 'Number and percentage of hotels and guest houses by size of establishment and region and receipts of hotels and guest houses by size of establishment', available at a province level by the local statistics office – tourism survey **** Viet Nam: 'Tourism revenue at current prices', available at a province level by the local statistics office database**

[274] *Number of Accommodation Establishments and Room Per Region, Province and City/Municipality*, Department of Tourism, 2014. Additional information available at: http://web.tourism.gov.ph/tourism_supply.aspx

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
Housing & home	Slums (% of urban pop.)	World Bank – Millennium Development Goals database / United Nations – Millennium Development Goals database	Data is available for 7 AMS (excluding Brunei Darussalam, Malaysia, and Singapore) however, currentness of data varies significantly Similar data at the subnational level include: *** Cambodia: 'Percentage of urban population living in slums', available at a city level (partial coverage) by the Asian coalition for housing rights[275]** Indonesia: 'Number of Villages According to Residential Existence on Riverbanks, Under Extra High Voltage Airways (SUTET), and Slums', available at a province level by the local statistics office database **** Lao PDR: No close indicator available** Malaysia: 'The Number of Squatters in Malaysia', available at a state level by the Ministry of Urban Wellbeing Housing and Local Government[276] **** Myanmar: No close indicator available** **** Philippines: No close indicator available** *** Thailand: 'Private households by type of living quarters, tenure of living quarters', available at a regional level by the local statistics office - report on population characteristics** *** Viet Nam: 'Percentage of poor households by province', available at a province level by the local statistics office database**
	Proportion of dwellings/ households with improved/permanent materials	**** N/A**	Similar data at the subnational level include: Cambodia: 'Occupied dwellings by kind of roof/wall/floor materials', available at an urban and rural level (Phnom Penh separately) by the local statistics office – Cambodia socio-economic survey Indonesia: 'Percentage of household by roof/wall type', available at a province level by the local office statistics database

[275] *Citywide upgrading in 11 Cambodian cities*, Asian coalition for housing rights, 2010. Additional information available at: http://www.achr.net/upload/downloads/file_03022014181311.pdf

[276] *Combating squatters in Malaysia: Do we have adequate policies as instrument?*, Dullah, Yusfida Ayu et al., 2017.

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
			Lao PDR: 'Private households by type of wall/floor/roof in their occupied dwellings', available at a province level by the local statistics office - population and household census survey Malaysia: 'Percentage of households by type of outer wall building materials (brick vs plank)', available at a state level by the local statistics office - household income and basic amenities survey report Myanmar: 'Percentage of households with dwellings a quality wall, floor and roof', available at a state level by the local statistics office – Myanmar living conditions survey Philippines: 'Occupied Housing Units by Construction Materials of the Outer Walls and Roof, and City/Municipality', available at a province level by the local statistics office – census survey Thailand: 'Number of households by household characteristics', available at a regional level by the local statistics office – health and wealth survey Viet Nam: 'Percentage of households with permanent housing materials', available at a province level by the local statistics office database
Healthcare	Malnutrition rates	World Bank – Health Nutrition and Population Statistics database	Data is available for 9 AMS (excluding Singapore) however, currentness of data varies significantly <u>Similar data at the subnational level include:</u> Cambodia: 'Percentage of children under age 5 classified as malnourished according to three anthropometric indices of nutritional status: height-for-age, weight-for-height, and weight-for-age, by background characteristics', available at a state level by the local statistics office – demographic and health survey Indonesia: 'Regional Child Stunting Rates', available at a province level by the SMERU research institute[277]

[277] *Child Malnutrition in Indonesia: Can Education, Sanitation and Healthcare Augment the Role of Income?,* The SMERU Research Institute, 2015. Additional information available at: https://mpra.ub.uni-muenchen.de/66631/1/MPRA_paper_66631.pdf

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
			Lao PDR: 'Percentage of children under age 5 by nutritional status according to three anthropometric indices: weight for age, height for age, and weight for height', available at a province level by the local statistic office – Lao PDR social indicator survey *** Malaysia: 'Risk of malnutrition among older persons', available at an urban and rural level by the local statistics office - national health and morbidity survey[278]** Myanmar: 'Child malnourishment (who standard), percentage of children aged 0-59 months who are severely or moderately malnourished', available at a state level by the local statistics office – statistical yearbook Philippines: 'Prevalence of Malnutrition Among Children 0-60 Months Old by Region', available at a regional level by the local statistics office – statistical yearbook *** Thailand: 'Prevalence of nutritional status from biochemical indicators in children, by age group', available at an urban and rural level by the British Journal of Nutrition[279]** Viet Nam: 'Rate of weight-for-height malnutrition', available at an urban and rural level by the local statistics office database
	Number of people suffering from **communicable** diseases (of any kind)	World Bank – Health Nutrition and Population Statistics database / World Health Organization – Global Health Observatory Data Repository	Data is available for 10 AMS, however, currentness of data varies significantly Similar data at the subnational level include: Cambodia: 'Among women and men age 15-49 who ever had sexual intercourse, the percentage reporting having an STI and/or symptoms of an STI in the past 12 months, by background characteristics', available at a state level by the local statistics office – Demographic and health survey Indonesia: 'Number of New Cases of AIDS and Cumulative Cases of AIDS', available at a province level by the local statistics office database

[278] *National Health and Morbidity Survey, Ministry of Health Malaysia*, 2015. Additional information available at: http://iku.moh.gov.my/images/IKU/Document/REPORT/nhmsreport2015vol2.pdf

[279] *SEANUTS: the nutritional status and dietary intakes of 0.5 –12-year-old Thai children*, British Journal of Nutrition, 2013. Additional information available at: http://apiycna.org/wp-content/uploads/2014/01/BJN-Vol-110-S3S0007114513002110a.pdf

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
			Lao PDR: 'HIV prevalence', available at a province level by HIV and AIDs data hub for Asia Pacific[280] Malaysia: 'Prevalence of dengue and Tuberculosis', available at a state level by the local statistics office - National health and morbidity survey Myanmar: 'Cause-specific death rate from leading causes of death in urban areas (malaria, Tuberculosis)', available at an urban and rural level by the local statistics office – Statistical Yearbook Philippines: 'Regional morbidity (TB, chickenpox, influenza)', available at a regional level by the Philippine Health Statistics[281] Thailand: 'Number and Death Rate from Tuberculosis per 100,000 Populations', available at a regional level by the local statistics office – statistical yearbook Viet Nam: 'Number of people with HIV/ AIDS and deaths caused by AIDS by province', available at a province level by the local statistics office database
	Number of people suffering from **non-communicable** diseases	World Bank – Health Nutrition and Population Statistics database / World Health Organization – Global Health Observatory Data Repository	Data is available for 10 AMS, however, currentness of data varies significantly Similar data at the subnational level include: Cambodia: 'Percentage of women age 15-49 with anaemia, by background characteristics', available at a state level by the local statistics office – demographic and health survey Indonesia: 'Malaria Incident Per 1000 People', available at a province level by the local statistics office database Lao PDR: 'Prevalence of anaemia in women', available at a province level by the local statistic office – Lao PDR social indicator survey Malaysia: 'Prevalence of overall diabetes, known diabetes and undiagnosed diabetes', available at a state level by the local statistics office - national health and morbidity survey

[280] *Lao PDR country progress report global aids response progress country report*, HIV and AIDs data hub for Asia Pacific, 2015.

[281] *The 2013 Philippine Health Statistics*, Epidemiology Bureau Department of Health, 2013. Additional information available at: https://www.doh.gov.ph/

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
			Myanmar: 'Cause-specific death rate from leading causes of death in urban areas (heart diseases, cerebrovascular diseases, cancer)', available at an urban and rural level by the local statistics office – statistical yearbook Philippines: 'Household Population and Number of Persons with Disability by Region', available at a regional level by the Philippine Health Statistics Thailand: 'Number and Death Rate from Heart Disease per 100,000 Populations by Region', available at a regional level by the local statistics office – statistical yearbook Viet Nam: 'Incidence of malaria in Vietnam', available at a regional level by Cold Spring Harbour Laboratory[282]
Other public services	Life expectancy	World Bank – Health Nutrition and Population Statistics database / World Health Organization – Global Health Observatory Data Repository	Data is available for all 10 AMS Similar data at the subnational level include: Cambodia: 'Life expectancy at birth by sex', available at an urban and rural level by the local statistics office – inter-censual population survey of Cambodia Indonesia: 'Life expectancy at birth', available at a province level by United Nations Population Fund[283] Lao PDR: 'Life expectancy at birth', available at a province level by the local statistics office – economic census *** Malaysia: 'Crude death rate', available at a state level by the local statistics office – vital statistics** Myanmar: 'Expectation of life at specific age group by gender', available at an Urban and rural level by the local statistics office - statistical yearbook Philippines: 'Projected Life Expectancy at Birth by Sex', available at a regional level by the local statistics office – statistical yearbook *** Thailand: 'Deaths and Crude death rate', available at a province level by the local statistics office – statistical yearbook** Viet Nam: 'Average life expectancy at birth', available at a regional level by the local statistics office database

[282] The decline of malaria in Vietnam, 1991-2014, Child Spring Harbour Laboratory, 2017. Additional information available at: https://www.biorxiv.org/content/early/2017/06/23/151456

[283] Indonesia on the Threshold of Population Ageing, United Nations Population Fund, 2014. Additional information available at: https://indonesia.unfpa.org/sites/default/files/pub-pdf/BUKU_Monograph_No1_Ageing_03_Low-res.pdf

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
	Number of doctors	World Health Organization – Global Health Observatory Data Repository	Data is available for all 10 AMS, however, currentness of data varies significantly Similar data at the subnational level include: Cambodia: 'Percentage of Number of Persons Engaged by Industry (see medical workers section)', available at a state level by the local statistics office – Cambodia socio-economic survey *** Indonesia: 'Number of Villages / Villages that Have Health Facilities', available at a province level by the local statistics office database** Lao PDR: 'Economic activity of workers', available at a province level by the local statistics office – economic census Malaysia: 'Number of Registered Doctors', available at a state level by the local statistics office – statistics yearbook Myanmar: 'Number of doctors' by state and region, available at a state level by the local statistics office - statistical yearbook Philippines: 'Number of Government Doctors, Nurses, Dentists, and Midwives', available at a regional level by the local statistics office – statistical yearbook Thailand: 'Employed persons by level of educational attainment, industry', available at a regional level by the local statistics office – labour force survey Viet Nam: 'Number of health workers under Department of Health' by province, available at a province level by the local statistics office database
	Access to health insurance	World Bank - Universal Health Coverage	Data is available for 7 AMS (excluding Brunei Darussalam, Singapore and Myanmar), however, currentness of data varies significantly Similar data at the subnational level include: Cambodia: 'Percentage of women age 15-49 with specific types of health insurance coverage, according to background characteristics', available at a state level by the local statistics office – demographic and health survey

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
			Indonesia: 'Percentage of Households, where one of the Household Members Has Guaranteed Financing / Health Insurance in the Last Year by type of Guarantee', available at a province level by the local statistics office database Lao PDR: 'Percentage of women/men age 15-49 with health insurance, and, among those with health insurance, percentage covered by various health insurance plans', available at a province level by the local statistics office - Lao PDR social indicator survey Malaysia: 'Benefit cases paid by Social Security Organisation (SOCSO)' by region, available at a regional level by the local statistics office – statistics yearbook **** Myanmar: No close indicator available** **** Philippines: No close indicator available** Thailand: 'Number of population by type of health insurance, sex and age group', available at a regional level by the local statistics office – Health and welfare survey Viet Nam: 'Percentage of people having health treatment in the last 12 months by income quintile, sex, age group and ethnicity, of which: having health insurance or free health care certificate', available at a regional level by the local statistics office - point population change and family planning survey
Personal safety & security	Crime victimisation rate (number of people/ households)	Underwriters Laboratories Safety Index	The UL Safety index aggregates data from a variety of sources. The database covers all 10 AMS Similar data at the subnational level include: Cambodia: 'Victimized persons of violence by sex and residence', available at an urban and rural-level by the local statistics office - Cambodia socio-economic survey Indonesia: 'Proportion of Residents Who Become Victims of Violent Crimes in the Last 12 Months', available at a province level by the local statistics office database **** Lao PDR: No close indicator available**

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
			Malaysia: 'Violent crime & Property crime reported to police', available at a state level by the local statistics office – social statistics bulletin Myanmar: 'Number of selected crimes by state', available at a state level by the local statistics office - statistical yearbook Philippines: 'Crime rate by region (per 100,000 population)', available at a regional level by the local statistics office – statistical yearbook *** Thailand: 'The provincial ranking of unweighted and weighted crime rates', available at a province level by Arunee Punyasavatsut[284]** *** Viet Nam: 'Number of juveniles in juvenile detention centers and prisons', available at an urban and rural split by Hoang Ba Thinh[285]**
Cyber-security	Malware encounter rates	**** N/A**	No data available at a subnational level
Water, waste & sanitation	Access to improved sanitation (% of urban pop.)	World Bank – Health Nutrition and Population Statistics database / World Health Organization United Nations Children's Fund – Joint Monitoring Programme for Water Supply, Sanitation and Hygiene	Data is available for all 10 AMS, however, currentness of data varies Similar data at the subnational level include: Cambodia: 'Toilet facilities by geographical domain', available at an urban and rural-level by the local statistics office - Cambodia socio-economic survey Indonesia: 'Proportion of Population that Has Access to Decent and Sustainable Sanitation Services', available at a province level by the local statistics office database Lao PDR: 'Percentage distribution of household by type of toilet facilities/ source of drinking water used by household', available at a province level by the local statistics office – Lao PDR labour force survey and Lao social indicator survey *** Malaysia: Water production supplied by state', available at a state level by the local statistics office – Statistics Yearbook**

[284] *Determinants of the Weighted Crime Rate in Thailand*, Arunee Punyasavatsut, 2016. Additional information available at: http://www.joebm.com/vol4/384-ET00030.pdf

[285] *Đô thị hóa và tội phạm đô thị, Hoang Ba Thinh*, 2011. Accessed at: http://tailieudientu.lrc.tnu.edu.vn/Upload/Collection/brief/brief_10022_30903_2542012715184.pdf

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
			Myanmar: 'Percentage of Population living in Households with Access to Basic Sanitation/good source of water/ with access to a place for hand washing with soap and water', available at a state level by the local statistics office - Myanmar living conditions survey Philippines: 'Number of Households by Main Source of Water Supply for Drinking/kind of toilet facility they use', available at a province level by the local statistics office - census survey Thailand: 'Private households by type of toilet facility/water supply', available at a regional level by the local statistics office – statistical yearbook and report on population characteristics Viet Nam: 'Percentage of households using sanitary toilet/access to sanitary water', available at a regional level by the local statistics office database
	Annual quantity of solid waste generated	World Bank – Global review of solid waste management/ Waste Atlas	Data is available for 9 AMS (excluding Cambodia), however, currentness of data varies Similar data at the subnational level include: Cambodia: 'Waste Generation and Disposal into dump sites by towns', available at a state level by the United Nations centre for regional development[286] **** Indonesia: 'List of municipal solid waste generation', available at a city level (partial) by the Center of Environment Technology, Indonesia[287]** **** Lao PDR: 'Estimated waste generation in municipal areas', available at a province level (partial) by C. Curea[288]** Malaysia: 'Solid waste generation in Malaysia', available at a state level by Ogboo Chikere Aja and Hussain H. Al-Kayiem[289]

[286] *State of the 3Rs in Asia and the Pacific*, Royal University of Phnom Penh, Cambodia, 2017. Additional information available at: http://www.uncrd.or.jp/content/documents/5686[Nov%202017]%20Cambodia.pdf

[287] *Integrated Solid Waste Management in Indonesia*, Center of Environment Technology, 2007. Additional information available at: http://www.esi.nagoya-u.ac.jp/h/isets07/Contents/Session05/1138Kardono.pdf

[288] *Sustainable Societies and Municipal Solid Waste Management in Southeast Asia*, C.Curea, 2017. Additional information available at: http://www.oneplanetnetwork.org/sites/default/files/15._sustainable_societies_in_south_east_asia.pdf

[289] *Review of municipal solid waste management options in Malaysia*, with an emphasis on sustainable waste-to-energy options, Aja, Ogboo & Al-Kayiem, Hussain, 2013 Additional information available at: https://www.researchgate.net/publication/259634229_Review_of_municipal_solid_waste_management_options_in_Malaysia_with_an_emphasis_on_sustainable_waste-to-energy_options?_sg=78P8Lw4GEL64oiJPSYtQlZp9oZcMJobvPGQESil1ZmupIIU-4q9GbFeTNPoJ2BgXy3NpqgOV3w

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
			**** Myanmar: 'Total solid waste generation per day and per capita', available for select cities (partial) by Dickella Gamaralalage Jagath Premakumara[290]** Philippines: 'Solid waste generation per day', available at a regional level by the Senate of the Philippines[291] Thailand: 'Quantity of Solid Waste', available at a regional level by the local statistics office – statistical yearbook Viet Nam: 'Municipal Solid Waste Generation' at a regional level by Thi Thu Hien Le[292]
	Proportion of waste managed effectively or recycled	World Bank – Global review of solid waste management/Waste Atlas	Data is available for all 10 AMS, however, currentness of data varies Similar data at the subnational level include: **** Cambodia: 'Sorted and unsorted waste ratio', available for Phom Penh only by Yim Mongtoeun[293]** Indonesia: 'Percentage of Households by Province and Treatment of Sorting Waste that Is Easy to Decompose and Not Easy to Decompose', available at a province level by the local statistics office database Lao PDR: 'Total household served for collection of solid waste', available at a town level by the Asian Development Bank[294] Malaysia: 'Scheduled waste managed by state', available at a state level by the local statistics office – statistics yearbook **** Myanmar: 'Solid waste collection coverage', available at a city level (partial) by Dickella Gamaralalage Jagath Premakumara**

[290] *Quick Study On Waste Management In Myanmar*, Dickella Gamaralalage Jagath Premakumara and Matthew Hengesbaugh, 2016. Additional information available at: https://www.iges.or.jp/files/research/scp/PDF/20160613/17_Quick_study_Web.pdf

[291] *Philippines Solid Waste at a Glance*, Senate of the Philippines, 2017. Additional information available at: https://www.senate.gov.ph/publications/SEPO/AAG_Philippine%20Solid%20Wastes_Nov2017.pdf

[292] *A study on Vietnam's solid waste management industry and business environment*, Thi Thu Hien Le, 2016 https://www.theseus.fi/bitstream/handle/10024/109790/Hien_Le%20Thesis.pdf?sequence=1

[293] *A Study of Commercial Solid Waste Generation and Composition in Phnom Penh City*, Mongtoeun, Yim & Fujiwara, Takeshi & Sethy, Sour, 2014. Additional information available at: https://www.researchgate.net/publication/264084303_A_Study_of_Commercial_Solid_Waste_Generation_and_Composition_in_Phnom_Penh_City_CAMBODIA

[294] *Lao PDR : Urban Development Sector Assessment,* Strategy, and Road Map, Asian Development Bank, 2012. Additional information available at: https://www.adb.org/sites/default/files/institutional-document/33722/files/lao-pdr-urban-sector-assessment.pdf

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
			**** Philippines: 'Collection of Recyclable Materials by Primary Collectors', available at a city level (partial) by the Department of Environment and Natural Resources[295]** **** Thailand: 'Method of Getting Rid of Household Solid Waste', available at a province level (partial) by the local statistics office – 2015 core environmental indicators** Viet Nam: 'Quantity of solid waste collected, and collected waste that was properly managed', available at a province level by the local statistics office database
Energy	Air quality index	Air Visual	Real-time data is available for 8 AMS (except Lao PDR and Myanmar) Similar data at the subnational level include:[296] **** Cambodia: 'Air Quality Index', available for Phnom Penh only by Air Visual** **** Indonesia: 'Air Quality Index', available at a province and city level (partial) by Air Visual** Lao PDR: 'Discharges of Air/toxic/ toxic metal Pollutants by Provinces', available at a province level by the local statistics office – statistics yearbook **** Malaysia: 'Air Quality Index', available at a state and city level by Air Visual** **** Myanmar: No close indicator available** **** Philippines: 'Air Quality Index', available at a regional level (partial) by Air Visual** **** Thailand: 'Air Quality Index', available at a province level (partial) by Air Visual** Viet Nam: 'Air Quality Index', available at a province level by Air Visual
	Access to electricity (% of urban pop.)	World Bank – SDGs database & Sustainable Energy for All (SE4ALL) database	Annual data is available for all 10 AMS, however, currentness of data varies Similar data at the subnational level include: Cambodia: 'Electrical power available', available at a state level by the local statistics office - inter-censual population survey of Cambodia

[295] *National Solid Waste Management Status Report,* Department of Environment and Natural Resources, 2015. Additional information available at: http://nswmc.emb.gov.ph/

[296] Air Visual Database. Accessed at: https://www.airvisual.com/

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
			Indonesia: 'Percentage of Households by Source of Electricity', available at a province level by the local statistics office database Lao PDR: 'Percentage distribution of household by type of electricity (incl. no electricity)', available at a province level by the local statistics office – Lao PDR labour force survey Malaysia: 'Percentage of households by accessibility to electricity supply', available at a state level by the local statistics office - household income and basic amenities survey Myanmar: 'Percentage of households connected to the public grid', available at an urban-rural level by the local statistics office – Myanmar living conditions survey Philippines: 'Number/ percent of municipalities/ cities that are energized', available at a regional level by the local statistics office – statistical yearbook *** Thailand: 'Average monthly household expenditure on energy and type of energy', available at a regional level by the local statistics office – energy survey Thailand** Viet Nam: 'Percentage of households using electricity' available at a province level by the local statistics office database
	Energy Mix (proportion using coal, clean fuels etc.)	World Bank – SDGs database & Sustainable Energy for All (SE4ALL) database	Annual data is available for all 10 AMS Similar data at the subnational level include: Cambodia: 'Main sources of lighting by geographical domain', available at an urban and rural level by the local statistics office – Cambodia socio economic survey Indonesia: 'Percentage of Households by Province and Major Fuels for Cooking', available at a province level by the local statistics office database Lao PDR: 'Percentage distribution of household by main source of energy for cooking', available at a province level by the local statistics office – Lao PDR labour force survey **** Malaysia: No close indicator available**

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
			Myanmar: 'Percentage Distribution of Households by Type of Fuel Used', available at a state level by the local statistics office – Myanmar living conditions survey Philippines: 'Number of Households by Type of Fuel Used for Lightning and by Region', available at a regional level by the local statistics office – statistical yearbook Thailand: 'Private households by major type of cooking fuel, source of lighting used and area', available at a regional level by the local statistics office – energy survey Thailand **** Viet Nam: No close indicator available**
Food	Crop production (tons or ha)	FAO database	Annual data is available for all 10 AMS Similar data at the subnational level include: *** Cambodia: 'Rice and non-rice harvested area', available at a state level by the local statistics office database** Indonesia: 'Harvest Area, Productivity and Food Crop Production by Province (Dynamic)', available at a province level by the local statistics office database Lao PDR: 'Low land paddy, Dry season Paddy, Maize, cotton etc. production', available at a province level by the local statistics office – statistics yearbook Malaysia: 'Planted Area of Main Crops', available at a regional level by the local statistics office – statistics yearbook Myanmar: 'Sown acreage of selected crops by states and regions', available at a state level by the local statistics office – statistical yearbook Philippines: 'Number and Area of Farms by Region', available at a regional level by the local statistics office – major crops statistics of the Philippines Thailand: 'Agriculture Land Use', available at a regional level by the local statistics office – 2015 core environmental indicators *** Viet Nam: 'Annual output of grain/ rice production', available at a province level by the local statistics office database**

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
Mobility	Road fatalities	World Health Organization – Global Health Observatory Data Repository	Data is available for all 10 AMS, however, currentness of data varies Data at the subnational level include: Cambodia: 'Percentage of the household population injured or killed in an accident in the past 12 months by type of accident, according to age and sex', available at a state level - Demographic and health survey of Cambodia **** Indonesia: 'Total number of traffic accidents in main provinces', available at a province level by Annisa Jusuf, Ignatius Pulung Nurprasetio & Arya Prihutama[297]** Lao PDR: 'Number of injured persons and deaths (Accidents by province)', available at a province level by the local statistics office – Statistics Yearbook Malaysia: 'Number of Road Accidents and Casualties Reported', available at a regional level by the local statistics office – Statistics Yearbook Myanmar: 'Type of traffic accidents', available at a state level by the local statistics office – Statistical Yearbook **** Philippines: No close indicator available** Thailand: 'Traffic fatalities', available at a province level by the Thai RSC[298] Viet Nam: 'Road accident (injuries/ fatalities)', available at a regional level by Pham Xuan Mai[299]
	Vehicles registered by type	World Health Organization – Global Health Observatory Data Repository	Data is available for all 10 AMS, however, currentness of data varies Data at the subnational level include: Cambodia: 'Percentage of households possessing various household effects, means of transportation, agricultural land, and livestock/farm animals by residence', available at an urban and rural level by the local statistics office – Demographic and Health Survey

[297] Macro Data Analysis of Traffic Accidents in Indonesia, Annisa Jusuf1,Ignatius Pulung Nurprasetio & Arya Prihutama, 2017. Additional information available at: https://media.neliti.com/media/publications/92866-EN-macro-data-analysis-of-traffic-accidents.pdf

[298] Statistical report, Thai RSC. Accessed at: http://rvpreport.rvpeservice.com/viewrsc.aspx?report=0486&session=16

[299] The Road Safety Situation in Vietnam, Pham Xuan Mai, 2013. Additional information available at: http://www.saemalaysia.org.my/wp-content/uploads/2017/03/SAEM-2013-002.pdf

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
			Indonesia: 'Percentage of Provincial Households and Motorized Vehicle Ownership', available at a province level by the local statistics office database Lao PDR: 'Vehicle by provinces (Motorcycle, three-wheeled, bus etc.)', available at a province level by the local statistics office – Statistics Yearbook Malaysia: 'Number of Motor Vehicles Registered by Type', available at a regional level by the local statistics office – Statistics Yearbook Myanmar: 'Registered motor vehicles by type', available for Yangon and other towns by the local statistics office – Statistical Yearbook Philippines: 'Number of Motor Vehicles Registered by Type, Status', available at a regional level by the local statistics office – Statistical Yearbook Thailand: 'Vehicles Registered Under Land Transport Act', available at a province level by the local statistics office – Statistical Yearbook *** Viet Nam: 'Percentage of households that use motorcycle', available at an urban and rural level by the United Nations[300]**
Building & construction	Total revenue output from construction industry	**** N/A**	Similar data at the subnational level include: Cambodia: 'Annual sales by industry (Construction)', available at a state level by the local statistics office – Cambodia Socio-Economic Survey Indonesia: 'Construction Value Completed by Province (Million Rupiah)', available at a province level by the local statistics office database Lao PDR: 'Distribution of economic units (number) by regions and economic activities (construction)', available at a regional level by the local statistics office – economic census Malaysia: 'Contribution of gross output (of construction activities)' available at a state level by the local statistics office – report on survey of construction industries

[300] *Vietnam Population and Housing Census*, Central Population and Housing Census Committee, 2009. Additional information available at: https://unstats.un.org/unsd/demographic/sources/census/wphc/Viet%20Nam/Vietnam-Findings.pdf

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
			*** Myanmar: 'Completed residential buildings' available for Yangon vs other towns or 'Completed construction of schools', available at a state level by the local statistics office – statistical yearbook** Philippines: 'Gross Value Added in Construction by Region', available at a regional level by the local statistics office – statistical yearbook Thailand: 'Total Receipts of Construction Establishments by Size of Establishment (Number of persons engaged)', available at a regional level by the local statistics office – construction industry survey *** Viet Nam: 'Number of individual business establishments by kinds of economic activity (construction)', available at a province level, by the local statistics office**
Urban resilience	Number of Damage House Caused by Natural Disasters	United Nations International Strategy for Disaster Reduction - Desinventar	One-off study. Data is available for 12 AMS cities Similar data at the subnational level include: Cambodia: 'Impact of disaster by province/district', available at a province level by UNDP[301] Indonesia: 'Provincial natural disaster by city', available at a city level by the local statistics office database[302] Lao PDR: 'Distribution of people and properties affected by disasters', available at a province level by the United Nations International Strategy for Disaster Reduction[303] *** Malaysia: 'Number of deaths, property, material, crop or other losses - Flood history in Malaysia', available at a state level by Sani Garba Durumin[304]**

[301] *Cambodia Disaster Loss and Damage Analysis Report,* United Nations Population Fund, 2014. Additional information available at: http://www.kh.undp.org/content/cambodia/en/home/library/environment_energy/cambodia-disaster-loss-and-damage-analysis-report-1996---2013.html

[302] Indonesia Disaster Information Data. Accessed at: http://bnpb.cloud/dibi/tabel1a

[303] United Nations International Strategy for Disaster Reduction – Desinventar. Additional information available at: https://www.desinventar.net/DesInventar/profiletab.jsp?countrycode=lao

[304] *FLOODS IN MALAYSIA Historical Reviews, Causes, Effects and Mitigations Approach*, Sani Garba Durumin Iya, 2014. Additional information available at: https://www.researchgate.net/publication/268152474_FLOODS_IN_MALAYSIA_Historical_Reviews_Causes_Effects_and_Mitigations_Approach

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
			Myanmar: 'Distribution of people and properties affected by disasters', available at a state level by the United Nations International Strategy for Disaster Reduction * **Philippines: 'Calamity Funds Received by Region and by Provinces', available at a province level by the local statistics office – statistical yearbook** * **Thailand: 'Damage and Losses in Housing, by province due to floods in 2011', available at a province level by the United Nations Development Programme** Viet Nam: 'Distribution of people and properties affected by disasters', available at a province level by the United Nations International Strategy for Disaster Reduction
Entrepreneurship & innovation	Number of enterprises/ establishments	World bank – World Development Indicators	Data is available for 8 AMS (excluding Cambodia and Viet Nam), however, currentness of data varies Data at the subnational level include: Cambodia: 'Number of Establishments by Year of Starting the Business', available at a state level by the local statistics office – economic census of Cambodia Indonesia: 'Number of Micro and Small Industry Companies by Province', available at a province level by the local statistics office database Lao PDR: 'Distribution of economic units by regions and economic activities', available at a regional level by the local statistics office – economic census Malaysia: 'Number of establishments by state', available at a state level by the local statistics office – economic census Myanmar: 'Number of establishments by state', available at a state level by the local statistics office – statistical yearbook Philippines: 'Number of Establishments by Region and by Sector', available at a regional level by the local statistics office – updating of the list of establishments

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
			Thailand: 'Operation information of business establishments by size of establishment', available at a regional level by the local statistics office – business and trade survey Viet Nam: 'Number of acting enterprises as of annual by province', available at a province level by the Ministry of planning and investment
Trade & commerce	Local GDP	World Bank national accounts data	Annual data is available for all 10 AMS Data at the subnational level include: *** Cambodia: 'Annual sales of enterprises by each province', available at a state level by the local statistics office – Cambodia socio-economic survey** Indonesia: 'Gross Regional Domestic Product at 2000 Constant Prices by Province', available at a province level by the local statistics office database Lao PDR: 'GDP for province', available at a province level by the local provincial statistics office Malaysia: 'Gross Domestic Product (GDP) by State at Current Prices', available at a state level by the local statistics office – statistics yearbook *** Myanmar: 'Revenue and expenditure of the states and regions', available at a state level by the local statistics office – statistical yearbook** Philippines: 'Gross Regional Domestic Product', available at a regional level by the local statistics office – statistical yearbook Thailand: 'Gross Domestic Product', available at a province level by the', available at a province level by the Office of the National Economic and Social Development Board[305] *** Viet Nam: 'Monthly income per capita at current prices by type of income and by province', available at a province level by the local statistics office database**

[305] Transport and Traffic Statistics and Information Thailand, Natthaporn Buaphut, 2013. Additional information available at:

https://www.researchgate.net/publication/280802684_Transport_and_Traffic_Statistics_and_Information_Thailand_2013?enrichId=rgreq-343c3588106e92fe80f8f836402f5748-XXX&enrichSource=Y292ZXJQYWdlOzI4MDgwMjY4NDtBUzoyNjA0Njg3MTk3NDcwNzNAMTQzOTExMTk5MDI2Ng%3D%3D&el=1_x_3&_esc=publicationCoverPdf

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
Education	Adult literacy rate	United Nations Development Programme – Human Development Reports	Data is available for all 10 AMS, however currentness of data varies Similar data at the subnational level include: Cambodia: 'Adult literacy by geographical domain and sex', available at an urban and rural level (Phnom Penh separate) by the local statistics office – Cambodia socio-economic survey Indonesia: 'Literacy Rate of Population Age 15-59 Years by Province', available at a province level by the local statistics office database Lao PDR: 'Percent distribution of women and men age 15-49 years by highest level of school attended and literacy, and the total percentage literate', available at a province level by the local statistics office – Lao PDR social indicator survey Malaysia: 'Literacy rate among Malaysian citizens age 10-64 by state', available at a state level by the local statistics office – population and housing census Myanmar: 'Population 15 years and over by Literacy Status, Sex and by State/Region', available at a state level by the local statistics office – Myanmar population and housing census Philippines: 'Simple Literacy Rate of the Population 10 Years Old and Over by Region', available at a regional level by the local statistics office – statistical yearbook Thailand: 'Population 10 years of age and over by literacy, age group, sex and area', available at a regional level by the local statistics office – census survey Viet Nam: 'Proportion of literate population aged 15 and over by province', available at a province level by the local statistics office database

Sub-area	Metric	Potential sources of national proxies and benchmarks	Comments and potential sources of subnational data for AMS
	Expected years of schooling	United Nations Development Programme – Human Development Reports	Annual data is available for all 10 AMS Similar data at the subnational level include: Cambodia: 'Persons aged 25 years and above by educational attainment and geographical domain, In Number and Percent.', available at an urban and rural level (Phnom Penh separate) by the local statistics office – Cambodia socio-economic survey Indonesia: 'Average School Duration Age ≥ 15 Years by Province', available at a province level by the local statistics office database *** Lao PDR: 'Percent distribution of women age 15-49 years by highest level of school attended and literacy, and the total percentage literate', available at a province level by the local statistics office – Lao PDR social indicator survey** Malaysia: 'Number of Pupils in Private Primary and Secondary Schools by region', available at a state level by the local statistics office – statistics yearbook Myanmar: 'Number of students at primary, middle and high schools', available at a state level by the local statistics office – statistical yearbook Philippines: 'Cohort Survival Rate in Public and Private Secondary Schools', available at a regional level by the local statistics office – statistical yearbook Thailand: 'Average Year of Education of Population Aged 15 Year and Over', available at a regional level by the local statistics office – statistical yearbook Viet Nam: 'Proportion of population aged 15 and over by education level', available at a province and city level by the local statistics office - point population change and family planning survey

ANNEX B – ASEAN SUSTAINABLE URBANISATION STRATEGY TOOLKIT 2: SUSTAINABLE URBANISATION ACTION TEMPLATES

ANNEX B – ASEAN SUSTAINABLE URBANISATION STRATEGY TOOLKIT 2: SUSTAINABLE URBANISATION ACTION TEMPLATES

INTRODUCTION

The ASEAN Sustainable Urbanisation Strategy (ASUS), aims to help cities in ASEAN Member States (AMS) to develop practical action proposals in sustainable urbanisation. Cities in ASEAN face a variety of challenges driven by rapid urbanisation ranging from increasing inequality, over exposure to natural disaster to increased resource footprints. While every city in the region and its local context is unique, there are a number of challenges that are common across them. The ASUS has identified seven priority sub-areas and eight corresponding priority actions of sustainable urbanisation that address the issues faced by a large number of these cities (Exhibit B - 1).

EXHIBIT B - 1: ASUS PRIORITY ACTIONS

8 action templates have been developed based on the sub-areas with the most need across cities in AMS

Sub-area	Action	Objective
Inclusive & equitable growth	*Introduce and improve access to digital payment solutions to enhance financial inclusion*	Increase the number of city residents with access to financial services through digital financial instruments
Housing & home	*Develop and expand affordable housing solutions*	Improve access to adequate, safe and affordable housing in the city
Personal safety & security	*Introduce digital solutions to enhance safety and security in cities*	Take advantage of relevant digital technologies to help reduce the incidence of crime and threats to public safety
Water, waste & sanitation	*Enhance solid waste management systems*	Improve the overall management of waste collection, segregation, treatment, and recovery in cities
Mobility	*Introduce and improve Bus Rapid Transit (BRT) systems*	Improve the quality and efficiency of public transport and reduce congestion
	Develop and enhance traffic management systems	Reduce traffic congestion and the incidence of traffic accidents in the city
Urban resilience	*Develop flood management systems*	Reduce the incidence, damage and disruption caused by flooding across a city through introducing, or improving, integrated urban flood management and other flood management solutions
Education	*Develop digital skills through "industry boot camps"*	Increase the level of digital skills amongst the population in line with the requirements of the local industry, resulting in a reduction in skills gaps, fewer vacancies, and more placements in higher value-added employment

ABOUT THIS TOOLKIT

Many cities want to promote sustainable urbanisation in the above sub-areas. However, they often face a range of barriers to successful implementation of sustainable urbanisation actions. One common barrier is that local governments struggle to develop robust strategies as well as bankable project proposals for sustainable urbanisation in their cities. Cities also often lack familiarity on best practice approaches or structures for successful sustainable urbanisation actions. The ASUS aims to address these barriers.

This toolkit provides action templates for 8 priority actions that cities can customise to their specific contexts. This can help cities to expedite the process of developing high-quality, or improving existing, implementation plans for actions they have decided to prioritise. These 8 actions only represent a small subset of many important and impactful sustainable urbanisation efforts cities may choose to pursue. This toolkit is therefore designed to be used in conjunction with the 'ASUS Toolkit 1: Prioritising focus areas and actions for enhancing sustainable urbanisation' – which helps cities to prioritise focus areas and actions for enhancing sustainable urbanisation.

HOW SHOULD THE ACTION TEMPLATES IN THIS TOOLKIT SHOULD BE USED

While this toolkit presents action templates for the priority actions in sustainable urbanisation for ASEAN on aggregate, individual city priorities and capacity are likely to differ. It is envisaged that cities will use the template plans in different ways, depending on the context. Three potential, but not exclusive ways action plans can be used, based on the city's local context are as follows:

1. If it's a **large city:** the action template can be used as a brief for implementers and officials to gain a preliminary understanding of the core issues, lessons learnt.
2. **Emerging cities** can use this as a means to support the development of proposals which could be used to engage multilaterals or the private sector support.
3. **Young emerging cities** can leverage the information to engage with Dialogue Partners and other External Partners[306] and/or the national government to seeks additional support to design an action around this space.

It is likely that cities that fall into the second and third category would require additional support to customise these templates i.e. identify the right set of data and draw up localised proposals. It is envisioned that city networks including the ASEAN Smart Cities Network (ASCN), the ASEAN Sustainable Development Goals (SDG) Frontrunner Cities Programme, ASEAN Mayors Forum, and various other city networks in ASEAN, such as those operating under the Brunei Darussalam-Indonesia-Malaysia-Philippines – East ASEAN Growth Area (BIMP-EAGA), and the Indonesia-Malaysia-Thailand – Growth Triangle (IMT-GT) could support cities in this process.

This toolkit is not meant to be prescriptive and hence it is adaptable to a city or network's unique context. For example, the activities listed within should be read as a summary of some of the core issues based on the experience of city administrators and project proponents (e.g. ASEAN partners and the private sector) working in this area. The list of activities may not be exhaustive. It is to be used as a guideline only and a city's local context will determine whether an activity is required, in which order activities are executed and

[306] The term Dialogue Partner refers to a country, or organisation with which an organisation or country has a consultative relationship in agreed areas of common interest. In the ASEAN context Dialogue Partner status can further be divided into Dialogue Partners (10), Sectoral Dialogue Partners (4) and Development Partners (1). For the context of this toolkit, Dialogue Partner can be synonymous with the respective development agencies of ASEAN's Dialogue Partners. For more information see https://asean.org/asean/external-relations/.

how these activities can be distributed across different projects with the support of different funders/partners. Hence, the key activities and outputs need not be completed as a one-off project but can be easily broken up into different stages with different stakeholders helping out in the area where they have developed the deepest expertise.

CONTENT

The content of the action templates was developed through extensive desktop research, as well as direct engagement (i.e. surveys and interviews) with Dialogue Partners and other external Partners as well as their respective development agencies; Multilateral Development Bank programmes; existing city networks in ASEAN; city officials; academics and private sector sustainable urbanisation solution providers.

Each action template has the following structure:

- **Action.** Includes the broad title of the action. For some cities in the early stages of sustainable urbanisation practices the emphasis may be on development of an action, for others it may be improvement.
- **Priority sub-area**. Indicates the sub-area which the action is under (out of the 18 sustainable urbanisation sub-areas outlined in the ASUS framework).
- **Background and rationale.** Helps to contextualise the action for enhancing sustainable urbanisation. It also gives a description of the challenges that are present in ASEAN cities in the relevant sub-area and how the action in question may address these challenges. Some examples of existing efforts in ASEAN are also presented for reference.
- **Common barriers to successful implementation**. Presents the common challenges faced by cities in and outside ASEAN that have impeded successful implementation of actions in this space. It also outlines how best practice design of actions and collaboration at the ASEAN level can help overcome these barriers.
- **Objective and key outputs of the action**. Provides a clearly defined objective of the action alongside a list of key outputs (milestones) with approximate timelines.
- **Key activities.** Lists out activities grouped into key outputs that, based on global best practice, an action in this space will have to complete. Includes detailed descriptions of each activity and the tasks, data and technical solutions required.
- **Monitoring and review mechanism**. Provides some suggested performance indicators that could be tracked to monitor progress.
- **Management of risks and lessons learnt**. Highlights the major risk factors or barriers that cities may encounter prior, during or after implementation and how these risks may be mitigated. This section also includes some useful lessons learnt based on specific global experiences.
- **ASEAN Partners active in this area**. Lists the potential sources of funding and technical capacity. These lists are non-exhaustive.

ACTION 1: INTRODUCE AND IMPROVE ACCESS TO DIGITAL PAYMENT SOLUTIONS TO ENHANCE FINANCIAL INCLUSION

Priority sub-area: Inclusive & equitable growth

BACKGROUND AND RATIONALE

The state of financial inclusion in many AMS cities remains nascent by international comparison. Between 2011 and 2014, the share of adults in ASEAN with a bank account grew from 42 percent to 50 percent of the population.[307] Yet, this is still much lower than the global average of 70 percent.[308] There is also a significant variance in financial inclusion levels across AMS. For example, in 2014, the proportion of adults with a bank account in Thailand, Malaysia, and Singapore (the top-three performing countries) was 78 percent, 81 percent and 96 percent respectively, while the proportion of adults with a bank account in Cambodia, Myanmar and Lao PDR (the bottom three) stood at only 22 percent, 23 percent, and 27 percent respectively.[309] The ASEAN Economic Community Blueprint 2025 aims to enhance economic integration and financial inclusion in the region by 2025.[310] To this end, ASEAN Finance Ministers and Central Bank Governors (AFMGM) have begun to prioritise and elevate the financial inclusion agenda as a policy priority. Member States aim to reduce the average financial exclusion level in the region to 30 percent by 2025 and increase the level of digital payment infrastructure readiness in ASEAN to 85 percent (currently at 70 percent).[311]

Innovative financial services, like digital payments, are a key enabler to support this agenda. In a region where mobile phones subscribership (as a percentage of the population) is over 133 percent and growing at 8 percent annually, digital solutions can support the delivery of financial services where traditional financial institutions have found it difficult to build out their footprint. [312] This could enable city populations to access a range of financial services beyond simple savings, like credit, insurance, and remittance which has the potential to considerably improve the overall quality of life. Financial services delivered digitally are powerful tools to empower women and marginalised groups – who disproportionally lack access to formal finance globally. For example, digital transactions have been shown to support remittance, of which 60 percent of recipients are women.[313] Digital payments can also improve the poor's access to other city-level services including utilities (e.g. through e-government applications or pay-as-you-go utilities). The potential benefits to consumers, businesses, and governments to switch to digital payments in a select number of AMS capital cities (Bangkok, Manila, Phnom Penh, Jakarta, Singapore, Kuala Lumpur and Hanoi) is estimated to be US$22.3 billion.[314] There are several promising examples of private sector innovation in this area. For example, ridesharing firm Grab has launched Grab Financial – a platform which provides microfinancing, insurance, and other services, primarily to Southeast Asians who were previously unbanked.[315] Similarly, mobile money provider,

[307] *Financial inclusion in ASEAN: Presentation for the ASEAN working group on financial inclusion*, World Bank, 2016.

[308] *Ibid.*

[309] *Ibid.*

[310] *Joint Statement of the 2nd ASEAN Finance Ministers and Central Bank Governors' Meeting,* ASEAN, *2016*.

[311] *Speech by Ms Jessica Chew Cheng Lian, Assistant Governor of the Central Bank of Malaysia (Bank Negara Malaysia), at the ASEAN Financial Inclusion Forum,* BIS, 2017.

[312] *The full guide to Southeast Asia's digital landscape in 2017,* Hootsuite and We Are Social, 2017.

[313] *Financial inclusion and consumer empowerment in Southeast Asia*, OECD, 2018.

[314] *Cashless Cities: realising the benefits of digital payments*, Visa, 2018.

[315] *Grab Launches Game-Changing Financial Platform*, The Independent, March 15, 2018.

Ascend Money, serves more than 30 million people in the region through its e-wallet app and its 50,000-strong agent network. The mobile wallet supports bill payments, mobile top-ups, money transfers and online and offline payments – without the need for a personal bank account.[316]

Digital payments also provide an opportunity to better support Micro, Small and Medium Enterprises (MSMEs) which constitute 98 percent of all enterprises across the region – one of the highest shares globally.[317] Digitising payments can spur their growth by reducing the cost of handling cash; enhancing inventory management (thereby preventing accumulation of access stock); and increasing working capital through alternative creditworthiness metrics derived through digital payment transactions.[318] For example, Ant Financial's 'Sesame Credit' scheme leverages spending data and behavioural analytics to generate credit scores for small businesses, thereby increasing lending opportunities and reducing the funding gap. This is particularly valuable in a region where over 8 million MSMEs face credit constraints and have no or insufficient access to credit, and the total funding gap amounts to US$491.4 billion.[319]

Supporting digital financial inclusion is not a policy priority exclusive to national governments. While many policy levers for supporting digital financial inclusion sit at the national level (e.g. developing digital infrastructure and payment gateways), there is also a range of levers available to cities to drive adoption. Past city-level initiatives in this space include:[320]

- Working with the private sector and civil society to identify initiatives to promote usage (for example GrabPay requires and supports its drivers to open a bank account, thereby promoting access to a broader range of financial services).[321]
- Supporting local citizens without a formal bank account in enrolling in secured digital payment for government benefits, like subsidies and tax benefits. For example, the Philippines disburses G2P payments digitally as part of its 2020 E-Peso initiative.[322]
- Promoting the use of smart cards which can be used for payments as well as for accessing government services. For example, Pekanbaru's Smart Card allows users to access 30 forms of licensing online; saving time and money for small businesses.[323] Similarly, Bandung's Smart Card can be used to make government payments, like school fees.[324]

COMMON BARRIERS TO SUCCESSFUL IMPLEMENTATION

Most cities in AMS have yet to capitalise on the above opportunities for driving digital financial inclusion – with the majority facing major challenges as early as the conceptualisation stage. Local authorities face barriers around information failures and implementation capacity,

[316] Ascend Money Selects Red Hat Solutions to Accelerate Electronic Payment Systems Across Southeast Asia, AsiaOne, 2018.

[317] Based on various sources including national statistics offices and International Finance Corporation

[318] *The digitisation of payments and innovation in SME finance*, MasterCard, 2016

[319] *MSME Finance Gap: Assessment of the Shortfalls and Opportunities in Financing Micro, Small and Medium Enterprises in Emerging Markets*, World Bank Group and International Finance Corporation, 2017.

[320] *Cashless Cities: realising the benefits of digital payments*, Visa, 2018.

[321] *City Financial Inclusion Efforts: A National Overview*, National League of Cities, 2015.

[322] *Accelerating financial inclusion in Southeast Asia with digital finance,* Asian Development Bank and Oliver Wyman, 2017.

[323] *Smart City Pekanbaru Bukan Ekspektasi Tapi Implementasi*, SeRiau.com, 2018.

[324] *Bandung Smart Card Diluncurkan, Ini 5 Bank yang Bekerjasama*, Detik News, 2015

often due to the complexity of technologies involved and diversity of private sector providers operating in this space. Some specific barriers include:

- *Low levels of policymaker awareness.* At present, there is a lack of well-structured data and information to engage senior government representatives on the benefits and means to drive digital financial inclusion at the city level. This leads to instances where policymakers are unaware of the relevance of digital payments to broader financial inclusion objectives. A common misconception is that digital payments are not relevant to the poor due to a lack of disposable income or savings (despite research showing that the poor households save up to 25 percent of their income).[325]
- *Lack of trust in digital financial instruments.* Despite a substantial amount of financial education programmes across the region, there persists a misconception that the cost of accepting digital payment is higher than cash.[326] For example, city administrators in AMS can often find it challenging to encourage digital payment adoption because citizens are fearful of putting money in an account where they cannot physically monitor it.[327] Frequent power outages, lack of liquidity at banks, and unreliable broadband connectivity further diminish trust in using these payment innovations.
- *No mandate at the city level.* In other instances, the national government does not provide the city with the mandate and resources to oversee implementation, leading to weak data collection and a lag in reporting times. For example, local governments may not have a department to oversee the digital infrastructure development in their cities and are powerless to do anything about it.
- *Limited interaction with various agencies and the private sector.* Strong cooperation between government agencies and banks is crucial to ensure smooth implementation of digital payments. Since most government institutions tend to work independently, collaboration among them needs to be significantly enhanced.[328] As a result of a lack of coordination with the private sector, digital payment platforms can end up having limited usage and applications. For example, mobile wallets might only be designed to work in selected merchant stores or to purchase certain items.

OBJECTIVE AND KEY OUTPUTS OF THE ACTION

The objective of this action is to increase the number of city residents with access to financial services through digital financial instruments [329]

Key outputs	Approximate timeline[329]
Assessment of the current payments and financial inclusion landscape in the city	45 working weeks
Assessment of existing digital payments and identification of potential solutions to accelerate adoption in the city	25 working weeks
Introduction of pilot and development of a city-level plan for the implementation of the proposed payment system in Output 2	Based on city context
Scaled implementation of the solution	Based on city context

[325] *Do low-income households invest? Some findings from Bangladesh*, United Nations Capital Development Fund, 2018.

[326] Based on interviews with city level officials during the ASUS Forum from 7-8 July 2018.

[327] *Ibid.*

[328] *Ibid.*

[329] Based on interviews with experts familiar with transport programmes in the region. These timings are provided as rough guidelines only. Actual time required will depend on the city context.

KEY ACTIVITIES

This section contains a list of the key activities an action in this space would have to complete. These activities were compiled based on research of global best-practice approaches, and with the help of city representatives, topic experts from development agencies, multilateral organisations, academia, and the private sector. It should be read as a summary of some of the core issues experienced by proponents working in this area. It is to be used as a guideline only and a city's local context will determine whether an activity is required, in which order activities are executed, and how these activities can be potentially distributed across different projects with the support of different funders/partners.

Activities	Comments
Output 1: Assessment of the current payments and financial inclusion landscape in the city	
Evaluate existing level of financial inclusion in the city	Assess the degree to which city residents have access to appropriate financial instruments in the city. This could include similar metrics to the Global Findex Database produced by the World Bank, which focuses on national-level data on how adults save, borrow, make payments, and manage risk.[330] Key metrics to consider include: ■ *Basic metrics* such as percentage of adults with a bank account, savings or borrowings from a financial institution; proportion of people with who use mobile money account; ■ *Usage metrics* such as frequency of deposits and withdrawals; credit / debit card usage; proportion of adults using mobile banking; types of phones used to transact (e.g. feature phones, smartphone). Where possible, this should draw upon existing research, but it is likely that new survey data will need to be commissioned. A minimum sample size of 300 residents (more depending on the different cuts of data being used and the city size) is required to ensure statistical significance of the results, and there should be coverage across gender types, income levels, and geographies across the city. This survey could be commissioned by the government, but there are also opportunities to partner with other important stakeholders in this analysis, to ensure sustainability of measurment efforts and reduce resource intensity. Such stakeholders include multilateral institutions (e.g. World Bank, Asian Development Bank) and the private sector (e.g. requesting ridesharing firms to survey their drivers). The survey should also seek to understand barriers that people face in becoming financially included and their perception of digital financial inclusion options. Data collected should be disaggregatable by ethnicity, age, gender, income segment, disability and household type to allow tracking of impact on marginalised groups as well as identify income groups which are most affected.

[330] https://globalfindex.worldbank.org/

Activities	Comments
Evaluate the impact of existing national and city-level initiatives to improve financial inclusion and ascertain if further action is required	A detailed examination of existing policies and initiatives (at both the national and city level) should be carried out to understand their approach, impact, and lessons learnt. This could be done through a combination of desktop research and interviews. This analysis should be matched against the review of financial inclusion in the city (conducted earlier) to understand the degree to which initiatives have translated into impact in the city. Key gaps should be identified (see next activity) and an understanding of the regulatory authorities of the city to develop a potential scope of activities by which the city could further promote financial inclusion.
Identification of specific gaps in digital financial landscape in the city	Data from the preceding two activities can be used to identify the root causes of weak digital financial inclusion in the city. These gaps are can be broadly grouped into four categories: 1. *Weak payments infrastructure*. The pace of digital infrastructure in some cities has not kept up with the local demand for digital financial services. Common problems in this area include large swathes of 'dead zones' with zero mobile connection, slow and unreliable internet bandwidth, lack of top-up/ agent facilities, unreliable agent network (with rampant fraud), infrequent electricity supply leading to unusable Point-of-Sale machines, and no interoperability between various payment providers. 2. *Low adoption by residents*. In other instances, even though digital payment services are reliable and accessible, residents are unwilling to adopt it. Several reasons include: mistrust in the usage of digital payments, low levels of digital literacy, and lack of awareness on the benefits of using digital payments (e.g. how it can reduce leakage and fraud). 3. *Limited options for digital payments.* The lack of opportunities to use digital payments can also hinder adoption. A continued reliance of handing-out welfare payments in cash, poor merchant adoption, and the lack of a payments portal to digitally accept P2G payments (e.g. fines, taxes) are some reasons for this. 4. *Outdated regulatory landscape:* In other instances, regulatory reform has not kept up with innovation and demand. For example, many cities cannot introduce digital payments because the financial regulation has not been updated to allow Mobile Network Operators to provide financial services. At other times, the Know-Your-Customer (KYC) procedure is too onerous for residents (particular the poor) to open an account.

Activities	Comments
Socialise and verify findings through a diagnostic workshop with key stakeholders	Key stakeholders should include network operators, local and national banks, community leaders, national regulators and merchant associations. This would provide the opportunity for stakeholders to share their personal experience around the payments and regulatory landscape, and act as a platform to identify issues which the proposed solution must address. Consultation should be conducted in two phases: i) individual consultations with specific groups (e.g. NGOs, women's groups, elderly – in particular, their carers) separated from each other to prevent the drowning out of their opinions. Experience has shown that minority groups do not speak up otherwise; ii) between groups once individual concerns have been heard. i.e. get differentiated information first, then bring it back together and overlay. Experts recommend a minimum 20-30 percent representation of women.[331]
Output 2: Assessment of existing digital payments and identification of potential solutions to accelerate adoption in the city	
Identify a range of options that show great potential for delivering financial services to targeted groups which can be implemented by the city	There are several levers which cities can implement based on the gaps analysis in Output 1:[332] ■ *Weak payments infrastructure.* Where a digital payment solution is already present, cities could ease licensing procedures for relevant providers (e.g. creating a one-stop-shop), support the development of agent networks, create ordinances which will ensure the long-term viability of telecommunications investments by the private sector. Should a digital payment solution not be present, cities could explore introducing electronic cards or mobile wallets. The former refers to pre-paid/ debit cards that also stores information on the user. These cards can be disbursed to beneficiaries from the government for welfare payments or in replacement of food stamps. The cards do not require the user to have a bank account to use it. This technology has been used successfully in some cities including Pekanbaru and Bandung. Mobile remote payments use mobile applications and/or SMS technology to transact. These wallets also include physical-mobile payment models – like agent networks. ■ *Low adoption by residents.* Financial and digital literacy can be enhanced through communication programmes which use simple messaging to inform participants of their rights and how banking products work. Cities could build trust by partnering with community institutions to promote and formalise savings, provide rebates to incentivise usage, improve accessibility to digital payments even for people without a bank account, and ease payment options (e.g. using QR codes to simplify transaction).[333]

[331] Based on consultations with social inclusion experts on projects funded by multilaterals.

[332] There are a host of other policy levers that central banks and national governments have to affect policy. This includes, increasing agent commissions, introducing a tier-ed KYC, improving consumer protection laws, etc. However, these are not discussed as the focus of this action lies at the city level.

[333] For example, Peru's BiM allows subscribers to send electronic money to anyone, even if that recipient isn't signed up with BiM. In such a case the recipient can visit an agent to register for BiM or simply withdraw money without registering.

Activities	Comments
	■ *Limited options for digital payments.* Some solutions in this area include exploring opportunities to digitise several types of payments including welfare transfers (i.e. G2P payments); converting existing in-kind transfers (including subsidies) to digital payments instead; supporting payment of taxes and fines (P2G payments) digitally; enabling digital payment on public transport; increasing stations for airtime top-up (pre-paid phone minutes); and working with payment providers to train and entice merchants to allow digital payments. Interviews with city officials highlight the importance of digitising P2G as a first step since governments have greater control over these payments. ■ *Outdated regulatory landscape.* Forming regulation for digital payment tends to be the role of national-level government agencies. In this instance, cities could focus on providing the evidence-base to support public policy formulation and reform at the national level.
Select the most suitable solution to enhance digital financial inclusion – based on root causes and feasibility of implementation at the city level	Aside from the technical capacity and additional resources required for implementation, special attention should be placed to work with operators/providers to understand the potential cost to scale and maintain operations. This is especially relevant when introducing/ reforming the digital payment system and would prevent an instance where the provider would unexpectedly exit – as experienced in India, South Africa, and Pakistan. Proponents should also examine the feasibility of the adoption of the new system based on the demographic group being targeted by the city. For example, introducing a smartphone-based mobile wallet solution might not be as effective if the financially excluded group are mostly the elderly.
Convene workshop with key stakeholders and the community to share proposed solutions and refine based on input received.	See above
Output 3: Introduction of pilot and development of a city-level plan for the implementation of the proposed payment system in Output 2	
Develop an implementation plan to apply solution identified in Output 2	The implementation plan should clearly identify key milestones and targets for stakeholders from both the private and the public sector. It should also include clear timelines to incorporate new providers/ operators to prevent only one player from occupying a monopoly over digital payments within the city. Proponents might be required to review and revise standard operating procedures (SOPs), and process flowcharts because of introducing these digital payment solutions.[334] This is of particularly relevance to solutions to address *'weak payments infrastructure' and 'limited usage of digital payments'.*

[334] *Making the Journey from Cash to Electronic Payments*, USAID, 2016.

Activities	Comments
Socialise solution and its benefits through media and an education strategy	Several global best-practice principles to build trust in users have been identified. (See 'lessons learnt' for more details) This activity is particularly important for solutions regarding '*low adoption rates'* and '*limited options for digital payments'.*
Provide training to relevant staff to ensure that the solution is implemented smoothly	It is important to ensure rigorous training for salesforce/agents/ merchants to ensure adequate market conduct to build a reliable payment platform and allay the fears/concerns of end-users. Practical, hands-on training is especially important in markets where first-time merchants are unaccustomed to handling electronic payments and/or have low financial literacy.[335]
Conduct a pilot to test out the proposed solution	Consider restricting pilots to particular groups of users such as civil servants or students. Civil servants are well suited to be part of the test group as they are better informed, and their feedback may be easier to monitor. Further, piloting through government employees opens up the additional dimension of G2P wage payments to be transitioned to digital. During the trial, there should be a strong channel for feedback. This was the same approach used in Pekanbaru when it rolled out its Smart Cards.
Measure the impact of the solution	See 'Performance indicators'. It is also important to conduct feedback using personal interviews to assess satisfaction.
Convene a workshop between stakeholders to provide feedback on the pilot results, share experience on implementation challenges, discuss best practice, and how to develop potential partnerships	The outcomes and lessons learnt from the pilot should be captured in the form of a document (e.g. report, city blue print, white paper, study) that could be shared more widely and be used to replicate as well as gather further support.
Output 4: Scaled implementation of the solution	
Update implementation approach based on results from the pilot programme in Output 3	This should include improving training packages for key officials to improve the long-term efficacy of implementation. Traditionally, women are difficult to reach through the usual channels that target men.[336] As such, it is important for gender-specific targets (e.g. 1 in 4 users should be female) to be included to prevent women from being excluded from the benefits of digital financial inclusion.
Expand solution at scale	Implementation should be based on a phased adoption process in order to prevent unforeseen hiccups from jeopardising the entire programme. (See 'lessons learnt' for more details)

[335] *Innovation in Electronic Payment Adoption: The case of small retailers*, World Bank Group, 2014.

[336] *5 Challenges for Women's Financial Inclusion*. CGAP, 2017.

Activities	Comments
Scope additional opportunities and partnerships with private stakeholders to improve and extend payment service offerings	This could include exploring opportunities for cross-selling which would improve the business case for payment providers to offer more services and/or subsidise the cost of service for target groups (e.g. they might be more willing to forego service fees for smaller P2P transactions – which are more likely to be used by the poor).
Continue monitoring and evaluation of activities to identify areas for future improvement and the expected outcomes	

MONITORING AND REVIEW MECHANISMS

Progress could be assessed at three levels: performance indicators, output, and input.

Performance indicators:

Possible metrics which could be used include:

- Proportion of adults (including split by gender, age, and race) that have a bank account
- Frequency of withdrawals and deposits (at least once a month) (including split by gender, age, and race) from those with a bank account
- Proportion of adults using mobile banking

Note – this data will need to be gathered by the city and the data collection process should be designed as part of Output 3.

Output metrics:

- Completion of outputs listed earlier

Input metrics will be linked to the specific implementing activities (see the key activities above for further details).

MANAGEMENT OF RISKS AND LESSONS LEARNT

Below are a list of key risks and potential options for managing them:

- *Misalignment between initiative at the city level and national policies.* Limited consultation during the early stages of the action could lead to challenges during the implementation stage. This can be mitigated through careful examination of the scope and authority that cities are given to introduce/ enhance digital payments (Output 1) and through constant consultation with national level agencies at important milestones of the action.
- *Lack of open markets.* Ensuring an open digital payments markets is important to allow for competition and innovation which can lower usage costs for end-users. Proponents can include clauses that allow other providers to enter the market after a predesignated amount of time (Output 4). For example, although Pekanbaru has begun the implementation of its Smart Card with only one provider (Mandiri), the provincial

government has already made plans to include several other banks after the testing phase.

There have been a considerable number of digital payment acceleration actions implemented globally. Some lessons from these actions include:

- **Develop a clear transition plan which focuses on phased adoption and built-in redundancies in case of implementation hiccups.** New payments solution tends to encounter unexpected hiccups which might not have been detectable even during the pilot stages (e.g. implementation at scale might lead to heavy network traffic which causes the payments system to break down or poor train-the-trainer programmes could lead to improper digital literacy training to end-users). Past actions have shown that it is prudent to implement the solution in phases to address challenges quickly and more efficiently. For example, Nepal opted for a district-to-district transition from manual to digital payment systems to ensure that systems were rigorous before fully switching over.[337] It is also important to include options for operators to revert to cash if digital solutions do not work – which can be common in the initial stages of implementation. Failure to include these elements might damage the perception of the digital solution and lead to residents shunning it from the start.
- **Built trust in the system through some basic design and implementation principles**. Some key principles to note- based on previous actions in this space include:[338]
  - *Communicate clearly and be transparent, do not hide any element of your service.* Ensure that communication clearly explains the benefits in dollars and cents and how they can save/earn more money using the platform. Be clear on how long each service will take to process transactions.
  - *Provide incentives for the switch.* Introduce discounts and rebates for the adoption of the digital payment. Including games as part of the app has also been shown to increase usage – as in the case of Google's mobile wallet, Tez, in India.
  - *Give simple and clear instructions*. Literal language, specific examples from real life, and clear visuals (e.g. illustrations) will improve understanding and usage. For example, Vistaar, a microcredit company in India, uses animated videos to explain to entrepreneurs how credit works while ensuring that the video is translated into the local language where it operates.[339] Similarly, Visa worked with Marvel to publish an educational comic book that teaches users about personal finance in a fun and engaging way.[340]
  - *Leverage informal social networks which users trust.* This could include teaching community leaders how to use the digital payments so that they can train others to use it. For example, Papua New Guinea's Nationwide Microbank recruited women, who actively used its mobile wallet (MiCash), to teach other women who have inactive accounts. Using women to train other women led to increased usage – a trend which was not observed when men were used.
  - *Ensure a regular feedback channel.* This will prevent users from feeling isolated and without recourse should problems occur. Features to include in successful grievance mechanisms include zero-charge for calls, procedures to expedite serious problems, and a specialised hotline (if the operator offers other services).[341]

[337] Interview with expert form UNCDF on financial inclusion

[338] *Insights into action: What human-centered design means for financial inclusion*, CGAP, 2014.

[339] *Building Consumer Confidence with Simpler Digital Financial Services*, Omidyar Network, 2017.

[340] *Visa Teams Up with Marvel to Offer Financial Education through 'Guardian' Comic Book,* Cision, 2016.

[341] *Recourse in Digital Financial Services: Opportunities for Innovation,* CGAP, 2015.

ASEAN PARTNERS ACTIVE IN THIS AREA

A number of potential sources of funding:

- Asian Development Bank (ADB)
- World Bank (WB)
- Australia Aid (AusAid)
- United Nations Capital Development Fund (UNCDF) - Shaping Inclusive Finance Transformations (SHIFT)
- United States Agency of International Development (USAID)

ACTION 2: DEVELOP AND EXPAND AFFORDABLE HOUSING SOLUTIONS

Priority sub-area: Housing & home

BACKGROUND AND RATIONALE

The definition of affordable housing varies between countries but can be broadly defined as 'dwellings which are adequate in quality and location and do not cost so much as to prohibit their occupants from meeting other basic living expenses or threatens their enjoyment of basic human rights'. [342] Many ASEAN cities suffer from a shortage of affordable housing which is often exacerbated by rapid urbanisation. The resulting pressure on the cost of housing means residents are forced to substitute housing expenses for expenditure on other basic needs, including food, health care, and schooling for children. Limited access to affordable housing can also lead to the formation of informal settlements (i.e. slums); 28 percent of the urban population lives in informal settlements in cities across AMS.[343] People living in these settlements often do not have access to water and sanitation, and other public services (e.g. schools).[344] Substandard housing also has implications for disaster resilience; one study estimates that some 115 million urban residents across Southeast Asia will be vulnerable to coastal flooding.[345] This can have a disproportionate impact on women and minorities as large gender pay gaps in most AMS can exacerbate housing concerns for women.[346] Tackling affordable housing issues can help open up additional economic opportunities for women while saving up to US$16 billion annually as a result of more efficient operations and maintenance.[347] City governments play a crucial role in delivering affordable housing solutions as they are in the best position to work with the public, national government agencies, and the local private sector.[348]

COMMON BARRIERS TO SUCCESSFUL IMPLEMENTATION

Affordable housing solutions often encounter challenges in cities across AMS for four main reasons:

- *Limited capacity of Local Government Units (LGUs).* LGUs often lack the necessary capacity to issue permits and approvals in a timely manner, affecting the overall efficiency of the housing market. They also often lack the technical expertise to ensure proper operations and maintenance (O&M) once the projects have been completed. Finally, many LGUs face budgetary challenges to provide a sufficient number of units.[349]
- *Lack of data on housing demand and supply, and land regulation.* Closely linked to the capacity of local government, is the lack of accurate data on the number and location of the target beneficiaries, and land tenure in the city. While data on the availability of adequate housing, income migration and marginalised groups in need of housing interventions are often present at the national level, city-level data are often scarce

[342] *Affordable land and housing in Asia,* UN Habitat, 2011.

[343] *Smart Cities in Southeast Asia*, McKinsey Global Institute, 2018.

[344] *ASEAN social progress,* ASEAN Statistics Office, 2017.

[345] *Green urbanisation in Asia*, Asian Development Bank, 2012.

[346] *The Power of Parity: Advancing women's equality in Asia Pacific*, McKinsey Global Institute, 2018.

[347] *Smart Cities in Southeast Asia*, McKinsey Global Institute, 2018.

[348] *A blueprint for addressing the global affordable housing challenge,* McKinsey Global Institute, 2014.

[349] However, this might be changing for the better as AMS governments are introducing new initiatives to address the affordable housing challenge, including Indonesia's 'One Million Houses' programme and Malaysia's '1Malaysia People's Housing Programme'. See *Affordable housing in Southeast Asia,* The ASEAN Post, 2017.

and outdated.[350] This makes it difficult to target the appropriate groups and ascertain the extent of intervention required (e.g. size of grant, type of subsidy for underserved segment).

- *Limited involvement of Local Government Units (LGUs) in national level plans.* Local authorities are often excluded from national-level consultations surrounding affordable housing policies – especially during the initial stages of planning (e.g. during the stages of rectifying building codes and/or regulation to support affordable housing).[351] This has resulted in instances where interventions were not fit for purpose to the local context.
- *Lack of an integrated planning approach.* Effective affordable housing plans require an integrated approach, where focus is placed not only on the housing itself but also on the broader economic and social context. For example, constructing new units far from cities where land is cheaper can entrench poverty and social isolation, unless attention is placed on the supporting social and economic infrastructure. Unfortunately, such an integrated approach can be challenging due to the skill sets required and the need for cross-sector collaboration in government.

An affordable housing action would concentrate effort on ensuring identified solutions are appropriate for the local circumstances. A best practice approach is to think about a ladder of housing aspirations, with rising standards for floor space per unit and amenities which can be met over time.[352]

Rather than just focussing on a new stock of affordable housing, a sustainable action requires cities to make refurbishments to existing stock, as well as make informal settlement upgrading (e.g. invest in infrastructure and social services to improve conditions in the short-term) a key component of the effort. Provision of affordable rental options and transitional housing are also crucial. Further, cities should also consider additional housing for middle and high-income citizens as part of the affordable housing strategy. Moving these income groups into new supply releases their current homes for lower-income households. A suitable action must also enhance the availability of data on the status of affordable housing and provide technical training and capacity building to ensure sustainable operations and maintenance of facilities.

OBJECTIVE AND KEY OUTPUTS OF THE ACTION

The objective of this action is to improve access to adequate, safe and affordable housing in the city.

Key outputs	**Approximate timeline[353]**
An assessment of the current housing situation in the city	30-60 working weeks
Identification of appropriate affordable housing solutions which address the specific problems in the city	25-50 working weeks
Development of a city-level plan for the identified housing solutions, with tailored plans for targeted areas as well as implementation launch in at least one pilot area	Based on city context
Phased implementation of housing solutions in all targeted areas	Based on city context

[350] Interview with a housing expert from a multilateral bank.

[351] *Achieving affordable housing for all: Strategy and practice*, Global Platform for Sustainable Cities, 2016.

[352] *A blueprint for addressing the global affordable housing challenge,* McKinsey Global Institute, 2014.

[353] Based on interviews with experts familiar with housing programmes in the region. These timings are provided as rough guidelines only. Actual time required will depend on the city context.

KEY ACTIVITIES

This section contains a list of the key activities an action in this space would have to complete. These activities were compiled based on research of global best-practice approaches, and with the help of city representatives, topic experts from development agencies, multilateral organisations, academia, and the private sector. It should be read as a summary of some of the core issues experienced by proponents working in this area. It is to be used as a guideline only and a city's local context will determine whether an activity is required, in which order activities are executed, and how these activities can be potentially distributed across different projects with the support of different funders/partners.

Activities	Comments
Output 1: An assessment of the current housing situation in the city	
Establish a common definition of 'affordable' that is based on discussions with key stakeholders from the private and public sector	Define 'affordable housing' based on local sensitivities to guide housing delivery and planning. As a point of reference, the McKinsey Global Institute defines affordable housing as housing costs that consume no more than 30 to 40 percent of household income.[354] The definition includes minimum standards for basic amenities (running water, a toilet), floor space, and access to essential social services like clinics and schools.
Gather data to understand the extent of housing issues by segment (e.g. race, gender, income), city area, and current housing stock and projected flow.	Timeline depends on quality of existing data. Both demand and supply side data are important to ascertain the severity of the housing problem in cities: ■ *Supply-side data to understand current housing stock of affordable housing and projected flow.* Analysis in this area should examine current housing stock by type, size, location and price, forecasted housing supply, spatial distribution of centres of employment, commuting patterns of people. ■ *Demand-side data to understand income distribution and housing usage at present and in the future.* Demand-side data is especially important and lacking in most AMS.[355] Analysis in this area should try to collect data on the amount of land and floor space available to households, housing cost as a share of total household income, household characteristics of the homeless group, and migration patterns within and between cities. One potential approach to gauge the quality of affordable housing is through the use of benchmarks. Project proponents familiar with this topic highlight the importance of going beyond health and safety standards, and including issues around energy usage, proximity to public infrastructure, and resilience to climate-related disasters when benchmarking the quality of housing. Data collected needs to be well stored for subsequent evaluations. It should also be disaggregatable by ethnicity, age, gender, income segment, disability and household type to allow the tracking of impact on marginalised groups as well as identify income groups which are most adversely affected.

[354] *A blueprint for addressing the global affordable housing challenge*, McKinsey Global Institute, 2014.

[355] *World Bank: Demand-side housing information lacking*, The Star Online, 2018.

Activities	Comments
Understand root causes of housing issues in the city.	Key gaps should include an understanding of the regulatory authority of the city to develop a potential scope of activities which the city could further promote affordable housing.
Socialise findings through a diagnostic workshop with stakeholders to verify findings and agree on target areas.	The workshop could also facilitate developing partnerships between housing administrators, national government agencies, local authorities, funding institutions, private developers, home builders, cooperatives, and consumers. A long list of initial ideas (which will be explored further in the next phase of work) could be shared to gather input. An issue common in housing projects is the development of 'not in my backyard' mentality from existing homeowners who want to preserve the status quo. As such, consultation should be conducted in two phases: i) individual consultations with specific groups (e.g. NGOs, women's groups, elderly – in particular, their carers) to ensure their views are appropriately captured; and ii) between groups once individual concerns have been heard. Also, a minimum 20-30 percent representation of women is recommended by experts.[356] The findings circulated in the workshop could be compiled in form of a document (e.g. report, city blue print, white paper, study) that will make it easier to engage stakeholders going forward.
Output 2: Identification of appropriate housing solutions which address problems in the city based on findings from Output 1	
Identify a range of appropriate affordable housing solutions.	Based on the landscape review and workshop (as part of Output 1) identify a range of potential solutions and their potential impact on the housing identified earlier. Solutions in this space should also be based on interviews with experts, an examination of the city's capacity and scope to implement, and its alignment with existing plans. In general, four main approaches to address this include: [357] (see 'Table 1' for more detailed explanation) ■ *Unlocking private and public land supply* for affordable housing through measures such as transport-oriented development, idle-land policies (e.g. taxes on undeveloped land, property tax exemptions for new developments), release of public land, and inclusionary zoning. Under inclusionary zoning, in return for flexibility on land use regulations (e.g. permitted floor-area ratio), the developer must set aside a certain portion of a project for affordable units to be sold or rented to lower-income residents. ■ *Integrating industrial approaches to improve built quality while keeping costs low*. Analysis by McKinsey Global Institute has shown the potential to reduce costs by up to 30 percent and time for construction by up to 50 percent through various industrial construction technologies (such as using pre-fabricated materials) and value engineering approaches (e.g. standardisation of building requirements).[358]

[356] Based on consultations with social inclusion experts on projects funded by multilaterals.

[357] *A blueprint for addressing the global affordable housing challenge*, McKinsey Global Institute, 2014. See Table 1 for further details.

[358] *A blueprint for addressing the global affordable housing challenge,* McKinsey Global Institute, 2014.

Activities	Comments
	■ *Achieving scale and efficiency for operations and maintenance work*, including using the private sector to manage operations and installing energy efficiency retrofits. ■ *Reducing costs through improving financing policies to ensure that prices are reasonable*. For example, introducing rental options for low-income earners, reducing loan origination costs, reducing the costs of funding mortgages, and utilising collective savings to reduce lending rate**s.**
Assess feasibility of implementation of solutions and prioritise solutions.	Examine feasibility of successful implementation of potential solutions, including technical capacity, budgetary implications, and regulatory requirements (particularly related to the scope of regulatory powers of the city government versus regional and national governments) and the root causes identified in Output 1.
Poverty, Social and Gender assessment resulting in Social Inclusion Action Plan.	In order to ensure effective gender mainstreaming, actions should include a Social Inclusion or Gender Action Plan (GAP) which to be conducted after an assessment of the social and gender divide and interaction with focus groups on this.[359] This should involve the key NGOs and local communities**.**
Convene workshop with key stakeholders and the community to share proposed solutions and refine based on input received.	See above
Output 3: Development of a city-level plan for identified affordable housing solution (from Output 2) for targeted areas and a pilot implementation in at least one of the targeted areas	
Develop a phased implementation plan for identified affordable housing solution	The implementation plan should clearly identify infrastructure and policy priorities – by intervention and target area. Identify metrics for measuring progress and process for gathering data (see section on 'monitoring and review mechanisms'). Cities can align to improve delivery through the construction of a 'delivery lab approach' which brings together 30-40 people from across various specialties for fast-paced intensive working events and are designed to translate high-level housing strategies into detailed initiatives, implementation plans, and key performance indicators.[360]
Socialise and train key stakeholders on the selected affordable housing solutions	Widely promoting the concept of affordable housing is an important part of cultivating a hospitable environment for actions. Timing depends on current training of officials and design of programme. Capacity training must ensure adequate representation amongst women and minorities (general guidelines suggest 20 – 30 percent) [361]

[359] Gender Action Plans in ADB Projects and Preparing a project Gender Action Plan, ADB, 2013

[360] Housing affordability: A supply-side toolkit for cities, McKinsey & Company, 2017.

[361] Based on consultations with social inclusion experts on projects funded by multilaterals and Dialogue Partners.

Activities	Comments
Pilot appropriate affordable housing solution in at least one target area.	Clear criteria around demographic indicators, established in Output 1 and 2, can help to identify beneficiaries. Some potential ways to select beneficiaries to be part of the pilot and the full-scale action include: ■ *Lottery*. Qualifying households register and are then randomly selected (e.g. Singapore and China). ■ *First come, first served.* Applicants are assigned according to the order they sign up (e.g. Mexico, South Africa). ■ *Needs-based.* A government agency evaluates the household and prioritises the allocation based on the perceived greatest need (e.g. United States, France). ■ *Agency-driven, choice based.* Households select their preferred choices and units are allocated in order of need or position on waiting list (e.g. United Kingdom).
Measure the impact of the affordable housing solution in the target area.	This would be based on metrics developed as part of Output 1.
Convene a workshop between stakeholders (e.g. trainers, government officials, private sector partners) to provide feedback on the pilot results, share experience on implementation challenges, discuss best practice, and how to develop potential partnerships.	The outcomes and lessons learnt from the pilot should be captured in the form of a document (e.g. report, city blue print, white paper, study) that could be shared more widely and be used to replicate as well as gather further support.
Output 4: Phased implementation of housing solution in all target areas of the city	
Identify agency responsible for action monitoring and reporting of the full-scale implementation across the city.	Ensuring a reliable and well-coordinated institutional arrangement is important due to the cross-cutting nature of the issue. For example, Malaysia created a National Housing Council to bring relevant ministries under one roof. This could help to improve planning, issuing of permits, implementation, and enforcement of standards/ regulation. This agency can streamline processes to fast-track land use approval and permits, alleviating the burdensome process.
Update approach based on pilot programme in Output 3.	This should include improving training packages for key officials (particularly around enforcement regulation) to improve the long-term efficacy of implementation.

Activities	Comments
Work with key stakeholders to implement housing solutions across all targeted areas.	There are several delivery models which are relevant to cities - based on the local context: ■ *Public delivery model.* Government engages the private sector to build the project on public land, while still acting as the primary developer and retaining ownership ■ *Public-Private Partnerships*. Partnership with the private sector to develop housing and share building and designs risks ■ *Incentivised private development model.* Private developers receive financial and non-financial incentives to build affordable housing (e.g. Malaysia) See 'Management of risks and lessons learnt' for more details). In some instances, cities could work with their national governments to approach multilateral banks for funding. While the requirements for each lender and loan may differ, cities should be able to show that they 1) have a clear understanding of the land available for development, 2) reflect a willingness to ease regulation and licensing for construction permits, and 3) show a strong level of political will to see through affordable housing programmes.[362]
Continue monitoring and evaluation of activities to identify areas for future improvement and the expected outcomes.	

[362] Based on interview with experts from the World Bank.

Table 1: There are four broad approaches to developing affordable housing[363]
Securing land for affordable housing at the right location. This approach entails developing affordable housing in areas where residents can reach jobs in reasonable commuting times. This can be achieved through several levers including enhancing public transportation around housing areas; releasing new land which is either government-owned or idle private land;[364] formalising ownership of informal land by updating the land-registry; and amending land-use rules to increase the permitted number of units which can be built on a plot of land, thereby providing developers concessions in return for providing affordable housing units.
Enhancing capital productivity via innovative construction techniques could cut total cost by 30 percent and shorten delivery time by almost half.[365] It is estimated that a standard housing unit needs to be delivered at a cost of US$150-1,500 (including land price) in order for it to be affordable for most households.[366] This productivity can be achieved through efficient purchasing policies, standardising construction parts to receive volume discounts, and adopting enhanced construction methods (e.g. prefabrication, modular housing). Governments can incentivise this approach through public procurement, uniform building codes, and design standardisation guidelines, as well as help shape consumer acceptance (e.g. industrial housing techniques can be unpopular). For example, Singapore's Housing Development Board (HDB) has begun exploring the application of modular unit construction – which entails using pre-built parts of a building (i.e. with completed floors, wall finishes, window frames) and combining them together at the construction site. It estimates that this mode of construction could improve productivity by up to 25 percent.[367]
Effective management of operations and maintenance could make housing more affordable while establishing the right standards to prevent dilapidation in the long-run. Some initiatives include introducing energy efficient technology (e.g. the Philippines has started installing Solar PV on rooftops of affordable housing settlements to reduce maintenance costs) and pooling demand for maintenance services to increase economies of scale.
Improving financing models to reduce the upfront costs for home buyers could improve overall access to housing. Policy options include reducing loan costs to lenders and borrowers (e.g. mortgage guarantee schemes and liquidity facilities) and leveraging collective savings (e.g. housing provident fund). For example, the Indonesian government subsidises mortgages for low-income earners and eases administrative requirements for lending.[368] Similarly, Philippines' 'Community Mortgage Programme' extends mortgages to poor households through partnerships with community groups that collect pooled savings from residents.[369]

[363] *A blueprint for addressing the global affordable housing challenge*, McKinsey Global Institute, 2014.

[364] An example of unlocking idle land is through Low Income Housing Tax Credit (LIHTC) schemes which promote the construction housing for low-income households. Developers can apply for tax credits/benefits, making real estate development for low-cost housing more attractive. Several LIHTCs have been implemented across AMS - including in Malaysia and Indonesia.

[365] *A blueprint for addressing the global affordable housing challenge,* McKinsey Global Institute, 2014.

[366] *Ibid.*

[367] *HDB to expand use of prefabrication building methods in BTO projects,* Channel NewsAsia, 2017.

[368] *13th Economic Policy Package Indonesia: Low-Cost Housing,* Indonesia-Investments, 2016.

[369] Access to affordable and low-income housing in East Asia and the Pacific, World bank and Australian Aid, 2014.

MONITORING AND REVIEW MECHANISMS

Progress could be assessed at three levels: performance indicators, output, and input.

Performance indicators:

Possible metrics which could be used include:

- Number of affordable homes built[370]
- Proportion of living space that is > $7m^2$
- Occupancy rates of affordable homes built
- Number of people with access to improved sanitation
- Number of people who live more than 1km from nearest transit stop[371]
- Average commute times from home to work
- Changes in household income for impacting groups (particularly women)

Note – this data will need to be gathered by the city and the data collection process should be designed as part of Output 3.

Output metrics:

- Completion of outputs listed earlier
- Number of women as share of total citizens re-housed

Input metrics will be linked to the specific implementing activities (see the key activities above for further details).

MANAGEMENT OF RISKS AND LESSONS LEARNT

Below are a list of key risks and potential options for managing them:

- *Plans for affordable housing which are not integrated into Master planning* can lead to buildings being built where land is cheap, often on the outskirts of cities, but with limited supporting infrastructure (e.g. transport, schools, etc) which can entrench poverty and social isolation.
- *Maintenance and operations discontinued at the end of the action*. Maintenance and operations activities should be built into the activities and not considered an ad-hoc activity (see Output 2). Otherwise, there is a risk of exclusive focus on the initial construction costs. However, operations and maintenance can account for 20-30 percent of annual household budgets according to McKinsey Global Institute.
- *Community resentment and neglect of infrastructure that is introduced.* This can be mitigated through early community engagement (including Output 1) and continued during the pilot phase.

[370] There are different definitions used to define what is affordable housing. For example, McKinsey Global Institute (2014), defines affordable housing as housing costs (including rental or loan repayments) representing less than 30 percent of household income, with a focus on those households earning 50 percent (or less) of area median income. A city would need to define its measure of affordability as part of this action.

[371] Based on definition used by the Institute for Transportation and Development Policy.

There have been a considerable number of affordable housing actions implemented globally. Some lessons from these actions include:

- **Rental programmes are essential complements to housing programmes.** For many households across AMS, fully owning a house is not a feasible option. As such, renting is an appropriate measure to support households who cannot afford or are not interested in long-term financed housing.[372] Rental programmes not only alleviate the pressure to construct new houses but also optimise the use of existing property in the city. While national governments tend to take the lead to provide demand-side and supply-side programmes, local governments play a vital role in creating a supportive environment by developing land-use and occupancy regulations which support rental housing investments, regulating rent rates, and improving legal protection for informal rentals.[373]
- **Aggregate demand from cities with similar challenges to increase salience and scale.** Interviews with experts highlighted the potential for cities experiencing similar housing challenges to cooperate and elevate a shared solution to their national governments, thereby increasing the likelihood of financial support. Working together could also increase scale and reduce cost.
- **Understanding different delivery models is key to creating an effective localised solution.** There are several models for delivering affordable housing solutions which have enjoyed success globally:[374]
  - *Public delivery model.* Local agencies can engage private contractors to build the project on public land while still acting as the primary developer and retaining ownership. This model works best when planning is on a large scale, designs can be standardised to control costs, and the entity responsible has the capabilities to effectively manage operations and procurement. Singapore's HDB housing is a good example of this model.
  - *Public-Private Partnerships*. This model is useful when the market is unlikely to respond to common incentives for private development. For example, local government units in the Philippines are allowed to access privately-owned land for social housing through joint venture agreements and negotiated process.[375] In this model, risks are borne in-line with the rewards and capabilities of the relevant parties (i.e. property development and construction risks are borne by the private sector, while land development and acquisition risks are borne by the government) and there are clear construction standards which cannot be deviated from.[376] Past actions emphasise the importance of conducting substantial due diligence on the competence of the company contracted in order to prevent stalling of affordable housing projects.[377]
  - *Incentivised private development.* Private developers receive financial and non-financial incentives to build affordable housing. Financial incentives include decreasing the cost of financing and improving profitability of housing delivery (e.g. leasing land at a lower cost for a longer period, providing import tax breaks for some construction material). Non-financial incentives – which are more practical for cities – include reducing risks by fast-tracking permits and land parcelling; increasing land availability (e.g. permitting increasing density); and improving infrastructure

[372] *A blueprint for addressing the global affordable housing challenge,* McKinsey Global Institute, 2014.

[373] *Access to affordable and low-income housing in East Asia and the Pacific*, World bank and Australian Aid, 2014.

[374] *A blueprint for addressing the global affordable housing challenge,* McKinsey Global Institute, 2014.

[375] *Affordable land and housing in Asia*, UN Habitat,2011.

[376] *A blueprint for addressing the global affordable housing challenge,* McKinsey Global Institute, 2014.

[377] *Report on Nexus activities in Naga City/Philippines on affordable housing and waste water management concept*, GIZ, 2014

connectivity and public services nearby. Based on previous actions in this space, local governments should ensure that contracts are transparent and that the financial resources and procedures should be established well before construction begins.[378]

ASEAN PARTNERS ACTIVE IN THIS AREA

A number of potential sources of funding:

- China
- Asian Development Bank (ADB)
- Asian Infrastructure Investment Bank (AIIB)
- World Bank (WB)
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)

[378] *Report on Nexus activities in Naga City/Philippines on affordable housing and waste water management concept*, GIZ, 2014

ACTION 3: INTRODUCE DIGITAL SOLUTIONS TO ENHANCE SAFETY AND SECURITY IN CITIES

Priority sub-area: Personal safety and security

BACKGROUND AND RATIONALE

Initiatives to improve 'public safety and security' can be defined as steps to ensure that the basic needs of residents (such as food, health, shelter) are met and that they are protected from crime and natural hazards.[379] Crime, in particular, is a burden that falls disproportionately on urban populations globally.[380] Urban crimes range from personal crimes (e.g. homicide, assaults, robbery, rape), to property crimes (e.g. burglary), to crimes against public order (e.g. firearms, drug trafficking, drug abuse). Women and children are particularly vulnerable to becoming victims of crime – especially human trafficking, intimate partner violence, and sexual assault.[381] The prevalence of these crimes could exacerbate gender economic inequalities as women might be discouraged to work or travel for fear of being victims of crime.

In Southeast Asia, crime and violence remain pressing policy issues; in a recent global report, several cities (5 out of 7) in AMS were ranked in the bottom half on an index measuring personal security in cities, behind other crime-prone cities like Sao Paolo, Istanbul and Mexico City.[382] The effects of rapid urbanisation, poor urban planning, and population density increase – as experienced in many cities in AMS – are some of the main factors contributing directly to increased incidence of crime and violence.[383]

Approaches to improving safety and security in cities can be broadly categorised into three areas:

1. Enhancing the ability of cities to police and strengthen first response
2. Improving channels and reducing disincentives for communities to report criminal activity
3. Strengthening urban planning to reduce pockets of crime and improve crime prevention

Across AMS, cities have adopted various approaches to enhance safety and security. Cities have increased financing support for law enforcement to improve their capacity to respond to threats. For example, Indonesia's counter-terrorism police force is expected to expand by over 600 personnel, while Singapore's budget expenditure on the Home Affairs Ministry (which covers law enforcement and emergency services) increased by 12 percent in 2017, to S$5.8 billion, to better develop infrastructure and training for personnel.[384] Similarly, strategic infrastructure upgrades have been used to reduce dark and isolated areas. For example, a city in Indonesia designed bus stops which had bright street lighting on both sides of the road to reduce the likelihood of theft and burglary and improve commuters' safety, particularly women.

Several AMS cities have also begun exploring the use of technology to enhance public safety across the three areas. For example, Singapore is improving its passive policing

[379] *Enhancing urban safety and security: Global report on human settlements*, United Nations, 2007.

[380] While urban crime rates generally exceed those in rural areas, there is some evidence that data may suffer from a number of biases. See for example, *Urban Violence or Urban Peace: Why Are Some Cities Safer than Others?*, Mc Evoy & Hideg, Small Arms Survey, Medium, 2017.

[381] *Indonesia to add hundreds of counter-terrorism police to monitor IS,* Reuters, 2017.

[382] *Smart Cities Index,* The Economist Intelligence Unit, 2017.

[383] *Global report on human settlements 2007: Crime & violence at a glance,* UN-Habitat, 2008.

[384] *Analysis of revenue and expenditure financial year 2017*, Singapore Budget, 2017.

capabilities by piloting its 'smart nation sensor' initiative which will equip over 110,000 lampposts with facial recognition cameras to detect unruly crowds and/or illegal gathering of people.[385] Similarly, Phuket is installing systems to integrate feed from 1,300 CCTVs across the city to conduct facial-recognition scanning in high-density public areas thereby improving the policing capacities. Finally, the Philippine National Police launched a mobile application in Quezon City in 2016 which connects subscribers to an emergency service hotline and also allow subscribers to send text messages to the police to inform them of potential criminal or suspicious activities.[386]

COMMON BARRIERS TO SUCCESSFUL IMPLEMENTATION

However, there are several barriers preventing cities in AMS from introducing similar digitally-enabled initiatives:

- *Limited understanding of digital solutions available.* Cities struggle with a number of information failures when it comes to employing digital solutions to improve safety and security. For starters, many policymakers lack awareness of various innovative approaches to tackle crime in cities that go beyond CCTV cameras. Second, due to a lack of understanding of already installed infrastructure, there is a tendency to gravitate towards new, often expensive technology instead of utilising already existing ones more effectively. This is exacerbated by a lack of coordination between city agencies (see next barrier).
- *Lack of coordination between agencies involved*. Ensuring the safety and security of residents typically requires the cooperation between various government departments (e.g. building and planning, law enforcement, transport). However, agencies often do not communicate, share data, or have an aligned approach to security.[387] This has led to instances where, despite certain departments already having data or other equipment in place, it cannot be accessed by other agencies. For example, while a transport agency may have installed CCTVs to monitor traffic conditions on roads, law enforcement agencies may not have access to the feeds to identify traffic offenders.[388]
- *Limited capacity of city governments to operate, maintain and monetise digital solutions.* The complexities of solutions in this space mean cities often have to rely on third parties for both the initial installation as well as continued operation of infrastructure. However, traditionally private sector operators have found it hard to establish a viable return on investment (ROI) around public safety and security, leading to most governments having to finance and/or implement it on their own.

OBJECTIVE AND KEY OUTPUTS OF THE ACTION

The objective of this action is to take advantage of relevant digital technologies to help reduce the incidence of crime and threats to public safety.

Key outputs	Approximate timeline[389]
Assessment of the current state of public security and public safety issues in the city	24 working weeks

[385] *Updates on Smart Nation Sensor platform – connecting all 110,000 lamppost in the city*, OpenGov Asia, 2017.

[386] *PNP launches new text hotline,* Philstar Global, 2016.

[387] Based on interviews with city level officials during the ASUS Forum from 7-8 July 2018.

[388] *Ibid.*

[389] Based on interviews with experts familiar with housing programmes in the region. These timings are provided as rough guidelines only. Actual time required will depend on the city context.

Key outputs	Approximate timeline[389]
Identify potential opportunities and approaches to address public safety and security challenges based on Output 1	40 working weeks
Introduction of pilot and development of a city-level plan for the implementation of the solution in Output 2	Based on city context
Scaled implementation of the solution in the city	Based on city context

KEY ACTIVITIES

This section contains a list of the key activities an action in this space would have to complete. These activities were compiled based on research of global best-practice approaches, and with the help of city representatives, topic experts from development agencies, multilateral organisations, academia, and the private sector. It should be read as a summary of some of the core issues experienced by proponents working in this area. It is to be used as a guideline only and a city's local context will determine whether an activity is required, in which order activities are executed, and how these activities can be potentially distributed across different projects with the support of different funders/partners.

Activities	Comments
Output 1: Assessment of the current state of public security and public safety issues in the city	
Collect and assess data to estimate the extent of crime and violence in the city	To conduct an accurate assessment of crime and violence in the city at present, data in the following areas need to be collected:[390] 1. *Type of crimes experienced in the city.* This should focus on identifying the type and prevalence of crimes (e.g. personal, property-related or against public order).[391] 2. *Identify crime-prone areas.* This will support identification of existing 'unsafe' areas in cities where additional resources might be deployed. 3. *Victim and offender profiles and public perceptions of risks.* Special focus should be placed on women, children, the elderly and the disabled since they are disproportionately more vulnerable to crime. One approach to supporting assessment of violence against women is through women's safety audits which involve 'boots-on-the-ground' walks by 3-6 women to identify specific problems in the local environment where they feel most vulnerable. This approach has been used successfully – in both developed and emerging cities.[392] Data collection on crime can be a challenging exercise as there is no commonly accepted standard for producing and presenting crime statistics. Moreover, crime victimisation data can be underreported due to the victim's unwillingness to cooperate. This can be mitigated through close alignment between the city and national-level agencies on common definitions and collecting information from multiple sources including victim survey audits, offender interviews, and hospital admissions.

[390] *Enhancing urban safety and security: Global report on human settlements*, United Nations Habitat, 2008.

[391] The type of crime will affect the solutions required. For example, cities with a higher prevalence of burglaries might require more surveillance (e.g. CCTV) while community engagement approaches might be more effective for cities with high domestic abuse reports

[392] *Women's safety audits: What works and where,* UN Habitat, 2007.

Activities	Comments
	Collection and assessment of the crime data above should be underpinned by the collection of key demographic and socio-economic data (e.g. income, unemployment). It is important that not only symptoms (crime statistics) but also underlying root causes are thoroughly understood. This way it can be assessed whether crime prevention should be the focus or whether root causes require economic policies.
Collect data and assess the ability of local law enforcement to tackle identified crime (NOTE: This can be done concurrently with the activity above)	It is important that there is a solid understanding of the existing and potential capacity, and resources available for law enforcement to address the risk of crime and violence. This should look at the technical capacity of law enforcement (e.g. types of communications and information technology equipment used in daily operations), emergency service response times, and the size and deployment of existing law enforcement personnel. The assessment should be tailored to the ability of law enforcement to tackle the key issues identified in the previous assessment to clearly identify gaps that could be addressed by digital solutions. This will ensure that no digital solutions are employed that tackle crime that is not a key concern.
Evaluate the impact of existing national and city-level initiatives to improve safety and security	A detailed examination of existing policies and initiatives (at both the national and city level) should be carried out to understand the impact, root causes of success or failure, and lessons learnt. It is important to adopt a comprehensive and rigorous evaluation process since previous research has found that most crime and violence programmes have not been evaluated with enough scientific evidence to draw credible conclusions.[393] Moreover, a large majority of crime prevention and mitigation policies have mostly been ad-hoc and without clear alignment with broader national strategies. Potential solutions to improving the accuracy of evaluation include: conducting interviews with community leaders; speaking directly to duty officers; requiring reports to include specific instances where projects have failed (verified through interviews); and having a third-party consultant to evaluate programmes.
Socialise and verify findings through a diagnostic workshop with key stakeholders	Key stakeholders should include law enforcement personnel, city planners, community leaders, civil society, the private sector, and security service providers. This would provide the opportunity for stakeholders to share their personal experience around the payments and regulatory landscape, and act as a platform to identify the issues which the proposed solutions must address.

[393] *State of the World's Cities 2006/2007: The Millennium Development Goals and Urban Sustainability,* United Nations Habitat, 2006.

Activities	Comments
	Special attention should be placed to include the comments and feedback from marginalised groups and the disenfranchised. These include women, youth and the elderly. Consultation should be conducted in two phases: i) individual consultations with specific groups (e.g. NGOs, women's groups, elderly – in particular, their carers) separated from each other to prevent the drowning out of their opinions. Experience has shown that minority groups do not speak up otherwise; ii) between groups once individual concerns have been heard. i.e. get differentiated information first, then bring it back together and overlay. Experts recommend a minimum 20-30 percent representation of women.[394]
Produce and disseminate document (e.g. report, city blue print, white paper, study) based on analysis and workshop	A formal assessment document in form of a whitepaper can help cities obtain further input on their action plan and engage additional funders and technical expertise for the next phases of the action.
Output 2: Identify potential opportunities and approaches to address public safety and security challenges based on Output 1	
Identify a range of options that could improve safety and security in the city	As highlighted earlier (see 'context and rationale'), there are 3 broad approaches available to address crime and violence in cities with digital solutions:[395] ■ *Strengthening formal traditional policing capacity*. For example, Johor Bahru's constructed neighbourhood police posts in crime-prone areas leading to a reduction in the incidence of crime by 15 percent.[396] Digital solutions include Geographic Information Services (GIS) which supports operational policing by providing intelligence reports through simple map-based tools that show historic incident records in a specific area via the officer's mobile phone.[397] Other solutions in this space help to show incident locations and improve dispatch times.[398] ■ *Adopting community-based approaches to enhancing urban safety and security.* Examples of these are the neighbourhood watch and voluntary patrol schemes found in most cities across AMS.[399] Digital solutions include the development of apps that can help law enforcement to receive information on suspicious activities around the city via citizen reporting (like in the Philippines and Singapore).

[394] Based on consultations with social inclusion experts on projects funded by multilaterals.

[395] State of the World's Cities 2006/2007: The Millennium Development Goals and Urban Sustainability, United Nations Habitat, 2006

[396] Johor cops fight crime by moving in to the neighbourhood, Malay Mail, 2013.

[397] Digital transformation in policing, Esri.

[398] *Ibid.*

[399] Neighbourhood watch, Department of National Unity and Integration Malaysia. Accessed at: https://www.perpaduan.gov.my/en/community/neighbourhood-watch-rt;

Activities	Comments
	■ *Enhancing urban safety and security through effective planning, environmental design, and governance.* This entails manipulating and maintaining the physical environment in cities (e.g. blind spots, dead-ends) to reduce the opportunity for crime. This approach has been used in Malaysia's 'City Safe' programme published an implementation guidebook to inform urban planners of these solutions (e.g. installing security mirrors, security alarms).[400] Digital solutions in this space include introducing CCTVs and sensors to improve passive surveillance of crime-prone areas or speeding motorists. Several cities including Phuket and Davao are in the process of exploring these solutions. While constructing the long list of solutions it is important to keep in mind the particular types of crime and root causes identified under Output 1 to ensure the selected digital solutions are fit for purpose.
Assessment of existing and required technical infrastructure	Before digital solutions can be introduced at scale, proponents should ensure that the city has the appropriate network and communications structures for effective implementation. Common problems in this area include large swathes of 'dead zones' with no mobile connection, slow and unreliable internet bandwidth, infrequent electricity supply leading to unusable computers, weak integration between various data sources. The assessment should have three objectives: 1. Understand what digital solutions can be utilised by repurposing existing infrastructure and capacities (e.g. data sharing amongst different agencies using installed solutions) 2. Identify digital solutions that can be installed complementary to existing capabilities (i.e. without having to make investments in digital infrastructures, such as broadband connectivity) 3. Identify additional infrastructure requirements that would optimise the usage of the digital solution (e.g. install public Wi-Fi hotspots that allow citizens to access public safety and security services on smartphones)
Select the most suitable solution to improve safety and security – based on findings from Output 1 & 2	To manage scope and costs, priority should be given to initiatives that repurpose already existing data or sensory systems. One example is Makassar City, which uses a combination of smart-cards (ID cards) for students and reporting through smartphone apps to combat radicalisation. The private sector brings about a set of deep expertise and technical knowledge that could help cities make use of such existing data at scale. For example, a Japanese firm, NEC, operates a software platform that integrates different data sources, while providing real-time data to security personnel which can be customised to the needs of the city.

[400] Crime Prevention Through Environmental Design Implementation Guide, Ministry of Housing and Local Government, 2011.

Activities	Comments
Develop long-term funding model to ensure financial sustainability of action	In order to assess financial feasibility, not only the short-term costs of installation but also a sustainable funding model for the continued operation of the digital solution to be implemented must be developed. As mentioned above, funding of security actions traditionally relies heavily on the government due to uncertain ROIs. However, some cities in ASEAN have experimented with innovative data monetisation revenue models, where data is monetised in new and creative ways such as marketing or insurance. Under such a model either the city or a private sector partner could be operating the infrastructure and license the data to the other party. Such a model would require strict safeguards to protect privacy as well as guard against misuse of data collected (see 'Management of risks and lessons learnt' below). Cities could potentially also use cross-financing by utilising the savings that safety and security interventions would unlock in other areas such as health, law enforcement running costs, however, this may be difficult due to the complexities of economic accounting.
Convene workshop with key stakeholders and the community to share proposed solutions and refine based on input received.	See above
Output 3: Introduction of pilot and development of a city-level plan for the implementation of the solution in Output 2	
Work with the private sector partner to develop an implementation plan to apply solution identified in Output 2	The implementation plan should identify key milestones and targets for stakeholders from both the private and the public sector. Solutions selected should be integrated into other urban development priorities of cities. For example, CCTV technology should be integrated with urban planning in general to increase open spaces that can be easily monitored.
Provide training to relevant staff on a selected solution	Rigorous training is important to ensure effective implementation. From the assessment in Output 1, project proponents can identify areas where capacity development training is lacking. A practical approach from previous projects to address this include a combination of bringing skills in from the outside (via international secondments of experts) while improving the skills of existing staff.
	It is crucial that training is provided both for the operation and maintenance of the technology as well as on the analytics of the data. Many actions fall short of their desired impact as data analytics are exclusively housed at the solution provider. This will lead to a non-sustainable action as local authorities are unable to conduct analysis independently once contracts with solution providers expire.
Conduct a pilot to test out the proposed solution	This could vary by area, target group, technology. This activity will likely include a tender process for private sector solution providers.

Activities	Comments
Measure the impact of the solution	See 'performance indicators'. It is also important to conduct feedback using personal interviews to assess satisfaction.
Convene a workshop between stakeholders to provide feedback on the pilot results, share experience on implementation challenges, discuss best practice, and how to develop potential partnerships	See above
Output 4: Scaled implementation of the solution	
Update implementation approach based on results from the pilot programme in Output 3	Proponents should develop strong political and institutional mechanisms for effective implementation for actions in this area – especially since the benefits might not be visible in the short term. One possible solution to promote cooperation between various agencies is to identify a common objective/incentive to work towards. For example, Phuket framed its security improvement programmes around improving tourism revenue. This provided a unifying framework reference for various agencies in the city.
Develop a mechanism to integrate data and approaches generated form the solution in Output 1	Regardless of the solution selected, a sizable amount of information and data will be generated. Project proponents, city planners, law enforcement personnel and private security operators require a mechanism to leverage these data to improve safety and security. On one end of the spectrum, data collected from various sources could be held independently and shared on an ad-hoc basis. On the other end, data could flow through a centralised command centre. When considering which option to adopt, proponents should be mindful of the infrastructure required and available, adequate amount of technical capacity, and regulation and guidelines in place to ensure no infringement of personal privacy (see 'lessons learnt').
Expand solution at scale	Dependent on solution.
Continue monitoring and evaluation of activities to identify areas for future improvement and the expected outcomes	

MONITORING AND REVIEW MECHANISMS

Progress could be assessed at three levels: performance indicators, output, and input.

Performance indicators:

Possible metrics which could be used include:

- Share of city area with coverage from digital surveillance
- Change in crime rates (in areas where solutions implemented)
- Number of convictions (through digital solutions)

Note – this data will need to be gathered by the city and the data collection process should be designed as part of Output 3.

Output metrics:

- Completion of outputs listed earlier

Input metrics will be linked to the specific implementing activities (see the key activities above for further details).

MANAGEMENT OF RISKS AND LESSONS LEARNT

Below are a list of key risks and potential options for managing them (drawing on lessons from past actions):

- **Weak integration with other city development strategies.** Increasingly, there is a realisation that the development of solutions to address crime and violence in cities cannot be stand alone. As discussed above, strategic planning is a core pillar of crime prevention. Cities need to consider the dynamics of policies in this area with other urban development strategies. These issues will be explored in Output 3.
- **Limited technical transfer for operations and data analytics.** Poorly executed digital solutions actions create a dependency on third-party providers and are not sustainable. This is also the case even if cities are trained in the operation of technologies but lack the capacity for the required data analytics. The analysis of data should be given equal priority to the hardware when it comes to capacity building and strong knowledge transfers must be guaranteed in Output 3. An example of cities taken a proactive lead in this area is Jakarta, which has hired a team of data scientist to help integrate information from various data sources.
- **Unclear identification and communication of benefits to population.** If local residents are uncertain about the direct benefits of the intervention they are unlikely to accept it, especially if they fear an invasion of privacy. Benefits of the solution – particular more intrusive ones - need to be clearly communicated to all stakeholders (along with appropriate safeguards to mitigate privacy concerns). These benefits need to be based on sound analysis and facts and cannot be vague or sweeping statements. Evidence of positive outcomes should be disseminated where possible and evidence of safeguards for privacy must be presented during the workshops.

Some lessons from past actions (most of which have been implemented outside of the region) include:

- **Ensure strong protection around personal data and privacy.** There are legitimate concerns around the infringement of personal privacy as a result of surveillance

technologies - which might be used by some city officials for personal or political gain.[401] The limited scope of national-level privacy laws, which have yet to be as comprehensive as the technologies they are meant to regulate, increases the privacy risk. This is a central concern for external partners of ASEAN.[402] Putting in place firm privacy safeguards into project design as well as technical safeguards can help address these concerns. Some guidelines from programmes in other cities including Hong Kong and London include:[403]

- *Responsible and transparent surveillance*. Cameras should avoid or mask inappropriate views of private areas (e.g. bedrooms, washrooms). The introduction of any surveillance equipment needs to have a clear, fact-based reasoning.
- *Robust usage guidelines*. Law enforcement agencies should stipulate how surveillance cameras can be used and what are the disciplinary consequences of misuse. These guidelines should be made clear in the training in Output 3. For example, the United Kingdom introduced a surveillance camera code of practice developed by a special commission to ensure that surveillance cameras are not being used irresponsibly.[404]
- *Clear information that one is under surveillance*. Another important element is to explicitly inform the public that the area is being observed by CCTV. This should be done by placing large and clear signboards in surveillance areas.
- *Proper custody of data*. In instances when private sector providers are supporting government agencies, clear policies and safeguards need to be in place to ensure that the data is not flouted by private sector providers.

- **Engage the private sector.** The private sector (including small business owners, landlords) plays a crucial role in supporting troubled communities as they are the main providers of housing, access to food and other services. Some cities have leveraged the private sector by including a police liaison for the private sector to create a channel of communication between law enforcement personnel and citizens.[405] This has shown to be successful in Nairobi, where the city's 'community policing' has helped to diffuse tension between the police and the community and attract customers back to the business district.[406]
- **Contextualise solutions to the local context.** There have been several global examples where solutions were copied, simply because they were shown to be successful in other cities.[407] However, these solutions were used without proper evaluation and understanding towards why the project was successful in that locality. A common misconception is that digital solutions like CCTVs will be able to solve the problem of crime in general; without a clear understanding that this could only be effective for certain types of crime (e.g. CCTV can't be used to detect instances of domestic or partner violence).[408] This risk will be addressed through a thorough investigation in Output 1 on the root causes and Output 3 when examining if the solution is fit for purpose.

[401] Based on interviews with city level officials during the ASUS Forum from 7-8 July 2018.

[402] *Ibid.*

[403] *Surveillance Camera Code of Practice*, Home Office, 2013 and *Guidance on CCTV Surveillance and use of drones*, Privacy Commission for Personal Data, 2017.

[404] *Surveillance Camera Code of Practice*, Home Office, 2013.

[405] *Addressing the enforcement gap to counter crime: investing in public safety, the rule of law and local development in poor neighborhoods,* World Bank, 2016

[406] *Public-Private Partnerships for Police Reform*, Vera Institute of Justice, 2004

[407] *Enhancing urban safety and security: Global report on human settlements*, United Nations Habitat, 2007.

[408] *Ibid.*

ASEAN PARTNERS ACTIVE IN THIS AREA

A number of potential sources of funding:

- China
- Asian Development Bank (ADB)
- Asian Infrastructure Investment Bank (AIIB)
- World Bank (WB)
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)

ACTION 4: ENHANCE SOLID WASTE MANAGEMENT SYSTEMS

Priority sub-area: Water, waste & sanitation

BACKGROUND AND RATIONALE

The volume of solid waste generated across Southeast Asia has been rapidly increasing since 2000, reaching approximately 150 million tonnes in 2016 alone. It is estimated that by 2025, the amount of waste volume will increase by 150 percent from 1995 levels.[409] At present, it is estimated that 53 percent of the waste generated in ASEAN is uncollected (largely driven by the Philippines and Indonesia). Of the waste that is collected, under a quarter is currently recycled. The remainder is either illegally dumped after collection (around 34 percent of collected waste) or treated and disposed (around 43 percent of collected waste).[410] Improperly disposed waste has high environmental, health, and economic impacts:

- *Environmental.* On land, open dumpsites can create a range of environmental issues linked to contamination of surface water, groundwater, and soil from potentially toxic elements, and underground fires fuelled by landfill gas and gas leakage. For example, it is estimated that the carbon emissions released during burning represent as much as 5 percent of current CO^2 emissions.[411] On water, in less than 10 years, there could be 250 million tonnes of plastic in the oceans.[412] Once in the marine environment, plastics harm marine animals; ingestion has been shown to inhibit growth, make them more prone to tumour development, less successful in reproduction, and less able to detect and evade predators.
- *Health.* More than 40 percent of the total waste generated globally is disposed through unregulated burning every year.[413] This practice has public health impacts including allergies, asthma, skin irritations and other gastrointestinal diseases.[414]
- *Economic.* Recent data has suggested that plastic waste debris in the ocean has an annual economic cost of at least US$13 billion, including tourism.[415]

Properly managed solid waste systems can have a positive impact on the environment as well as the level of public health. For example, recycling a metric tonne of polyethylene terephthalate (a form of plastic more commonly known as 'PET') could save up to 1 metric tonne of CO^2 emissions and 69,000 litres of water.[416] Further, waste management systems that integrate the informal sector could help improve the lives of poor – particularly women and children.[417]

Managing this surge in waste is complicated by the changes to the solid-waste mix (i.e. the type of waste produced) as cities urbanise. For example, the composition of plastics waste is increasing across AMS as a result of packaging waste. This change in the waste

[409] *Report of ASEAN regional assessment of MDG achievement & post-2015*. United Nations Development Programme, 2015.

[410] *Better Together: Business, Government, Society and our Sustainable Future*, Temasek and AlphaBeta, 2018.

[411] *Global Emissions of Trace Gases, Particulate Matter, and Hazardous Air Pollutants from Open Burning of Domestic Waste*, National Center for Atmospheric Research, 2014.

[412] *Stemming the Tide: Land-based strategies for a plastic-free ocea*n, McKinsey Centre for Business and Environment and Ocean Conservancy. 2015.

[413] National Center for Atmospheric Research (2014), *Global Emissions of Trace Gases, Particulate Matter, and Hazardous Air Pollutants from Open Burning of Domestic Waste*.

[414] *Prevalence of Health Hazards Associated with Solid Waste Disposal- A Case Study of Kolkata, India*. Journal of Procedia Environmental Sciences, Vol. 35., 2015

[415] *Ocean Plastic Pollution Costs $13 Billion a Year*. TakePart, 2014.

[416] *Asian waste management outlook*, United Nations Environment Programme, 2017.

[417] *Ibid.*

mix affects the efficacy of solid waste management technologies that have been, or in the process of being, introduced.[418]

Cities in ASEAN have deployed various measures to improve their solid waste management systems. For example, municipalities in Indonesia have adopted sanitary landfill technologies and rehabilitated dumpsites, while Yangon has introduced fees, charges, and fines to improve the overall efficacy and sustainability of its solid waste management and collection system. However, according to the United Nations Environment Protection agency (UNEP), the majority of existing waste management systems remain inefficient or backdated, particularly in secondary cities.[419] In these cities, a large portion of the costs (80-90 percent of the waste management budget) is spent on collection instead of developing proper disposal methods.[420] For example, many cities in AMS still practice open dumping and burning systems despite the environmental and health risk associated with it.

COMMON BARRIERS TO SUCCESSFUL IMPLEMENTATION

An examination of past actions and expert interviews have identified several common barriers local authorities face:

- *Limited knowledge of suitable technologies available.* Waste management is a complex issue but there is a lack of sharing of best practice waste management processes (between cities and operators).[421] This has led to instances where decision-makers choose technologically-advanced solutions even though they lack adequate technical knowledge and institutional capacity for maintenance (i.e. not fit for purpose).[422] At the other end of the spectrum, the complicated nature of proper waste management solutions has sometimes led to cities resorting to unsustainable methods of disposal like open dumping and burning.[423]
- *Lack of access to capital.* Improving waste management processes is capital intensive and requires a significant amount of financing. However, less than 20 percent of the largest 500 cities in developing countries are deemed creditworthy in their local context.[424] This severely restricts their capacity to finance investments in public infrastructure. This is particularly acute in the region, where the overall funding gap for infrastructure is approximately US$800 billion annually.[425] Carbon finance programmes are not yet filling the finance gap and the time required to establish Monitoring Review and Verification (MRV) mechanisms may be significant.
- *Barriers to private sector participation*. There are several barriers to private sector participation, including lack of clear project pipeline, inability to guarantee feedstock volumes, lack of offtake markets, political risk, and a lack of an integrated approach:
    - *Lack of quality project pipeline.* Pre-feasibility and feasibility costs (including due diligence) are particularly high and project developers often must 'reinvent the wheel' each time on preparing business cases, with no standardised template or approach.

[418] *Urban solid waste management*, World Bank. Accessed at: http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTURBANDEVELOPMENT/EXTUSWM/0,,menuPK:463847~pagePK:149018~piPK:149093~theSitePK:463841,00.html

[419] *Waste management in ASEAN countries*, United Nations Environment Programme, 2017.

[420] *Waste in Asia*, United Nations Economic and Social Commission for Asia and the Pacific, 2015.

[421] *Waste-to-Energy options in municipal solid waste management*, Deutsche Gesellschaft für Internationale Zusammenarbeit, 2017.

[422] *Municipal Solid Waste Management in Asia: A Comparative Analysis*, Vsivanthan and Trankler, 2003.

[423] *Good Practice Guide: Sustainable solid waste systems*, C40, 2014.

[424] *City Creditworthiness Initiative: A Partnership to Deliver Municipal Finance*, World Bank, 2015

[425] *Deepening capital markets in emerging economies,* McKinsey & Company, 2017.

- *Inability to guarantee feedstock volumes.* Many pilot projects in ASEAN have failed due to an inability to guarantee sufficient feedstock volumes for waste monetisation activities – which can be due to a lack of policy and legislation around waste management. [426] Some innovative approaches have been trialled to tackle this (e.g. a reverse tipping fee incentive where if below agreed level, government pays a fee; if above that, subject to capacity limits, government gets a share in upside).
- *Limited development of offtake market.* A lack of a developed offtake market for waste to maximise reuse options limits the potential revenue generation opportunities.
- *Political risk.* Waste management systems typically take 10-15 years to become profitable while political cycles range between 3-5 years; there are concerns by the private sector that a change in leadership could result in existing concessions to be withdrawn. Some mechanisms have been used to navigate this, such as getting council-level ordinances which cannot be easily unwound by a new incoming mayor, but these are not yet widely adopted across ASEAN.
- *Lack of integrated approach.* Given the interdependencies in the waste value chain, successful projects typically require end-to-end management of the waste supply chain (as opposed to focusing on only one component). For example, companies that are integrated across the entire end-to-end waste value chain (from collection through to treatment) in ASEAN tend to have stronger financial performance than companies only focused on 1-2 activities (e.g. collection, recycling). On average, the Earnings Before Interest Tax Depreciation and Amortisation (EBITDA) margins are anywhere from 4-7 percentage points higher for these integrated players compared to niche players. Companies that handle multiple (e.g. 3-4) waste streams also tend to have stronger financial performance than companies which are more focused on single waste streams (e.g. medical, e-waste).[427]

- *Weak support to manage system once in operation*. Previous actions across AMS tend to lack adequate knowledge transfer to the local staff (e.g. contractors did not provide adequate technical information on using and maintaining the sorting, incineration, and gasification machines). This has resulted in expensive equipment being underutilised.
- *Lack of data and collection techniques*. Many cities across AMS have reported that they lack robust impact metrics and measurement methodologies to establish baseline statistics.[428] This creates difficulty in establishing targets for operators and to monitor the efficacy of selected waste solutions.[429]

An action in this area would have to consider the concerns of various stakeholders in the supply chain to promote broad endorsement. The action will also have to identify potential financing opportunities, improve market information and ensure accountability and mechanisms to support enforcement. Further, to ensure the long-term sustainability of the action, the action should include activities to support knowledge transfer to local agencies.[430]

[426] *Managing waste in emerging markets*, McKinsey & Company, 2016.

[427] *Better Together: Business, Government, Society and our Sustainable Future*, Temasek and AlphaBeta, 2018.

[428] Interview with city networks during ASUS Forum in Singapore from 7-8 July 2018.

[429] *Valuing waste, transforming cities*, United Nations Economic and Social Commission for Asia and the Pacific, 2015

[430] *The next wave*, Ocean Conservancy, 2017

OBJECTIVE AND KEY OUTPUTS OF THE ACTION

The objective of this action is to improve the overall management of waste collection, segregation, treatment, and recovery in cities.

Key outputs	Approximate timeline[431]
Assessment of current waste management processes and future waste production in the city	12 working weeks
Prioritisation of possible solutions based on an examination of root causes and data collected	30 working weeks
Development of a customised city-level plan for the implementation of the proposed waste management system	Based on city context
Phased implementation of a solid waste management system	Based on city context

KEY ACTIVITIES

This section contains a list of the key activities an action in this space would have to complete. These activities were compiled based on research of global best-practice approaches and with the help of city representatives, topic experts from development agencies, multilateral organisations, academia, and the private sector. It should be read as a summary of some of the core issues experienced by proponents working in this area. It is to be used as a guideline only and a city's local context will determine whether an activity is required, in which order activities are executed, and how these activities can be potentially distributed across different projects with the support of different funders/ partners.

Activities	Comments
Output 1: Assessment of current waste management processes and future waste production in the city	
Conduct an assessment of the existing and forecasted waste generation, and waste streams in the city	A 'waste characterisation' study needs to be completed. Key data points to include are:[432] ■ *Types and quantities of solid waste being generated in the city.* This includes municipal, commercial, industrial, and hazardous waste. ■ *Waste mix*. The proportion of different waste materials generated by the city (e.g. organic matter, glass, plastic, paper, ashes, metal, wood, textiles, hazardous waste). Some waste solutions might be more relevant based on the type of waste. ■ *Forecasted waste volume and composition*. Analysis should be based on changing economic patterns and population growth (e.g. rising household income could lead to more packaging waste). In the likely instances of significant missing data points, surveys and studies may need to be commissioned. Over the longer term, establishing (voluntary or mandatory) reporting frameworks for companies generating waste can be important for understanding and tracking waste volumes.

[431] Based on interviews with experts familiar with transport programmes in the region. These timings are provided as rough guidelines only. Actual time required will depend on the city context.

[432] *Practical Guidebook on Strategic Planning in Municipal Waste Management*, World Bank, 2003.

Activities	Comments
Conduct an assessment of waste management approaches used in the city (NOTE: this can be conducted concurrently with the activity above)	It is also important to estimate the efficacy of existing waste management approaches and the capacity of the city to absorb increasing and varying types of waste:[433] ■ *Waste management capacity.* Analysis should include the existing coverage of waste services, the estimated lifespan of landfills, and the list of entities that carry out waste management operations within the city. It should also examine the potential for these operations to scale-up in the future. ■ *Level of integration and efficiency of existing waste management systems* (i.e. how comprehensive and productive are they). This analysis should examine the entire waste value chain. Data can be collected through surveys with experts and households. ■ *Cost of waste management*. Analysis of the cost at different stages of the value chain - measured with a common unit (e.g. cost in US$/tonne). This is particularly important to identify potential processes where the cost can be better controlled or monetised. ■ *Extent of compliance and resources for enforcement*. This assessment should be based on the capacity of the city to ensure that its local ordinances (i.e. laws) are followed by residents and companies. Experts interviewed highlighted the importance of ensuring adequate evaluation of this area as having sufficient resources for enforcement is a major barrier across cities in AMS. ■ *Alignment with national policies.* This is to verify if there is an alignment of existing municipal activities with larger national objectives and national-level programmes. It is also important to clarify the authority that the city has in relation to waste management, as this might fall under the jurisdiction of a private sector entity or the national government. Special attention should be placed on examining the contributions of the informal sector (e.g. waste pickers, itinerant buyers and junk shops) to waste recycling and collection – especially given their high level of participation across AMS.[434]
Identify root causes of improper waste management in the city	The underlying reason for improper waste management could significantly differ between cities; for example, while the problem across most cities in AMS is low collection rates, the root cause could range from i) low public awareness, ii) lack of infrastructure, or iii) poorly-managed sorting facilities. Careful identification of root causes will help to tailor solutions and deliver impact.

[433] *Practical Guidebook on Strategic Planning in Municipal Waste Management*, World Bank, 2003.

[434] The next wave, Ocean Conservancy, 2017.

Activities	Comments
Socialise and verify findings through a diagnostic workshop with key stakeholders	The workshop will facilitate developing partnerships between the city council, various departments in agencies managing waste, environmentalists, waste operators, informal collectors, recycling companies, potential donors, NGOs, housing cooperatives, and residents located close to alternative sites. A long list of initial ideas (which will be explored further in the next phase of work) to improve waste management could be shared to gather initial reactions. An issue common in waste management projects is the development of 'not in my backyard' mentality from households who will resist the construction of waste facilities near them for several reasons (e.g. fear of the smell, the congregation of informal waste pickers, depreciation in property value). As such, consultation should be conducted in two phases: i) individual consultations with specific marginalised groups (e.g. refugee groups, the poor, women's groups, elderly – in particular, their carers) to ensure their views are appropriately captured; and ii) between groups once individual concerns have been heard.
Output 2: Prioritisation of possible solutions based on an examination of root causes and data collected	
Identify possible solutions based on the assessment of root causes in Output 1	There are four main approaches and innovative solutions which cities can adapt to improve waste management. These are: 1. *Reducing inputs into the system*. This focuses on preventing/ discouraging the use of certain types of solid waste. Solutions include introducing product industry fees and promoting packaging designs for substitutes or biodegradables. 2. *Enhancing collection rates.* Solutions in this approach focus on building reliable collection and separation systems to optimise treatment further downstream. This includes increasing the number of waste collection points, banning recyclables at dump sites, and introducing sanitary landfills. New approaches for fast and cost-efficient generation of waste data include crowd-sourcing, drone and satellite technology, open data approaches. 3. *Plugging leakage in post-collection*. Solutions in this approach focus on preventing collected waste from being mismanaged. Potential initiatives include optimising transport hauler systems and closing hazardously-placed dump sites. Innovative digital solutions in this space include shared transportation processes and RFID tags to track waste. 4. *Creating value for waste reuse*. This approach focuses on accelerating the demand for recycled waste and introducing treatment innovation. Some solutions include waste exchange programmes, creating recycling materials recovery facilities (RMRF), and providing incentives for the procurement department to purchase recycled goods. New plastics recycling technologies – particularly for lower value flexible plastics which include chemical recycling, solvolysis – could help to improve reuse rates.[435]

[435] Solvolysis refers to the breaking down of polymers in flexible plastics to return them to monomer state. This has been successful in Surabaya. *See Towards Circularity of post-consumer flexible packaging in Asia, Amcor, 2017*.

Activities	Comments
	Special attention should also be placed on integrating the informal waste sector as part of the potential solution (see 'lessons learnt' for additional information).
Assess solutions which are relevant to the city – based on robust scenario planning	When considering the feasibility of these solutions, project proponents should include the following considerations:[84][5] ■ *Impact.* Past projects have found that cities have not always selected solutions which have the greatest potential (e.g. post-collection is not given enough attention). Proponents should consider using scenario planning to ascertain which solutions work best and to measure the potential impact that a solution (or a combination of them) would have – both at present and in the future.[436] For example, scenario planning was used to great effect in Quezon city to help officials better integrate the informal waste sector. ■ *Finances.* Access to finance remains a challenge in the region. Proposed solutions need to be cost-effective and financially sustainable. Cheap solutions need not come at the expense of impact. For example, Mahasarakham in Thailand uses affordable innovations such as chippers or balers to significantly reduce the volume of waste entering landfills.[437] ■ *Technical capacity*. This considers the scale of technical capacity training required for successful implementation. It also includes the level of training required to ensure proper operations and/or enforcement post-action. ■ *Applicability.* Cities should consider if the solution is 'fit for purpose'. As a good test, proponents could verify if the technology has been successfully applied in another city with similar waste generation volumes and waste mix (data from Output 1). The choice of solutions will also vary by city. For example, while some AMS struggle with collection issues at present, others face more difficulty around post-collection. ■ *Compliance with national legislation.* Ensure that solutions are aligned with national regulations (e.g. engineering requirements for landfill sites, occupational health standards). While it is important to examine individual solutions / levers (e.g. introduction gasification technologies), given the interdependencies between different stages of the waste value chain, it is also vital to consider the coordination and integration of these different solutions. For example, if collection issues are not addressed, then many reuse technologies will lack the scale to become commercially viable.

[436] Practical Guidebook on Strategic Planning in Municipal Waste Management, World Bank, 2003.

[437] *Waste management in Asia: 1 goal, 5 cities, 5 lessons*, Asia Development Blog, 2017.

Activities	Comments
Convene workshop with key stakeholders and the community to share proposed solutions and refine based on input received	See above.
Output 3: Development of a customised city-level plan for the implementation of the proposed waste management system	
Explore funding and financing models that ensure the long-term viability of operations	There are several funding options that can be explored, including: ■ *Consumer fees.* Waste management fees for local residents. This can be challenging given low incomes and levels of tax avoidance in many cities. ■ *Producer fees or commitments.* There is a range of options from mandatory to voluntary schemes. In terms of mandatory approaches, Extended Producer Responsibility (EPR) arrangements can be established which encourage manufacturers to design environmentally friendly products by holding producers responsible for the costs of managing their products at end of life. These have been adopted across many countries, although they can encounter challenges in terms of uneven enforcement and lack of clarity on the management of fees. There is a range of voluntary approaches, which range from advanced market commitments to offtake pricing guarantees, where producers commit to purchasing reused / recycled products. ■ *Externalities.* Given the large potential benefits to carbon reduction, there are also potential funding sources related to carbon markets. However, as highlighted earlier, given the MRV challenges and the current low levels of many carbon pricing schemes, this may not be a viable short-term funding option. Beyond traditional donor and multilateral institution financing, a range of additional financing options could also be explored, including: ■ *Green bonds.* Green bonds were created to fund projects that have positive environmental and/or climate benefits. Proceeds from these bonds are earmarked for green projects but are backed by the issuer's entire balance sheet. The green bond market has seen strong growth, growing from USD 11 billion of issuance in 2013 to USD 157 billion in 2017.[438] While waste management projects have not been a focus of these green bonds to date, they do meet the eligibility criteria.

[438] For further information, see https://www.climatebonds.net/market/explaining-green-bonds.

Activities	Comments
	■ *Blended finance.* Blended finance is the strategic use of development finance and philanthropic funds to mobilise private capital flows. There are a variety of different forms of blended finance: 1) junior/subordinate capital, 2) guarantees and risk-insurance mechanisms, 3) donor-funded technical assistance facilities, and 4) design or preparation grant-funding.[439] A number of these models have already been used in ASEAN Member States to support private sector investment by increasing risk-adjusted returns for investors. For example, blended finance approaches are being used in the water sector in the Philippines.[440] ■ *Results-based financing.* Under these arrangements, achieving and verifying a set of explicit, pre-determined performance targets is a condition to receive payment for services or certain behaviours. Until recently, such mechanisms had not been widely used in the waste sector, although there are now an increasing number of case studies with some useful lessons in their appropriate design.[441] A key requirement is to lower the levels of risk which could otherwise inflate the required rate of return of private sector participants. Some mechanisms to do this include: ■ *Managing collection risk.* Some innovative approaches have been trialled to tackle this (e.g. a reverse tipping fee incentive where if below agreed level, government pays a fee; if above that, subject to capacity limits, government gets a share in upside); ■ *Ensuring offtake markets.* Either through mandatory or voluntary agreements, ensure there are markets for reuse and recycling of waste. ■ *Reducing political r*isk. City-level ordinances, which are laws that are published and enforced at the city level, have been used by some cities (e.g. Quezon and Tuguegarao) to ensure that contracts do not renege as a result of a change to government leadership. Another approach has been to have strategic investment from a government-related entity (e.g. a national development bank) to ensure that there is alignment on the success of the project**.**
Develop an implementation plan to apply the proposed waste management system	The plan should be part of a broader waste management strategy for the city. This approach has enjoyed success in the Philippines – where cities need to draft a 10-year waste management plan. Not only did the exercise help cities plan their waste management process better, it also increased the amount of policy focus spent on the topic.

[439] *The state of blended finance,* Business & Sustainable Development Commission, 2017.

[440] 'Blended Finance: a key to achieve universal access to water supply and sanitation by 2030', World Bank Blog, July 5, 2018.

[441] *Results-based financing for municipal solid waste (Vol. 2): Main report,* World Bank, 2014.

Activities	Comments
(Where appropriate) Provide hands-on training for technical staff and enforcement personnel	In cases where the solution is the introduction of a new technology, cities should ensure that sufficient training to maintain new equipment is built into operation contracts. In cases, where the solution is the introduction of new regulation, proponents should ensure an adequate amount of official capacity for enforcement. For example, the city of Quezon deputised over 250 officials to enforce its ordinances on environmental protection.[442]
Begin a demonstration project	Based on the type of solution proposed, the trial could be based on groups of people/companies (e.g. manufacturing companies); by geography (areas with currently poor collection rates); by waste type (working with plastic waste); or by-products (FMCG goods are a starting point).
Measure the impact of the technology and/or system in reducing waste pollution	Impact to be measured using metrics identified in the implementation plan (see 'monitoring and review mechanisms').
Convene a workshop between stakeholders to provide feedback on the demonstration, share experience on implementation challenges, discuss best practice, and how to develop potential partnerships	See above.
Output 4: Phased implementation of a solid waste management system	
Update implementation approach based on results from the demonstration in Output 3	Past projects have found implementation model is one of the most challenging as there is fatigue during the long implementation process. One approach to address this is through the creation of a task force to oversee coordination between agencies and other stakeholders are important to ensure smooth implementation in the long-run.[443]
Continue monitoring and evaluation of activities to identify areas for future improvement and the expected outcomes	

[442] *Solid Waste Management City Profile*, Climate and Clean Air Coalition Municipal Solid Waste Initiative, 2014.

[443] *Asia waste management outlook*, United Nations Environment Protection, 2017.

MONITORING AND REVIEW MECHANISMS

Progress could be assessed at three levels: performance indicators, output, and input.

Performance indicators:

Possible metrics which could be used include:

- Percent of waste collected
- Percent of waste recycled or reused[444]
- Percentage of operated covered vehicles for transporting waste on a daily basis
- Percentage of the reduction in total waste generated a year

Note – this data will need to be gathered by the city and the data collection process should be designed as part of Output 3.

Output metrics:

- Completion of outputs listed earlier

Input metrics will be linked to the specific implementing activities (see the key activities above for further details).

MANAGEMENT OF RISKS AND LESSONS LEARNT

Below are a list of key risks and potential options for managing them:

- *Inability to enforce waste management legislation.* The lack of ample resources allocated to enforcement is a common occurrence across many cities due to limited upfront planning.[445] This problem can be mitigated by including hands-on training of enforcement personnel (Output 3) and to inform officials of waste best practices.
- *Weak coordination between stakeholders.* In some AMS, the responsibility for waste management is spread across several government agencies and there are weak communication mechanisms between them – even at the local level.[446] This risk can be overcome through frequent consultation at important milestones and through the development of a task force that will oversee and coordinate efforts (Output 4).
- *Poor management of informal waste pickers.* The informal sector is a large stakeholder in waste management across most AMS. These stakeholders collect a large volume of waste. For example, Quezon City recovers 2 percent of waste through the formal sector and 23 percent through the informal sector.[447] Moreover, the informal sector also collects valuable waste as in the case of Viet Nam where informal waste pickers collect most of the scrap metal.[448] Hence, any attempt to improve waste collection would require coordination with the informal sector (Output 2). While the approach to manage informal waste pickers will vary between cities, some potential practices to include the informal waste sector and ensure safe and fair working conditions include:[449]
    - Supporting waste pickers with a registration system and assuring them access to municipal waste streams.

[444] This term has to be clearly defined as part of Output 1.

[445] *Asia waste management outlook*, United Nations Environment Protection, 2017.

[446] *Waste management in ASEAN*, United Nations Environment Protection, 2017.

[447] *Asia waste management outlook*, United Nations Environment Protection, 2017.

[448] Bercegol et. al., *Waste Municipal Service and Informal Recycling Sector in Fast-Growing Asian Cities: Co-Existence, Opposition or Integration*, Resources, 2017.

[449] *The next wave*, Ocean Conservancy, 2017.

- Offering working capital loans or microfinancing to entrepreneurs and small businesses in the sector to purchase equipment that will improve waste collection rates.
- Conducting scenario modelling (Output 2) with the informal sector as part of the equation.
- Ensure proper representation of the sector during city-level planning and projects.

- *Limited engagement with the private sector.* Private sector participation is crucial not only for financing but also to bring the required skill sets to support the entire value chain. Ample time and resources should be placed to explore potential opportunities to engage the private sector (see Output 3) Several options exist for the private sector to take part in the waste management value chain including contracting (where the company has a fixed- term contract of the delivery of the services); leasing (where the city still owns the asset but leases it to a private business to operate with profit-sharing); and concessions (where the city offers a long-term contractual agreement for a private firm to build and operate facilities).

ASEAN PARTNERS ACTIVE IN THIS AREA

A number of potential sources of funding:

- Asian Development Bank (ADB)
- World Bank (WB)
- Japan International Cooperation Agency (JICA)
- United Nations Environment Programme (UNEP)
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
- United States Agency of International Development (USAID)

ACTION 5: INTRODUCE AND IMPROVE BUS RAPID TRANSIT (BRT) SYSTEMS

Priority sub-area: Mobility

BACKGROUND AND RATIONALE

Public transportation networks in many cities within ASEAN Member States (AMS) are fairly underdeveloped. At present, many public transport systems only serve a small section of the community and leave large swathes of underserved areas.[450] Of increasing concern, the use of public transport (measured as a proportion of total trips) across many large cities in ASEAN is declining, with many citizens switching to private modes of transportation (e.g. motorcycles) instead.[451] Should this trend continue, cities in ASEAN are likely to face even greater pressure on their road infrastructure and rising congestion.

Such public transportation constraints can have a disproportional impact on women as well as for people with disabilities. For example, for women living in congested urban areas, inefficient transport routes to work increase the cost of participating in the labour market. A survey of Indonesian women found that 31 percent of women who have ever turned down a job did so because of transport constraints, while 64 percent said that a job's location was the decisive factor when choosing whether or not to accept an offer of employment.[452] People with disabilities also face many difficulties in accessing public transport and participating in the labour market. Most public transportation facilities have not been built to accommodate the needs of low-income disabled people; hindering mobility.[453]

To this end, cities in AMS have begun developing various options to improve and increase the usage of public transport, including the development of tramways, light rapid transits, and feeder buses.[454] Constructing a Bus Rapid Transit (BRT) system has been seen as one of the most promising approaches to improve public transport availability. A BRT mimics a metro system by using high-capacity buses on city streets on dedicated lanes (ranging from 15-60 kilometres) that travel at high average speeds.[455] The concept prioritises public transport on urban roads at a fraction of the cost of a metro or rail system. Aside from being more environmentally friendly than taxis and other informal public transport modes (e.g. 'Jeepneys' used in the Philippines), past research has shown BRT systems are preferred options because they generally have lower construction costs compared to rail transit (for example, BRT is 20 times less capital-intensive per passenger kilometre than building metro capacity)[456] and a quicker implementation timeframe. BRT systems can also have a significant impact on traffic congestion and daily commute times. For example, Jakarta's BRT system has helped to save commuters 20 minutes daily while reducing 170,000 tonnes of carbon dioxide emissions and 70 million litres of fuel consumption annually. [457] [458]

[450] Past research has defined 'underserved' areas as having a distance of 1.5km or more to the nearest transit stop. See *Rethinking urban mobility in Indonesia: The role of shared mobility services*, AlphaBeta, 2017.

[451] *Current status of public transportation in ASEAN Megacities,* The Korea Transport Institute, 2014.

[452] *How Jakarta's Traffic Affects Labor Market Outcomes for Women and People with Disabilities*, Australia Indonesia Partnership for Economic Governance (AIPEG), 2017.

[453] *Travel behaviors of the disabled in Jakarta metropolitan area*, 13th International Conference on Mobility and Transport for Elderly and Disabled Persons, 2012

[454] *Current status of public transportation in ASEAN Megacities,* The Korea Transport Institute, 2014.

[455] *Factsheet on Bus Rapid Transit System*, Uemi Solutions, 2017.

[456] *Resource Revolution: Meeting the world's energy, materials, food, and water needs*, McKinsey Global Institute, 2011.

[457] Sayeg, Philip, *Post evaluation of a decade of experience with Jakarta's Transjakarta Bus Rapid Transit System*, 2015.

[458] *Saving time and energy through Bus Rapid Transit*, Institute for Transportation & Development Policy and San Francisco County Transportation Authority.

COMMON BARRIERS TO SUCCESSFUL IMPLEMENTATION

Many cities in AMS are struggling to develop a sustainable and efficient BRT system due to several challenges:

- *Lack of consensus building with stakeholders.* Public transport systems – like the BRT – require extensive up-front planning and discussions that consider all the relevant perspectives from key stakeholders (e.g. government agencies, private transport operators, district mayors) - especially national governments and the public. Previous actions which have fared poorly have often failed to incorporate proper stakeholder consultation into the project design and this resulted in pushback from several interest groups during implementation.[459] For example, some ASEAN cities have faced resistance from road-users in constructing BRT systems as the benefits were not properly communicated to road users. Without proper consultation, road users may question the sense in dedicating a lane specifically for buses when traffic may be already congested. Moreover, ensuring that the perspectives of women and commuters with disabilities are incorporated into the design process is particularly crucial, especially since their travel patterns might differ from most users. For example, studies have found that women conducted multiple-stops in a single journey – compared to men who tend to adopt more direct point-to-point journeys.[460]

- *Lack of employer engagement.* Some BRT actions have failed because of a lack of resources spent on commuter education (i.e. how the system operates) and addressing potential barriers to adoption. Part of this process involves engaging employers and not just commuters. For example, pre-tax benefits to employees who purchase transit passes could be offered, or free parking options could be reduced. Research has shown that this can decrease the level of vehicle trips by 8-30 percent.[461] Another problem faced during implementation has been the lack of last-mile connectivity to make 'park-and-ride' a convenient option for BRT users.

- *Poor integration with other existing public transport modes.* While BRT has the potential to improve the efficiency of public transport, it is important that it is well integrated with other modes of public transport. For example, a BRT should ideally seek to target underserved areas of a city in terms of public transport, rather than just adding capacity to existing routes. In addition, given the growth of ridesharing throughout cities in Southeast Asia, it is important that there is coordination between ridesharing and public transport development. For example, in Bandung, 15 percent of ridesharing trips start or end within 200 metres of a major public transport hub, and 20 percent of ridesharing users in Indonesia state that they now use ridesharing as part of a multi-modal commuting strategy (whereas previously they were using a single mode of transport).[462] It is crucial to synchronise transport networks, enabling customers to save time by easily switching between different modes and systems of transport. For example, transit apps like Moovit and Citymapper allow riders to incorporate multiple modes of transportation, including public transit, into their commutes.[463] Poor integration could also lead to overloading of the BRT – a problem being experienced in some ASEAN cities.

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[459] *International bank for reconstruction and development project appraisal document on a proposed loan in the amount of US$116 million and a proposed loan from the clean technology fund in the amount of US$25 million to the Republic of the Philippines for the Cebu bus rapid transit project*, World Bank, 2014.

[460] *Gender makes a world of difference for safety on public transport,* The Conversation, 2017.

[461] *Rethinking urban mobility in Indonesia: The role of shared mobility services*, AlphaBeta, 2017.

[462] *Ibid.*

[463] *Moovit transit app integrates with Uber*, TechCrunch, May 4, 2016. Accessed at: https://techcrunch.com/2016/05/03/moovit-transit-app-integrates-with-uber/

- *Affordability of usage.* While BRTs are relatively cheaper and more affordable than most other transportation options, the resources required to establish a fully functioning system are still significant. Some cities have tried to pass the cost directly to commuters while expecting them to forego more direct forms of point-to-point public transport. The combination of these factors has led to low adoption rates in some cities.[464]

A well planned and contextualised BRT system could improve the overall effectiveness of public transport while reducing the total proportion of underserved areas in the city. A sustainable BRT system should focus on ensuring stakeholder consultation at important phases during the project and as well as maintaining equitable fare prices. The BRT system should also emphasise integration with existing transportation modes to reduce duplication and ensure complementarity of public transport services for residents.

OBJECTIVE AND KEY OUTPUTS OF THE ACTION

The objective of this action is to improve the quality and efficiency of public transport and reduce congestion.

Key outputs	**Approximate timeline[465]**
An assessment of the current public transport situation in the city	50 working weeks
Development of a customised BRT system	50 working weeks
Development of a city-level plan for the implementation of the BRT system and a pilot on a major road corridor	Based on city context
Phased implementation of BRT system across the city	Based on city context

[464] *Moving to access: Transport pricing and accessibility*, Brooking Institute, 2017

[465] Based on interviews with experts familiar with transport programmes in the region. These timings are provided as rough guidelines only. Actual time required will depend on the city context.

KEY ACTIVITIES

This section contains a list of the key activities an action in this space would have to complete. These activities were compiled based on research of global best-practice approaches, and with the help of city representatives, topic experts from development agencies, multilateral organisations, academia, and the private sector. It should be read as a summary of some of the core issues experienced by proponents working in this area. It is to be used as a guideline only and a city's local context will determine whether an activity is required, in which order activities are executed, and how these activities can be potentially distributed across different projects with the support of different funders/partners. [466][467]

Activities	Comments
Output 1: An assessment of the current public transport situation in the city	
Gather data to understand the public transport situation in the city and emerging trends	Data on commuter traffic is lacking in most cities in AMS. The study should assess the current public transport network in the city, including the modes of transport, average commute times, and the share of areas underserved by the public transport network in the city. The analysis should also consider emerging trends, such as urbanisation increasing the size of the city, emerging growth centres within the city, and the ownership of automobiles and motorcycles. For example, past research in Indonesia has shown that the average journey time increases by around 1.9 minutes (equivalent to about 4 percent of the average commute time) for every 100,000 population increase in the city.[466] Conducting commuter/household surveys to understand their commuting patterns, their perspectives on public transport options, and their potential willingness to use a BRT system (and under what conditions) will be an important component of this initial analysis. Further, data sharing with ridesharing firms operating in the city, which may have valuable input into the total volume of trips, and the share of trips that start or end near major public transit hubs (which could highlight the potential for greater integration between ridesharing and a BRT system), should be explored. The data collected would provide important information to determine the feasibility, location, and scale of a potential BRT system. Past research has demonstrated that BRT can outperform light rail transit (LRT) in providing a moderate to high level of service capacity at a moderate level of capital and operating costs in cities with moderate population densities (around 9600 per km^2).[467] While MRT systems are the most expensive to build, they could achieve over five times the capacity of a BRT or LRT system and are associated with the largest positive impact on property values in the vicinity of stations. MRT systems can be more appropriate in larger cities but this also depends on other crucial local factors, such as the ability to acquire the necessary land. The data provided would also support an evidence-based policy approach when communicating with national-level policy makers.

[466] *Rethinking urban mobility in Indonesia: The role of shared mobility services,* AlphaBeta, 2017.

[467] Ming Zhang, *Bus Versus Rail: Meta-Analysis of Cost Characteristics, Carrying Capacities, and Land Use Impacts*, Journal of the Transportation Research Board, 2009 and Bus Rapid Transit (BRT) A*n Efficient and Competitive Mode of Public Transport,* ACEA, 2013.

Activities	Comments
Socialise findings through a diagnostic workshop with key stakeholders to verify findings and affirm adoption of a BRT system	Important stakeholders identified through previous successful projects include national-level agencies transport operators, motorists, construction industry, commuters, employers, transport department, health department, merchants' associations, law enforcement and residents' associations.[468] It is particularly crucial that there is a broad representation of different user groups, including women and people with disabilities. Receiving national level approval early on is crucial particularly as public transportation is considered a national-level issue for many AMS.[469]
Output 2: Development of a customised Bus Rapid Transit system which is based on the analysis from Output 1	
Design a feasible BRT system based on data collected in Output 1	BRT systems can differ vastly in terms of design specifications. The design decision should be based on a thorough cost-benefit analysis of the various specifications. Two indicators which cities could potentially use to assess the cost effectiveness of a BRT are 'persons moved per hour' and the relative 'cost per kilometer'. These metrics could support a more accurate assessment between various design elements of the BRT. It is important that any design decision is based on the estimated future demand (as part of Output 1). Key elements that should be considered in the design of the BRT system include:[470] ■ *Operatorship and network.* Issues to consider include operator ownership model (i.e. closed loop where only selected transport operators can use the network, or open loop where any existing transport operator can use the system), the type of BRT network (i.e. trunk-feeder or direct service)[471], and routes. Special attention should be placed on ensuring that new routes complement existing public transport routes such that there are limited overlaps between services and that the BRT has appropriate scale to prevent overcrowding and under-utilisation. ■ *Infrastructure and vehicles.* Key issues include runways (i.e. lane separation) station size, pedestrian crossings, station location, transfer stations, fare collection system (e.g. offboard versus onboard collection), vehicle specifications (e.g. size of vehicle, high-floor versus low-floor buses), and fleet size. ■ *Traffic regulation and land-use policy.* Regulations to minimise delays and improve safety at intersections (e.g. reducing the number of mixed-traffic movements, 'green-lane' travel for buses[472]).

[468] *Good practice guide: Bus Rapid Transit,* C40,2014

[469] Based on interviews with experts familiar with transport programmes in the region

[470] *Sustainable Urban Transport Project: BRT planning guide*, GIZ, 2007.

[471] 'Trunk' refers to routes which are operating inside the BRT infrastructure (i.e. having express lanes, and limited red-lights), while 'feeder' refers to routes operating in mixed (i.e. normal) traffic which are 'feeding' the trunk stations. 'Direct' services refer to a point-to-point BRT routes with very limited stops.

[472] This refers to traffic signalling which reduces the number of red-lights which buses on the BRT system have to stop at, thereby improving travel times

Activities	Comments
	■ *Pricing.* Stakeholder consultation and economic analysis (e.g. comparison of costs of different forms of transport and likely incomes of users) should be undertaken to set prices appropriately and to exploring concessionary fees for the poor, children, seniors, women and the disabled (see 'Management of risks and lessons learnt' for more details). ■ *Non-price incentives.* Key issues including commuter and employer engagement and incentives (e.g. employer subsidies for public transport usage, reduction in parking allowances, addressing any safety concerns for passengers, and ensuring public transport is universally accessible).[473]
Explore complementarities between BRT system and other transport modes	As highlighted earlier, a BRT system should not be designed in isolation. The city should explore opportunities to design other non-motorised transport options and Traffic Demand Management (TDM) policies around the BRT System. For example, cheaper parking around BRT stations, zoning, establishing bicycle rental kiosks around BRT stations, technology solutions for commuters to plan their journey on multiple transport modes, and potential financial incentives for multi-modal transport.[474] This would improve the overall adoption of the BRT eventually. Special focus should also be placed on ensuring that other emerging patterns of transport (e.g. ridesharing) do not adversely affect plans for the BRT and adversely affect any ridership estimates. Past research has shown that ridesharing can actually increase the amount of public transport usage through multi-modal travel, but the design of systems to maximise these synergies is important (as discussed earlier).[475]
Convene workshop with key stakeholders and the community to share proposed solutions and refine based on input received. Stakeholders should also identify a corridor to begin pilot construction.	As with the initial workshop, it is important to have a broad representation of user groups, including women and people with disabilities, to ensure that specific concerns are addressed. To gain acceptance, a potential approach for a BRT system is through real-life demonstration/simulations which inform the public that blocking one lane of the traffic will not severely impact traffic movement. This was the approach adopted by city officials in Iskandar, Malaysia, where the authorities closed a section of the road to demonstrate and socialise the BRT to residents.
Output 3: Development of a city-level plan for the implementation of the BRT system (from Output 2) and a pilot on a major road corridor	

[473] The World Bank has developed guidelines to ensure that BRT systems are usable by seniors, persons with disabilities, and all others who especially benefit from universal design. See *BRT Accessibility Guidelines*, World Bank, 2007. Accessed at: http://siteresources.worldbank.org/DISABILITY/Resources/280658-1172672474385/BusRapidEngRickert.pdf

[474] For example, the Pinellas Suncoast Transit Authority (PSTA) in Florida has launched a 'first mile, last mile' partnership to support public transport. The programme allows riders to use (partly subsidised) ridesharing in Pinellas Park to travel within a specific geographic zone to or from a series of designated stops. From there, riders can connect with the regular PSTA public transit bus system. On the return trip, they can use ridesharing to travel from the designated stop back home or to work (within the zone). Further details can be found at: https://newsroom.uber.com/us-florida/uber-announces-partnership-to-increase-transportation-access-in-tampa-bay/

[475] *Rethinking urban mobility in Indonesia: The role of shared mobility services*, AlphaBeta, 2017.

Activities	Comments
Develop a funding and financing plan	Past experience has shown that most BRT systems do not fund more than a small portion of their infrastructure capital costs out of fare revenue, and only a few are able to cover the capital investment into their vehicles, their fare collection system, and their operational control system. Hence other forms of financing and funding will be required. Some key recommendations include:[476] ■ Initial BRT planning could be funded by the government and/ or donor agencies with a combination of municipal funding and international funding when possible. ■ Construction of the BRT infrastructure and its maintenance should ideally be paid for by the government from a stable source of tax revenue. ■ Debt financing can be useful to support the construction of the BRT, but ideally limited to no more than 70 percent of the infrastructure cost should be pursued. ■ The system should be designed so that revenue from fares will be sufficient to cover the cost of the system's operations. Cities could also explore other options including 'Green Financing' (due to the reduced emissions from introducing a BRT). See 'Management of risks and lessons learnt' for more detail**s.**
Develop a phased implementation plan for BRT	The implementation plan should clearly identify infrastructure priorities – for main BRT routes, metrics for measuring progress and process for gathering data (see section on 'monitoring and review mechanisms') and procedures to ensure minimal disruptions during the construction of stations.
Develop a manual and training schedule to train staff to support the BRT system	Administrative and technical skills are important facets to ensure that the BRT system will have adequate and well-trained staff to manage stations, drive the buses, and manage customer complaints.
Increase awareness of commuters on using the BRT system through media and education strategy	As highlighted earlier, city planners should ensure sufficient time to introduce the BRT and share with the public the merits of using it. This would increase buy-in and prevent low usage during the pilot stage. Local governments play a crucial role at this stage to promote the BRT system. For example, Pekanbaru's mayor is a strong advocate of public transport, and municipal officials practice a 'car-free' day once a week where they commute using buses. Similarly, Cebu conducted a media programme to promote the BRT through various clubs, schools and other public spaces – even during the feasibility study phase. This led to very broad support for the BRT system relative to other cities in the country. Failure to do so could lead to low adoption rates – as seen by Delhi's failed BRT project due to limited public awareness building.[477]

[476] *The Online BRT Planning Guide*, The Institute for Transportation and Development Policy. Available at: https://brtguide.itdp.org/branch/master/guide/

[477] *Why Did Bus Rapid Transit Go Bust in Delhi?*, City Lab, 2016.

Activities	Comments
Construct a pilot corridor and conduct pilot implementation	This could be the development of a single service on the most used route – as identified in Output 1.
Measure the impact of the BRT and benchmark efficiency of the BRT in relation to other BRTs globally	Impact to be measured using metrics identified in the implementation plan (see 'monitoring and review mechanisms'). The efficacy of the BRT system could be measured through the BRT Standard, an international benchmark used to evaluate various BRT systems globally.[478]
Convene a workshop between stakeholders to provide feedback on the pilot results, share experience on implementation challenges, discuss best practice, and how to develop potential partnerships	The outcomes and lessons learnt from the pilot should be captured in the form of a document (e.g. report, city blue print, white paper, study) that could be shared more widely and be used to replicate as well as gather further support.
Output 4: Phased implementation of BRT system across the city	
Update implementation approach based on results from the pilot programme in Output 3	This should include improving training packages, tweaking of regulation to prioritise buses and additional schemes to improve complementarity between the BRT and broader transport plan for the city.
Explore additional add-ons to enhance the BRT experience	In order to ensure the continued efficiency of the BRT system, municipalities should explore opportunities to upgrade the overall quality and experience of the BRT. For example, integrating ticketing system with other public transport; allowing on-demand services (including dynamic routing), and improving estimate trip times using GPS and traffic conditions.
Implement BRT across all routes identified in Output 3	
Continue monitoring and evaluation of activities to identify areas for future improvement and the expected outcomes	

[478] *The BRT Standard*, Institute for Transportation & Development Policy, 2016.

MONITORING AND REVIEW MECHANISMS

Progress could be assessed at three levels: performance indicators, output, and input.

Performance indicators:

Possible metrics include:

- Increase in the number of people using improved public transport services
- Satisfaction of passengers using the BRT system
- Reduction in average travel times (for those using the BRT system)

Note – this data will need to be gathered by the city and the data collection process should be designed as part of Output 3.

Output metrics:

- Completion of outputs listed earlier

Input metrics will be linked to the specific implementing activities (see the key activities above for further details).

MANAGEMENT OF RISKS AND LESSONS LEARNT

Below are a list of key risks and potential options for managing them:

- *Misalignment between local and national stakeholders*. Scheduling diagnostic workshops early in the project (see Output 1) would help to ensure that local and national stakeholders are aware of the intended outcomes and efficacy of a BRT system through regional examples (e.g. Jakarta and Bangkok). Data collection from Output 1 could also support strong evidence-based policy making which might also increase the financing opportunities for the city.
- *Low usage and knowledge of the BRT.* This could be mitigated through early community engagement through the workshops, and a media and education campaign during the pilot phase (Output 2). Strong political support for the adoption of the system (as highlighted in Pekanbaru) in Output 3 could also improve the overall acceptance of the system.

There have been a considerable number of BRT systems implemented globally. Some lessons from these actions include:

- **Designing the BRT.** A lesson learnt from the experience of other cities is that the BRT should not be elevated (i.e. having separate busway road which are built 12-25m above normal roads). This is because elevated busways inconvenience passengers by preventing the integration of other public transport options and linkages to other routes in the BRT system (e.g. it is difficult to join two separate bus routes which are 12m above ground due to construction challenges). For example, a study found that the elevated busways for a corridor in Jakarta led to challenges in integrating the service with other BRT routes and led to slower bus speeds.[479]
- **Financing the BRT.** Cities have a host of financing options including bonds, national development bank loans, multilateral development loans, commercial loans and bilateral loans. Selecting these options will be based on several factors including the availability

[479] *Elevated BRT: Is Higher Better? Lessons from China and Indonesia,* The Institute for Transportation and Development Policy, 2018.

of a credit rating for the city (which is not present for many cities globally) and (more importantly) approval from national level agencies.

- **Structuring fares.** Four strategic principles are important for cities to consider when structuring the fare system for BRTs:
  - **Ensuring commercial efficiency**, which can be addressed through peak surcharges and location-specific fares.
  - **Supporting competition**, by having a maximum fare control that still enables a reasonable rate of return for private sector operators (as seen in Singapore) and introducing franchise rights.
  - **Acknowledging the public good benefit of public transport**, in terms of easing congestion and reducing environmental impacts of commuting, by providing financial support, particularly for targeted groups, such as children, seniors, women and the disabled.
  - **Being mindful of practicality,** by ensuring that the system designed is technically and operationally feasible given the city context.

ASEAN PARTNERS ACTIVE IN THIS AREA

A number of potential sources of funding:

- Asian Development Bank (ADB)
- Asian Infrastructure Investment Bank (AIIB)
- World Bank (WB)
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
- The United Nations Environment Programme (UNEP)

ACTION 6: DEVELOP AND ENHANCE TRAFFIC MANAGEMENT SYSTEMS

Priority sub-area: Mobility

BACKGROUND AND RATIONALE

Traffic congestion is a growing problem across cities in AMS. The average number of hours that a commuter spends in traffic jams per annum in Bangkok and Jakarta is estimated to be 64 and 63 hours respectively.[480] Congestion is also starting to affect smaller cities like Bandung, Kuching, and Chiang Mai. There is a significant economic cost to this; for example, the total time-related cost of commuting in Indonesian cities is currently estimated at IDR 498 trillion (US$37 billion) per year and could increase by over 41 percent by 2020.[481] Inadequate traffic management infrastructure is one of the main reasons for this problem. Traffic signalling systems in some cities in AMS are outdated (having been built in the 1980-90s) and only configured to manage a fraction of the vehicle population that cities have today.[482] Congestion is likely to worsen due to a growing consuming class and increasing demand for motorised vehicles (which grew at an estimated 8 percent per annum in ASEAN in 2017).[483]

Traffic congestion and ensuing traffic accidents also add to public discontent with the city administration and diminish the quality of life for residents–women in particular. For example, traffic mortality rates in AMS are some of the highest globally, with an average of 19 deaths per 100,000 population – compared to a global average of 15.8 deaths per 100,000.[484] Traffic fatalities tend to disproportionately affect women; a study by the World Health Organization found that traffic fatality was one of the leading causes of death among female adolescents globally.[485] Recent research has also demonstrated that congestion can be a significant deterrent for workforce participation of women.[486]

Cities across AMS are introducing various solutions to improve congestion including promoting non-motorised transport options (e.g. developing BRT systems and bike sharing); discouraging/ restricting private car use (e.g. carbon taxes on cars, vehicle use restrictions like even-off license plate days); and enhancing land-use management (e.g. parking quotas in the central business district).[487] Moreover, several cities in AMS, including Cebu, Bandung, Hanoi, Surabaya, Kuching, Manila, Singapore and Kuala Lumpur, are exploring opportunities to leverage technology to improve the responsiveness and the adaptiveness of their traffic management based on the shifting road conditions. These include interconnected intersection controls, leveraging crowdsourced data sharing platforms (such as the collaboration between ridesharing firm Grab and the World Bank in Cebu), fleet management systems for public transport (in Bangkok and Hanoi), and introducing integrated traffic command centres (such as the City Brain project in Kuala Lumpur). Traffic data from these technologies (e.g. cameras and speed sensors) flow into a central control centre where they are integrated and processed (e.g. for incident detection), resulting in

[480] *Global Traffic Scorecard 2017*, INRIX, 2017.

[481] *Rethinking urban mobility in Indonesia*, AlphaBeta, 2017.

[482] *Southeast Asia struggles to tackle chaotic traffic*, Deutsche Welle, 2016.

[483] *Booming Southeast Asian vehicle sales drive urban congestion*, Nikkei Asian Review, 2017.

[484] *Global Health Observatory: Road traffic deaths*, World Health Organization, 2013.

[485] *Road traffic accidents*, World Health Organization, 2018.

[486] *How Jakarta's Traffic Affects Labor Market Outcomes for Women and People with Disabilities: Results from a Baseline Survey*, Australia Indonesia Partnership for Economic Governance (AIPEG), 2017.

[487] *Smarter congestion relief in Asian cities: Win-win solutions to urban transport problems*, Transport and Communications Bulletin for Asia and the Pacific, 2013

actions to improve traffic flow, such as traffic rerouting, changing of traffic signals, dynamic road pricing, road information updates, etc. The impact of these systems on traffic flow can be substantial. For example, a study in Sydney found that using coordinated and adaptive traffic signal systems could optimise usage of arterial road networks and improve journey times by 10 percent on average, and up to 50 percent in areas with outdated signalling systems.[488]

COMMON BARRIERS TO SUCCESSFUL IMPLEMENTATION

Many cities in ASEAN face barriers in implementing these traffic management actions, including:

- *Lack of data to support informed decision making.* A lack of critical congestion or travel-time data can undermine the traffic management decision-making process.[489] Traffic data can be costly to collect and requires substantial technical expertise to analyse. Even when data are available, assessments of congestion and its impacts sometimes do not sufficiently recognise the networked nature of roads in large metropolitan areas i.e. they tend to examine congestion across a single road rather than the network of roads and lanes feeding into it.[490]

- *Limited coordination between government agencies.* Tackling congestion requires an integrated approach, which can be a challenge in a large metropolis where there are overlapping jurisdictional powers (e.g. Jabodetabek, Kuala Lumpur). For example, national-level authorities may determine transport infrastructure priorities which do not align with city-level transport management plans. Moreover, the responsibility of managing traffic tends to be spread across various ministries in a given city and there is a lack of communication between these ministries. For example, while the Ministry of transport is in-charge of road management, the pavements and the land next to the road – which might be required for traffic signal upgrading or road signs – is usually the responsibility of the Ministry of environment and land respectively.

- *Poor integrated planning.* Implementation of traffic management solutions in some AMS has been haphazard. Solutions to reduce congestion in one place have come at the cost of congestion in others. A related problem is the lack of software and hardware systems integration which makes it difficult to link information from (new) data sources together.

- *Weak technical support to manage system once introduced*. Interviews with experts found that cities often failed to ensure that the technology and/or system was easy and intuitive to understand. Past actions introduced advanced technology without adequate hands-on training to support officials in traffic enforcement agencies, transport planning, and the operators of the automated system.[491]

A well planned and contextualised traffic management system and/or technology could potentially improve traffic flows and reduce overall congestion within a city. The data gathered from this system could also be used in the longer term to rethink urban planning, including road development, public transport accessibility, and congestion charges.

[488] *Adaptive traffic signal control*, Atkins, 2013.

[489] *Open Traffic: Easing Urban Congestion*, World Bank, 2017.

[490] *Ibid.*

[491] *Transport crowd source ICT demonstrations*, World Bank, 2014

OBJECTIVE AND KEY OUTPUTS OF THE ACTION

The objective of this action is to reduce traffic congestion and the incidence of traffic accidents in the city

Key outputs	Approximate timeline
An assessment of the current congestion and road accident situation in the city	24 working weeks
Assessment and prioritisation of possible solutions based on local city context (through data collection)	40 working weeks
Development of a city-level plan for the implementation of the proposed traffic management system and/or technology (from Output 2) and a pilot on a selected area	Based on city context
Phased implementation of traffic management system and/or technology	Based on city context

KEY ACTIVITIES

This section contains a list of the key activities an action in this space would have to complete. These activities were compiled based on research of global best-practice approaches, and with the help of city representatives, topic experts from development agencies, multilateral organisations, academia, and the private sector. It should be read as a summary of some of the core issues experienced by proponents working in this area. It is to be used as a guideline only and a city's local context will determine whether an activity is required, in which order activities are executed, and how these activities can be potentially distributed across different projects with the support of different funders/partners.

Activities	Comments
Output 1: An assessment of the current congestion and road accident situation in the city	
Gather data to understand current and future congestion issues in the city	This activity can be broken into two components: 1) Creating a repository of existing open and or proprietary data sources (e.g. data from transport providers, data from infrastructure such as car park or shopping mall operators); 2) Identifying and collecting new data required for congestion and traffic flow analysis on primary, secondary and tertiary roads. This could be completed through intrusive and non-intrusive methods. Intrusive methods refer to instruments placed in, or, on the road. These include road tubes, piezoelectric sensors, and magnetic loops. Non-intrusive methods include transport surveys, gathering data from ridesharing companies, consumer surveys, manual counts, passive and active infrared cameras, magnetic sensors fixed under or on top of the roadbed, and microwave radars. The selection of the appropriate instruments will be determined based on the data points required for the study and the proposed solution to be introduced (i.e. speed, classification of vehicle, occupancy, and volume of vehicles).

Activities	Comments
	The analysis should also consider emerging trends, such as urbanisation increasing the size of the city, emerging growth centres within the city, and the purchase of automobiles and motorcycles. For example, past research in Indonesia has shown that the average journey time increases by around 1.9 minutes (equivalent to about 4 percent of the average commute time) for every 100,000 increase in city size.[492]
Analyse data to compare actual flows in relation to maximum achievable speeds and identify current and future congestion chokepoints and accident 'hot spots'	This is a separate activity, as it might require additional technical expertise which the data collection team and the city do not have. Project proponents should also explore the whole corridor and the traffic feeding into it to develop a better sense of traffic density. Results from this activity could be expressed as the economic cost to congestion as a result of time delayed. This could be useful to support evidence-based policymaking.
Socialise findings through a diagnostic workshop with key stakeholders to verify findings	Important stakeholders identified through previous successful projects include law enforcement personnel, transport operators, construction industry, developers, interest groups, transport operators, commuters (particularly women and people with disabilities), transport department, planning department and the general public. Given the size of some large cities, jurisdictional borders may act as physiological and institutional barriers. Based on the scale of the action, proponents would need to ensure that stakeholders from various cities are well represented. The findings circulated in the workshop could be compiled in form of a document (e.g. report, city blue print, white paper, study) that will make it easier to engage stakeholders going forward.
Output 2: Assessment and prioritisation of possible solutions based on local city context and data collected from Output 1	
Identification of congestion improvement system and/or technology	There is a range of Intelligent Transport Systems to improve performance and efficiency in the city, including:[493] • *Digital solutions to improve the monitoring of traffic.* Leveraging advances in remote sensors and surveillance to monitor roadway conditions in real-time through a control centre; electronic fleet management to track the location and performance of public transport and freight; and computerised dispatching of utility/ emergency vehicles. These systems could also be used to improve traffic enforcement via computer vision.

[492] *Rethinking urban mobility in Indonesia: The role of shared mobility services*, AlphaBeta, 2017.

[493] *Intelligent Transportation Systems*, Victoria Transport Policy Institute, 2017.

Activities	Comments
	• *Digital solutions to share traffic information.* These include on-road displays and warnings which inform drivers of roadway hazards, traffic conditions, and alternative routes; in-built navigation devices to inform commuters of transit information (e.g. waiting times, expected travel time). • *Digital solutions to improve traffic demand managemen*t. These include technology to detect and give certain vehicles priority at intersections (e.g. transit vehicles); electronic pricing for parking and tolls that increases the cost of using some routes and areas during certain conditions (e.g. specific times of the day); and traffic signal adjustments across a network of roads in real-time - based on traffic speeds and volume across the overall network.
Assessment and selection of the most suitable system based on a set of clear criteria	The following criteria should be considered when deciding on a suitable solution: • *Potential impact.* The benefits should consider potential savings on construction costs (from smarter transport planning), user benefits (in terms of fuel use and time savings), and environmental benefits (in terms of CO2e savings from lower traffic congestion). For example, for cities where traffic patterns do not vary significantly throughout the day, a system to regulate traffic might not be as relevant. The analysis should also take into account the effect of generated traffic (see 'management of risks' for more). • *Cost.* The city will also have to analyse the projected cost. The costs include not only the initial construction of the system but also the ongoing costs of operations and ensuring consistent data collection, skilled personnel, etc. The long-term maintenance costs of these technologies could be particularly high due to the cost of data storage infrastructure. [494] • *Feasibility.* Traffic management systems vary in terms of the level of technical and analytical expertise required to run and maintain them. This should be a key decision-making criterion in the selection process. In addition, depending on data availability, some systems might not be as easily implemented as others (for example, it is more challenging to implement a control centre if the city does not have existing traffic surveillance infrastructure). • *Coordination.* Some systems will require more coordination than others. For example, while transit information displays can be implemented through close coordination internally with other transit departments, other solutions - like traffic control- will have to include construction companies, land authorities, and a service provider.

[494] *Transport crowd source ICT demonstrations*, World Bank, 2014.

Activities	Comments
	• *Consolidation of information*. Information collected through sensors are vast. There is a need to consolidate this information in order for it to be usable. One approach is through the use of command centres that act as a hub for information. When considering how to consolidate the information, project proponents should be mindful of the additional cost and digital infrastructure required.
Convene workshop with key stakeholders and the community to share proposed solutions and strategy and refine it based on input received	See above.
Output 3: Development of a city-level plan for the implementation of the proposed traffic management system (from Output 2) and a pilot for a selected area	
Prioritise key areas in city where the transport system is performing poorly or is expected to deteriorate to unacceptable levels if no action is taken	This should be based on findings from Output 1.
Develop an implementation plan to apply selected in Output 2 to these areas	Special focus should be placed on ensuring that the plan includes timely maintenance and upgrading of the system in order to prevent breakdown and/or loss of data thereafter. A plan should also consider when would be the optimum time to install the system. For example, some cities have preferred to introduce the system as they expand their road network, while others have opted to build it only once the entire road network has been completed.
Explore complementarities between the traffic management system and other traffic flow policies/tools	Past projects have found that the introduction of an improved traffic management technology and/or system can enhance commute times but will do little to ease overall congestion unless coupled with other traffic demand management approaches (see 'lessons learnt'). The long-term success of projects on tackling congestion also relies on utilising the data generated from the traffic management system to inform broader policy towards a 'car-lite' city.
Provide hands-on training to staff to acquaint them with the new system	Administrative and technical skills are important components to ensure that the system and/or technology system will have adequate and well-trained staff to manage the new system. One key approach is the use of 'walk-through' training which provides an opportunity for potential managers to use the system in a controlled environment.

Activities	Comments
	Another lesson from past projects is to ensure that a well-trained data scientist is part of the team to 'clean' the data and integrate it with various sources. For example, Jakarta hired and trained a team of data scientist when it was introducing its traffic management system.
Conduct a pilot over a predetermined network of roads	Completing a pilot across a network of roads is preferred as this would provide the opportunity to examine how the system and/or technology works to alleviate network congestion instead of congestion at a single point in the city.
Measure the impact of the traffic management system in reducing congestion	Impact to be measured using metrics identified in the implementation plan (see 'monitoring and review mechanisms').
Convene a workshop between stakeholders (e.g. trainers, government officials, private sector partners) to provide feedback on the pilot results, share experience on implementation challenges, discuss best practice, and how to develop potential partnerships	See above
Output 4: Phased implementation of traffic management system (from Output 2)	
Update implementation approach based on results from the pilot programme in Output 3	Traffic solutions tend to be capital intensive with upfront costs and with limited funding opportunities. One solution to reduce the financial burden is for local agencies to share the cost of the action with other agencies, reducing the cost a single agency has to pay. One potential area of cost-sharing could be data collection – which could be as high as 60 percent of the project's total cost- as in the case of Cebu.[495] Due to the cross-cutting nature of the issues and the weak coordination at present, cities should consider creating a task force which includes at least one senior representative from each relevant agency.
Distribute the system across all targeted areas and conduct regular maintenance to ensure that the system is running well	

[495] Based on feedback from cities who attended the ASEAN Sustainable Urbanisation Strategy forum from 7-8 July 2018.

Activities	Comments
Link the traffic management system to broader traffic flow measures	Ensure that data from traffic management system is fed into decision-making on traffic flow approaches, including prioritising new public transport corridors, congestion pricing, road construction, etc.
Continue monitoring and evaluation of activities to identify areas for future improvement and the expected outcomes	

MONITORING AND REVIEW MECHANISMS

Progress could be assessed at three levels: performance indicators, output, and input.

Performance indicators:

Possible metrics include:

- Average traffic speed (during peak and non-peak hour)
- Average commute travel time across peak and non-peak hours (potentially informed by consumer surveys, partnerships with ridesharing firms, or using geospatial services such as Google Maps)

Note – this data will need to be gathered by the city and the data collection process should be designed as part of Output 3.

Output metrics:

- Completion of outputs listed earlier

Input metrics will be linked to the specific implementing activities (see the key activities above for further details).

MANAGEMENT OF RISKS AND LESSONS LEARNT

Below are a list of key risks and potential options for managing them:

- *Improved traffic flow may generate additional traffic*. Generated traffic is defined as the additional vehicle traffic as a result of increasing roadway capacity. Several reports have found that a reduction in travel time by 10 percent (as a result of improved transport infrastructure), could ironically attract more cars and lead to increase in travel volume by 5 percent (a so-called 'rebound effect').[496] The impact of generated traffic will need to be considered when evaluating congestion reduction strategies in Output 2 so as to not overstate the true benefits of the system, and to identify solutions that can mitigate this rebound effect (e.g. introducing dynamic road pricing).
- *Insufficient data storage ability.* The data collected through the new system and/or technology could potentially be large and unwieldy, leading to some previous project proponents being unable to leverage the information collected to its fullest. This potential

[496] *Intelligent Transportation Systems*, Victoria Transport Policy Institute, 2017.

risk will be addressed early on through proper planning of data collection and storage (Output 2).

- *Poor operations and maintenance.* Project outcomes could be undermined if there is an insufficient budget allocation for ongoing operations and maintenance. To mitigate this, it will be important to include the current and ongoing costs in the budgeting process, and ensure there are available funds to support this going forward.
- *Lack of technical skills.* A lack of technical skills to collect and analyse the data could undermine the impact of the project, particularly if real-time data is needed. To mitigate this, it will be important to ensure there are sufficient resources allocated to the training of key staff in Output 3. Cities should also be aware of research and development (R&D) trends in traffic management including autonomous (self-driving) vehicles, integration of Internet of Things to monitor conditions, and the ride-sharing economy. These trends could affect the overall volume of traffic and the means to monitor it and should be considered in detail during the planning phase.

There have been a considerable number of traffic management solutions implemented globally. Some lessons from these actions include:

- *Integrate with other Traffic Demand Management (TDM) approaches.* TDM refers to strategies that help to achieve more efficient use of transportation resources. TDM approaches aim to reduce automobile dependency. In emerging cities, it is important to explore additional TDM approaches that are realistic, cost-effective and equitable (see Output 3). Some potential approaches include:
  - **Reducing the number of journeys taken**. Solutions in this approach include integrating transport and land-use master plans to promote transit-oriented cities that prevent urban sprawl, limiting the number of parking places in the central business district to promote public transport use, promoting car-free areas, and reducing fuel subsidies.
  - **Shifting traffic to other times**. Solutions in this approach help to smooth traffic volumes between peak and non-peak times. These include congestion or road pricing and institutionalising flexible working time (starting with civil servants). For example, congestion pricing in London reduced the number of vehicle trips in the congestion-pricing zone by 17 in a year.[497]
  - **Improving non-private and non-motorised transport options**. Solutions include improving the accessibility of public transport for residents (e.g. access to a form of public transport is at most 1km away); improve transit systems (e.g. BRT) with dedicated right of road; and promoting bike/ride-sharing programmes. For example, China's bikesharing platforms have been attributed to the reduction of heavy-congested traffic days in Beijing last year.[498]
- *Coordinate with larger land use planning objectives*. Relying on improving traffic management systems alone is only part of the solution to reduce congestion. City officials in-charge of traffic management need to work with their colleagues in-charge of land-use planning and the private sector to ensure that land located along major roads ease (and not obstruct) traffic and that ample amount of space is provided between the road and the next development. Poor planning has led to issues in some cities in AMS where private sector developers build properties next to main roads without considering the implications outside their land. For example, developers in Vientiane have built new housing developments without on-site parking, leading to on-road parking that obstructs traffic. The occurrence of this can be reduced through consultation with the private sector and thorough inspection of construction plans.

[497] *Intelligent Transportation Systems*, Victoria Transport Policy Institute, 2017.

[498] *Shared bikes help ease Beijing traffic congestion in 2017*, XinHua Net, 2018.

ASEAN PARTNERS ACTIVE IN THIS AREA

A number of potential sources of funding:

- Asian Development Bank (ADB)
- Asian Infrastructure Investment Bank (AIIB)
- World Bank (WB)
- International Development Cooperation Agency (China)
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
- Australia Aid (AusAid)
- Japan International Cooperation Agency (JICA)

ACTION 7: DEVELOP FLOOD MANAGEMENT SYSTEMS

Priority sub-area: Urban resilience

BACKGROUND AND RATIONALE

Cities in ASEAN Member States (AMS) are facing growing threats from climate change, especially flooding. A study by the OECD found that 6 out of 12 ASEAN cities are in the top one-third of global cities most prone to flooding.[499] Cities in AMS are implementing various plans to reduce inundation from flooding; these solutions range from cleaning rivers and enhancing drainage (e.g. Kuala Lumpur's river of life programme[500]), to tracking rising water levels of drains and canals in real-time (e.g. Singapore's SMART water-grid system). However, rapid population growth and poor maintenance has led to insufficient expansion or even to the deterioration of flood management systems in many ASEAN cities, reducing their functionality. This is a crucial priority in ASEAN – for example, 11 percent of cities in the ASCN have indicated that developing flood management approaches is a priority action for their city.[501]

Flood management has larger gender inclusiveness implications as women tend to be disproportionately affected by national catastrophes such as floods. For example, women accounted for 61 percent of deaths in Cyclone Nargis in Myanmar and 70 percent of deaths in the Aceh tsunami.[502] Moreover, despite bringing unique experiences and skills to disaster risk reduction and management, these skills are often not acknowledged or tapped into sufficiently. That is because women tend to have lower rates of decision-making in disaster management activities and their efforts are sometimes overlooked by the local community.[503]

COMMON BARRIERS TO SUCCESSFUL IMPLEMENTATION

Cities often face some key barriers in their efforts to develop flood management systems:

- *Lack of prioritisation:* Flood management has low political salience due to being a) not very visible, especially if successful, b) floods not being daily occurrences. In the meantime, cities face a range of pressing and very visible challenges on a daily basis (e.g. congestion, waste). This means flood management is often deprioritised. For example, Hat Yai in South Thailand was only able to implement a flood management project following catastrophic floods in 2005 because it was a 'King Project' (i.e. by royal decree).
- *Limited capacity and planning ability of Local Government Units (LGUs).* Integrated and sustainable flood management can be a highly complex challenge. It often requires sophisticated data as well as cross-disciplinary approaches from the fields of engineering, urban planning, geography and architecture. LGUs often lack the necessary technical expertise to conduct flood risk assessments and to ensure that robust flood management systems, including operations and maintenance (O&M), are put in place.
- *Legislative challenges to acquire land for infrastructure.* Difficulties around land acquisition mean that authorities may not be able to purchase the land that is required to install drainage.

[499] *Ranking Port Cities with High Exposure and Vulnerability to Climate Extremes: Exposure Estimates*, Organisation for Economic Cooperation and Development, 2008.

[500] For more information see https://www.aecom.com/projects/river-life/

[501] Based on priority projects emerging from the May 2018 workshop in Singapore of the ASCN.

[502] *Gender and disaster risk reduction*, Global Gender and Climate Action – UNDP, 2013

[503] *Ibid.*

- *Lack of data.* Modern flood management systems typically rely on a variety of data inputs, including census and geospatial information as well as historic flood data. Unfortunately, many cities lack the means of collecting as well as analysing this data which is often exacerbated by poor quality of the data sources.
- *Weak coordination.* Integrated flood management requires coordination between a range of government departments, at both the local and national level, which could be challenging for many cities. For example, the topography of an urban watershed can be impacted by urban planning decisions such as building and road construction. Water and sewage, refuse, and land use decisions are typically spread across multiple government departments. Flood management systems also often extend beyond the boundaries of a given city, requiring coordination with other regional and national entities. For example, impacts of flood management on downstream water quality.
- *Challenges to fund innovative flood management approaches:* There are many innovative infrastructure flood management solutions such as: smart-tunnels (e.g. Kuala Lumpur), which can be used to tackle congestion in no-flood times and to redirect run-off during flood season; multi-purpose access roads to rivers, which can be used to redirect water; public spaces or installations designed with flood management front of mind (e.g. Hart Park Project in Wauwatsoa, Milwaukee County, Wisconsin).[504] However, often there are issues around developing sustainable funding mechanisms for such infrastructure. Sometimes the funding mechanism can break down if commercial interests are at odds with flood management priorities.

An action in this sub-area should concentrate effort on ensuring identified solutions are appropriate, sustainable and integrated into their implementation. This may well require the action to allocate a larger amount of resources into the analysis of the state of current flood management solutions such as the drainage system (i.e. gathering robust data, facilitating alignment of local and national stakeholders including residents) or even building capacity of local authorities to adequately assess flood risk, before even considering new or additional solutions.

OBJECTIVE AND KEY OUTPUTS OF THE ACTION

The objective of this action is to reduce the incidence, damage and disruption caused by flooding across a city through introducing, or improving, integrated urban flood management and other flood management solutions.

Key outputs	Approximate timeline[505]
An assessment of the current flood risk situation in the city	23 working weeks
Identification of appropriate flood management solutions which address problems in the city	18 working weeks
Development of a city-level integrated urban flood management master plan and a pilot implementation of flood management solutions in at least one sub-watershed[506]	Based on city context
Phased implementation of flood management across the entire urban watershed	Based on city context

[504] *Public and Private Sector Best Practice Stories for Acquisition/Buyouts Activity/Project Types in All States and Territories relating to Flooding Hazards, FEMA* (2011)

[505] Based on interviews with experts familiar with transport programmes in the region. These timings are provided as rough guidelines only. Actual time required will depend on the city context.

[506] Watersheds are defined as the areas of land (urban of otherwise) that separate waters flowing to different bodies of water (e.g. rivers, basins, or seas). Sub-watersheds are sub-divisions of this watershed (i.e. sub-areas) that funnel water into one flow of that leads to the eventual body of water (e.g. branches of rivers, sections of a lake etc.)

KEY ACTIVITIES

This section contains a list of the key activities an action in this space would have to complete. These activities were compiled based on research of global best-practice approaches, and with the help of city representatives, topic experts from development agencies, multilateral organisations, academia, and the private sector. It should be read as a summary of some of the core issues experienced by proponents working in this area. It is to be used as a guideline only and a city's local context will determine whether an activity is required, in which order activities are executed, and how these activities can be potentially distributed across different projects with the support of different funders/partners.

Activities	Comments
Output 1: An assessment of the current flood risk situation in the city	
Identify of urban watershed and sub-watersheds	Convene relevant stakeholders to identify urban watersheds (e.g. how the urban watershed is divided into sub-watersheds based on the natural features of bodies of water) in the city and surrounding areas. This may involve having to include other cities and jurisdictions into the watershed considered.
Establish a 'baseline' by gathering data to understand the likelihood of flooding and the potential impact of flooding by areas	Indicators could include: i. Likelihood of floods - Precipitation - Flow of river beds - Speed of runoff - Flood levels - Distribution of floods ii. Impact of floods - Size of area within flood planes - Annualised costs of flood damage (e.g. property, human lives, economic disruption, socioeconomic) - Water quality - Sediments - Demographics (e.g. number of people) affected and to what extent (i.e. data needs be disaggregatable by ethnicity, age, gender, disability and household type to allow tracking of impact on marginalised groups) - Impact on land valuation The collected data should be used to establish a 'baseline' against which cost benefit analysis can be conducted (see Output 3) and progress can be measured. It is also crucial to collect forward looking data and conduct trend analysis (e.g. population estimates, geospatial analysis to detect land erosion). Where historic data is unavailable, planners may want to turn to alternative sources of data (e.g. geospatial data). Finally, mechanisms should be put in place that guarantee the continued collection of the above data going forward. The timeline depends on quality of existing data.

Activities	Comments
Conduct a 'Gap analysis' of existing flood management solutions, review their effectiveness, and analyse underlying issues related to flood management	This can be broadly separated into three components: i) review of infrastructure (e.g. storm water drains); ii) review of disaster and emergency-response capabilities; iii) review of flood management related legislation (e.g. urban plans for city, land-use regulations, building codes). ■ *Effectiveness of current flood management solutions*. Including data on: - Runoff capacity - Potential impact of measures at full utilisation - Impact of measures in one sub-watershed onto flooding in others. It will identify issues related to flood management, including lack of operations and maintenance expenditure, inadequate urban planning, illegal building, etc. ■ *City's ability to live with floods rather than only look at prevention*. This component is often overlooked.[507] A review in this area will include: - Currency of emergency responses services - Financial reserves set aside to deal with the flood fallout (i.e. supporting victims) - Ability of buildings and infrastructure to deal with flood impact ■ *Legislati*on. This is also often overlooked. Planners will need to understand the legal and regulatory environment to ensure sustainable flood management can be implemented. This includes: - Ensuring building codes are stringent enough to avoid new urbanisation and construction that increases run-off - Environmental and zoning laws that grant protection to natural catchment and reservoirs - Designation of vulnerable areas for non-residential use - Giving government the flexibility to acquire the required land to install flood management measures (i.e. land acquisition rights)
Compile assessment report of flood risk	The analysis based on the data gathered above should include a) Thorough study of the topography and identification of natural reservoirs and sub-catchment areas that will need to receive preservation priority. b) Rankings of areas most impacted by flooding (both from a flooding, economic and social standpoint). c) Weaknesses and bottlenecks in the current measures and drainage system. d) Scenario analysis forecasting/estimating the impact of changes in parameters above.

[507] *Community-based flood risk management: lessons learned from the 2011 flood in central Thailand*, Jukrkorn et. al (2014)

Activities	Comments
Socialise findings through a diagnostic workshop with stakeholders to verify findings	The workshop could also facilitate developing partnerships between city officials, community leaders, and the private sector. It is key that all relevant stakeholders are represented as modern flood management requires an integrated approach (see barriers above.) This means including other agencies such as transport, water management, utilities etc. Representatives from marginalised groups must be included in consultation (e.g. NGOs, women's groups, elderly – in particular their carers). Consultation should be conducted in two phases: i) individual consultations with specific groups separated to prevent the drowning out of their opinions. Past experience has shown that minority groups do not speak up otherwise. ii) between groups once individual concerns have been heard. i.e. get differentiated information first, then bring it back together and overlay. A long list of initial ideas (which will be explored further in the next phase of work) to mitigate flood risk could be showcased.
Output 2: Identification of appropriate flood management solutions which address problems in the city based on findings from Output 1	
Identify data gaps and plan to address	Based on analysis in Output 1, identify key data gaps and a plan for how the city can develop data. From thereon out it should be ensured that data is measured continuously to establish historical data allowing further analysis in the future.
Identify appropriate flood management solutions based on potential impact	Potential flood management solutions can be categorised according to three dimensions[508]: 1. Structural vs Non-Structural: *Structural* - Extensive (e.g. alteration of vegetation cover, control of soil erosion) - Intensive (e.g. dykes and polders, improvements or alteration to channel, reservoirs) *Non-structural* - Forecasting and early-warning system - Legislation (e.g. zoning of areas liable to flooding) - Flood-proof construction - Flood insurance 2. The effect on the watershed can be: - Distributed or at source (i.e. control over runoff from housing developments, public squares and paths) - In the micro-drainage (i.e. controlling run-off from a handful of urban developments) - In the macro-drainage (i.e. control of the main urban watercourses such as canals and rivers)

[508] For a comprehensive exposition see Tucci (2007), *Urban Flood Management*, Cap-Net-APFM-World Meteorological Organisation (WMO).

Activities	Comments
	3. Effect on the hydrograph (i.e. rate of runoff versus time)[509]: - Infiltration and percolation (i.e. absorption of water into groundwater through ground) - Storage - Increased runoff efficiency - Dykes and pumping stations It is crucial that solutions are treated holistically, rather than a build-up of solutions for individual sub-watersheds (that create issues for other sub-watersheds). Solutions must also take account of future urbanisation developments. New innovative solutions (see barriers above) should also be considered, alongside measures to improve the city's ability to 'live with floods'. This includes alternative building and construction technologies that make floods less damaging and impactful (e.g. sponge cities) or hybrid infrastructure that is better equipped to deal with floods and can be repurposed).
Assess feasibility of implementation of solutions and prioritise solutions	Examine feasibility of successful implementation of each of these solutions, including: ■ *Economic feasibility*: including budgetary implications and long-term return on investment (ROI) (e.g. estimated increase in land valuations). ■ *Technical feasibility*: based on required and available technical skills. ■ *Regulatory feasibility*: in terms of likelihood of city being able to address required regulatory reforms (particularly related to the scope of regulatory powers of the city government versus regional and national governments). ■ *Environmental feasibility*: in terms of impact on water quality, biodiversity and downstream activities and stakeholders.
Combine the potential impact of solutions and feasibility assessment into a cost-benefit analysis to prioritise solutions and locations for implementations	The cost-benefit analysis should be applied across the dimensions of solution and geography. i.e. different priority areas in the watershed will require different solutions. The analysis must be conducted against the baseline established in Output 1. The cost-benefit analysis should incorporate a poverty, social and gender assessment. For example, international case studies demonstrate that women have a crucial role to play in local flood management systems, yet their contributions are often overlooked or undervalued. Compared to male members of the community, women tend to be more prepared for flood disaster and are more active in their response to and involvement in tasks, post disasters, such as rehabilitation, reconstruction, restoration etc. Despite this they often are granted only a minor role in the decision-making process.[510]

[509] Urbanisation tends to 'front load' hydrographs with initially high rates of runoff but lower runoff as time progresses, indicative of 'flash floods'.

[510] *Women Participation in Flood Risk Management: A Case Study in Char South Baladoba in Kurigram District*, Zinnatul Bassar & Tasnuva, American Journal of Environmental Protection, 2017.

Activities	Comments
	In order to ensure effective gender mainstreaming, projects should include a Social Inclusion or Gender Action Plan (GAP) which is conducted after an assessment of the social and gender divide and interaction with focus groups on this. This should involve the key NGOs and local communities. (Note: the outcome of the cost-benefit analysis may well be that some areas of land should be marked for repurposing (e.g. non-residential) or relocation of residents. While difficult to implement it is important that planners have the political will and power push through such 'living with flood' solutions when more appropriate than flood prevention.**)**
Convene workshop with key stakeholders and the community to share proposed solutions and refine based on input received	See above
Output 3: Development of a city-level integrated urban flood management master plan and a pilot implementation of flood management solutions in at least one sub-watershed	
Develop an integrated master plan for flood management across the city, constructed out of sub-plans for each significant sub-watershed	The implementation master plan should clearly identify infrastructure priorities – by intervention and target sub-watershed. Identify metrics for measuring progress and process for gathering data (see section on 'monitoring and review mechanisms'). The drainage master planning needs to be tightly linked to other plans (e.g. Master plans for Urban development, transport, sanitation etc.), legislation (e.g. land use, environment, water sources) and management (e.g. national/local, decentralised executive unit). This should also include the development of mechanisms for gathering critical data to assess flood risk. Finally, the master plan should outline initial funding approaches that can be considered. In particular if new hybrid infrastructure has been identified as a viable solution it is important to outline potential monetisation mechanisms that balance commercial and flood management incentives.
Develop funding model to ensure financial sustainability of action	Traditionally, flood management will have to be funded by government but a number or modern approaches have considered commercialisation of flood management. Innovative hybrid or multi-purpose infrastructure projects as mentioned above can be one model, however they may lead to negative incentives for operators. Another approach is the use of financial contracts that leverage the improvement from land valuation (e.g. land becoming available for development) due to flood management to compensate for the cost of flood management solutions. Kuala Lumpur's 'River of Life' project is an example of this.

Activities	Comments
Train key stakeholders on the flood management solutions	Timing depends on current training of officials and design of programme. Capacity training must ensure adequate representation amongst women and minorities (general guidelines suggest 20 – 30 percent).
Pilot flood management solutions in priority sub-watersheds	Priority should be given to non-structural solutions amongst the identified range of solutions, allowing for faster implementation.
Conduct training on data gathering for flood risk assessment	Develop and implement training programmes to support gathering of critical data to assess flood risk.
Measure the impact of the flood management solution in the target area	This would be based on metrics developed as part of Output 1. This must also analyse any unforeseen side effects on the watershed such as re-distributing floods across the watershed.
Convene a workshop between stakeholders to provide feedback on the pilot results, share experience on implementation challenges, discuss best practice, and how to develop potential partnerships	The outcomes and lessons learnt from the pilot should be capture in the form of a document (e.g. report, city blue print, white paper, study) that could be shared more widely and be used to replicate as well as gather further support.
Output 4: Phased implementation of flood management across the entire urban watershed	
Identify agency responsible for action monitoring and reporting of the full-scale implementation across the city	The ideal scenario is for storm water management, sewage system and solid refuse to be managed within the same agency, to achieve economies of scale and a clear hierarchy in the services at the interface between these components. However, in practice, water and sewage are often administered by one agency, and storm water and refuse by other agencies, along with land use. Establishing or leveraging existing 'River agencies' can be useful vehicles that allow for management across jurisdictions (i.e. several cities in the same watershed). If powers are spread across multiple agencies, then light-touch, practical coordination mechanisms should be developed to support necessary coordination (e.g. monthly agency leadership discussions).
Update approach based on pilot programme in Output 3	This should include improving training packages for key officials to improve the long-term efficacy of implementation.

Activities	Comments
Work with key stakeholders to implement flood management solutions across all targeted areas	
Continue monitoring and evaluation of activities to identify areas for future improvement and the expected outcomes. This should include additional studies	Adhere to best practice sustainability criteria: ■ Natural runoff must not be increased by inhabitants of watershed ■ Priority given to natural runoff mechanisms Ongoing control, community engagement, education and administration

MONITORING AND REVIEW MECHANISMS

Progress could be assessed at three levels: performance indicators, output, and input.

Performance indicators:

Possible metrics which could be used include:

- Frequency of flood incidences (i.e. water levels causing inundation of areas that are not normally covered by water)[511] - controlling for weather trends
- Proportion of population affected by flooding
- Net costs arising from flood damage (accounting for implementation costs of flood management solutions)
- Changes to land valuations

Note – this data will need to be gathered by the city and the data collection process should be designed as part of Output 3.

Output metrics:

- Completion of outputs listed earlier
- Proportion of women as part of total personnel trained in integrated flood management approaches

Input metrics will be linked to the specific implementing activities (see the key activities above for further details).

[511] A formal definition of a flood is, *a general and temporary condition of partial or complete inundation of two or more acres of normally dry land or of two or more properties from: a) overflow of inland or tidal waters, b) unusual and rapid accumulation of runoff of surface waters from any source, or c) mudflow.*

MANAGEMENT OF RISKS AND LESSONS LEARNT

Below are a list of key risks and potential options for managing them. In particular, there are valuable lessons from successful flood management projects globally that can help mitigate these risks:

- *Maintenance and operations discontinued at the end of the action*. Maintenance and operations activities should be built into the activities and not considered an ad-hoc activity, with proper provision for future maintenance expenditure included in the project budgeting (see Output 2).
- *Focus on intensive flood mitigation, especially infrastructure, at the expense of extensive measures and 'living with flood approaches'*. Further, for many cities floods will become inevitable and they will have to adjust to living with them. The state of Florida has initiated the State-wide Post-Disaster Redevelopment Plan Planning Initiative to create guidance for local municipalities to integrate post-disaster recovery plans into their flood management Master plans. This is aimed to strengthen their ability to tolerate disasters in the future.[512] As far as flood mitigation goes extensive measures should not be overlooked. For example, tree planting and other natural approaches have been successfully used in flood control on the UK.
- *No subsequent monitoring of solution effectiveness.* The development of a set of replicable indicators and staff which can execute data collection (Output 2) will help to develop a database to monitor flood risk and flood management performance. Flood management requires frequent updating and monitoring as flood patterns can change significantly over short time horizons (e.g. driven by further urbanisation and climate change). Academia can be leveraged to assist in data analysis and continued flood management planning. This can be facilitated through partnerships with universities and research institutes.

There have been a considerable number of flood management solutions implemented globally. Some lessons from these actions include:

- *Develop flood management with other urban planning activities*. Integrated flood management is key but difficult to administer, given the complexity and variety of stakeholders involved. Not adhering to best practice can lead to undesired side effects, in particular, non-sustainable solutions being implemented that will result not so much in flood reduction but simply in shifting the impact of flooding to other areas of the watershed. To address this risk, it is important that key stakeholders and relevant activities (e.g. land use codes, urban masterplans) are identified early in the project, and stakeholders are engaged during the project development. The ADB recommends that flood management efforts begin with the production of an integrated flood management master plan. This means that significant resources are allocated to research and review of flood risk and existing measures, as well as engaging other agencies to integrate flood management into larger urban development plans. Master plans should include individual plans for sub-watersheds. This approach has been successful, for example, in London where individual Surface Water Management Plans for each of the 33 London Boroughs were developed.[513]
- *Community engagement, education is key to avoid ensuing neglect of solutions.* Despite having well-designed drainage systems and other flood management solutions in place, these can only be impactful if maintained properly. One threat to this is the blocking of drains through improper waste disposal processes. It is therefore crucial that local

[512] More information under http://www.floridajobs.org/community-planning-and-development/programs/community-planning-table-of-contents/post-disaster-redevelopment-planning

[513] *Best practices for managing surface water flooding: Applying lessons learned in the UK to Canada*, Graham et. al (2012)

communities are involved in the flood management process and receive adequate education in proper treatment of infrastructure. This risk can be mitigated through early community engagement (including Output 1) and continued during the pilot phase. In 2010, Tangerang ran information and education campaigns in 300 locations, teaching communities about the importance of flood management. They then provided the local communities and volunteers with tools and machinery to construct infiltration wells. In Jakarta, local NGOs are also consulted when it comes to negotiating with riverbank residents to relocate to a safer place in areas subject to heavy flooding. For example, Ciliwung Merdeka, a local NGO, worked with the residents of Ciliwung riverbank and sought their input for on-site resettlement proposals and convinced residents about the benefits of multi-story housing. Based on input from the residents and the advice of a group of experts, Ciliwung Merdeka presented the proposal of Kampung Susun (elevated villages) to the Jakarta city administration which was approved in 2015.[514]

ASEAN PARTNERS ACTIVE IN THIS AREA

A number of potential sources of funding

- Japan International Cooperation Agency (JICA)
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
- China
- World Bank (WB)
- Asian Development Bank (ADB)

[514] *Flood Governance in Jakarta: The Role of CBOs in Mitigating Annual Floods,* D. Rukmana, Savannah State University (2016)

ACTION 8: DEVELOP DIGITAL SKILLS THROUGH 'INDUSTRY BOOT CAMPS'

Priority sub-area: Education

BACKGROUND AND RATIONALE

The internet economy in Southeast Asia is forecast to grow to US$200 billion by 2025 and mobile internet growth alone is forecast to boost Gross Domestic Product (GDP) by US$58 billion and support 1 million additional jobs from 2015 to 2020.[515] The growth of these digital technologies could create a range of potential benefits to workers, including reducing workplace injuries as dangerous manual tasks are automated; improving job satisfaction as tedious and routine tasks are reduced; and potentially complementing the skills of lower skilled workers to enable them to do higher value-added activities.[516]

Cities across ASEAN are aiming to capitalise on this growth by establishing 'techhubs'. However, a large majority of these techhubs are limited to the region's mega-cities (with populations over 5 million), and the fastest growing middleweight cities (with populations between 0.5 to 5 million) have limited presence of these techhubs For example, of the 38 techhubs in Thailand, 27 are in Bangkok.[517] This creates the risk that as the internet economy develops in ASEAN, there could be growing inequalities in economic outcomes between these digital hubs and other cities. Building digital skills has been identified as the policy lever which matters the most to developing a vibrant digital ecosystem.[518] However, many cities experience a shortage of such digital skills. Academic research on Indonesia, Malaysia, Thailand, Philippines and Singapore has identified the 'inability of educational institutions to meet industry demands', and 'weakness in Science, Technology, Engineering and Mathematics (STEM) and Technical and Vocational Education and Training (TVET) programs' as among the key challenges facing these countries.[519]

A second challenge related to the growth of digital technologies is managing the potential disruption in the labour market. Digital technologies are estimated to potentially displace 12-17 million non-farm jobs in ASEAN from 2015 to 2030.[520] Technological advances such as automation and AI will require a radical shift in education and training. For instance, it has been projected that over 50 percent of students are being trained in jobs that will be radically changed by automation.[521] On average, by 2020, more than a third of the desired core skill sets of most occupations will be comprised of skills that are not yet considered crucial to the job today.[522] Women could be particularly impacted by these changes. 57 percent of jobs which are projected to be displaced between now and 2026, will belong to women.[523] In addition, there is a gender imbalance in the number of students completing STEM-related degrees. In Cambodia for example, 94 percent of doctoral students and 79 percent of researchers in STEM are men.[524] New, lifelong learning approaches will be

[515] *E-Conomy SEA Spotlight 2017 - Unprecedented growth for Southeast Asia's $50B internet economy*, Google-Temasek, 2017 and *One million opportunities: The impact of mobile internet on the economy of Southeast Asia*, Oxford Economics, 2016.

[516] *The Automation Advantage*, AlphaBeta, 2017.

[517] *Asia Pacific: a look at the 565 active tech hubs of the region's emerging economies,* GSMA, 2018.

[518] *Digital Nation: Policy levers for investment and growth*, AlphaBeta, 2017.

[519] *Managing skills challenge in ASEAN-5*, Tan & Tang, SMU - J.P. Morgan, 2016.

[520] *No Ordinary Disruption: The Forces Reshaping Asia*, McKinsey Global Institute, 2015.

[521] *The New Work Order*, AlphaBeta, 2015.

[522] *The Future of Jobs: Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution*, World Economic Forum, January 2016.

[523] *Towards a Reskilling Revolution: A Future of Jobs for All*, World Economic Forum, January 2018.

[524] 'Women must be at the heart of the digital revolution', *Strait Times*, May 9, 2017.

needed that enable individuals to keep pace with the changing skill demands of the labour force.

Many national as well as city governments in ASEAN have realised the importance of actively fostering digital skills. For example, in a bid to prepare its population for the global digital workforce, Ho Chi Minh City's Department of Education and Training adopted Internet Computing Core (IC3) Digital Literacy certification in all primary, secondary and post-secondary schools.[525]

COMMON BARRIERS TO SUCCESSFUL IMPLEMENTATION

Many cities in AMS still face significant barriers around implementing impactful digital skill programmes:

- *Education interventions are highly dependent on national policy and curricula.* Education curricula in most AMS are set at the national or regional level with limited scope for cities to influence what gets taught in primary and secondary schools. This means digital skills training often needs to occur as extra curricula activities or additional post-secondary trainings.
- *Lack of coordination with industry needs.* It can be hard for cities to determine the skill requirements of industries, particularly digital skills, given how quickly these needs appear to be changing. As one city official in an AMS remarked, 'we are constantly playing catch-up – as soon as we update the curriculum to respond to industry needs we find out that those needs have since changed.'[526] In Indonesia for example, surveys of employers and students highlighted concerns around insufficient employer input into the curriculum and limited hands-on training.[527] It is therefore crucial that industry takes a leading role in any actions aiming to promote digital skills.
- *Limited capacity of Local Government Units (LGUs), local training providers and trainers to transfer digital skills.* LGUs often lack the necessary technical expertise to ensure proper skills training. The digital economy is still relatively new territory to many AMS and it is also constantly evolving. This can make it challenging to ensure instructors with up-to-date knowledge on key areas of digital skills.
- *Insufficient ICT infrastructure.* Limited broadband connectivity and a lack of internet enabled devices can make it hard for some cities to provide training, particularly accessing remote online learning courses.

INDUSTRY BOOT CAMPS

Cities can leverage private sector partnerships to overcome these barriers and equip their citizens with the appropriate digital skills to meet modern industry needs.[528] Cities in ASEAN have partnered with private sector companies to design programmes to advance their citizens into a digital workforce. Singapore's national SkillsFuture programme partners with Microsoft to provide courses on software development, data analysis, cloud technologies, and online facilitation.[529] In Indonesia, Google partners with local universities in a number of cities as part of their Indonesia Android Kejar initiative that aims to train 100,000

[525] *Ho Chi Minh City in Vietnam Launches IC3 Digital Literacy Certification for All Primary, Secondary and Post-Secondary Students*, Certiport, 2014.

[526] Based on input from an AMS city official during the July 2018 ASUS Forum in Singapore.

[527] *Catalysing Productive Livelihood: A guide to education interventions with an accelerated path to scale and impact*, Asia Philanthropy Circle, 2017.

[528] *ASEAN needs vocational skills boost – now*, Bangkok Post, 2018.

[529] See the SkillsFuture – Digital Workplace website for more details.

Indonesians in Android app development by 2020.[530] Google further supports 'Google developer community groups' in 7 Indonesian cities and several other cities in ASEAN which are community led groups exchanging knowledge, organising study jams and hackathons.

'Industry boot camps' are an innovative approach to bridge the skills gap between industry needs and skills taught, as well as integrating industry into the education process. These boot camps are industry-led training programmes, each two to three months long, which teach practical skills needed within specific sectors. The boot camps also provide individual support to the participants, such as job interview preparation, and guaranteed interviews with potential employers. Similar programmes have been successfully undertaken by Infrastructure Leasing and Financial Services (IL&FS) in India and the Generation programme which operates across over 70 locations in over 65 cities.[531] While industry boot camps vary in design depending on the sectors involved, the ASEAN programmes would need to have a heavy emphasis on digital skills that cut across all sectors of the economy. Key aspects include:

- Work with local employers to identify key skills needed (not just digital);
- Design a targeted programme with employers to train workers in those skills;
- Include industry practitioners to make the courses practical and utilise their facilities to lower the costs of programme delivery;
- Conduct the courses over a focused timeframe (typically no more than 2-3 months); and
- Support placement of workers with employer partners leading to direct employment.

OBJECTIVE AND KEY OUTPUTS OF THE ACTION

The objective of this action is to increase the level of digital skills amongst a city's population in line with the requirements of local industry, resulting in a reduction in skills gaps, fewer vacancies and more placements in higher value-added employment.

Key outputs	Approximate timeline[532]
Analysis of current state of the digital skills gap in the city	24 working weeks
Assessing industry engagement and feasibility of digital skills 'industry boot camp' opportunities in the city based on findings from Output 1	27 working weeks
Development of phased implementation plan (from Output 2) and pilot implementation of priority industry boot camps	Based on city context
Phased implementation of digital skills industry boot camps across the city	Based on city context

[530] Interview with Google representative.

[531] Worldwide, more than 75 million young people are unemployed. But many employers can't find people with the skills they need for entry-level jobs. Generation is a non-profit founded in 2014 by McKinsey & Company to help bridge the skills gap between unemployed and employers who cannot find people with the skills they need for entry-level jobs – at speed and scale. For further information, see https://www.generation.org/

[532] Based on interviews with experts familiar with transport programmes in the region. These timings are provided as rough guidelines only. Actual time required will depend on the city context.

KEY ACTIVITIES

This section contains a list of the key activities an action in this space would have to complete. These activities were compiled based on research of global best-practice approaches, and with the help of city representatives, topic experts from development agencies, multilateral organisations, academia, and the private sector. It should be read as a summary of some of the core issues experienced by proponents working in this area. It is to be used as a guideline only and a city's local context will determine whether an activity is required, in which order activities are executed, and how these activities can be potentially distributed across different projects with the support of different funders/partners.

Activities	Comments
Output 1: Analysis of current state of the digital skills gap in the city	
Gather data on: ■ Digital skills requirement of local industry ■ Digital skills base by demographic segment (e.g. age, gender, income) as well as the skills shortages compared to other cities ■ Existing digital skills training solutions and providers (locally, domestically as well as international)	A impactful action in this space will require a thorough understanding of the digital skills gaps present and their root causes. Data from three major stakeholder groups is required: potential employees; employers; and training providers. *Digital skill requirements.* This should be done at a by industry level (i.e. industries relevant for local city context). For each industry, the indicators to be collected could include: ■ Density of local industry clusters (e.g. number of firms by industry in city); ■ Employment opportunities in industries (e.g. job openings); ■ Ability of industry to find labour with the required digital skills locally (e.g. number and length of vacancies); and ■ Job profiles including digital skill requirements (e.g. common shortcomings of new hires). This will heavily rely on surveys of and targeted interviews with businesses, however, innovative data can also be leveraged, for example, by partnering with online job platforms to identify job vacancies and high demand areas. Surveys should also include questions on employers' willingeness to engage in digital skills training which can be used in later outputs. *Digital skills base.* Indicators to be collected could include: ■ Unemployment rates and unemployment linked to digital skills (e.g. self-reported shortcomings to meet job requirements); ■ Enrolment into STEM education programmes; ■ Levels of digital literacy and digital penetration (e.g. smartphone and broadband penetration, digital competency self-assesments); ■ Access to ICT infrastructure (e.g. access to and number of online enabled devices per household); and ■ Access to existing digital skills training solutions (e.g. awareness of trainings, ability to afford or access trainings). Much of this data may not be publicly available so surveys would need to be conducted among job seekers, students, teachers and

Activities	Comments
	the general populus. Data needs to be disaggregatable by ethnicity, age, gender, disability and household type to allow identification of upskilling needs for different demographic groups. *Digital skill training providers.* Indicators to be collected could include: ■ Existing digital skills training provided by local providers (i.e. school curricula including digital skills, offerings from local universities and TVET centres); ■ Existing engagement of local industry in digital skills training (e.g. in-house training offered by firms); and ■ Training providers for digital skills that could be imported from other cities or countries (this includes distance or e-learning solutions). The above information needs to be collected in a manner that helps action coordinators understand the digital skills for which training solutions exist and the potential scalability of existing solutions. It is also important to understand the physical ICT infrastructure requirements to scale such solutions.
Analyse the data in combination to understand existing digital skills gaps and their root causes	Using the above data, it is important to identify the root causes of any digital skills shortages that may exist. Digital skills gaps can exist for several reasons, not all of which can be addressed by industry boot camps. Further, the causes can differ across industries, even within the same geography, so an industry specific analysis is required. Potential causes that can be addressed include: ■ Insufficient availability of digital skills training, or mismatch of skills taught, and skills required by industry – i.e. the digital skills required by employers are not taught through existing providers; ■ Difficulties around signalling skills and competencies – i.e. candidates with the right skills exist but potential employees are unable to get their digital skills verified; ■ Difficulties in finding suitable employers post training – i.e. candidates with the right skills exist but existing providers are unable to place students with employers in need of their skills due to a lack visibility into industry needs; ■ Lack of understanding of job requirements on the part of the students – i.e. potential employees have a poor understanding of what a job entails or pre-conceived notions about or biases against certain industries; and ■ Uncertainty about the value of digital skills – i.e. workers are unaware of the impact of acquiring digital skills on their employment opportunities, the number of vacancies or average salaries preventing them from enrolling into existing programmes. The likelihood of finding employment post programme is also an important factor.

Activities	Comments
Draft the programme structure, including focus industries and key skills (particularly focused on digital)	It is crucial at this stage to identify priority sectors and the required skills, with a focus on the necessary digital skills to increase employability. This prioritisation can lead to classification of digital skills into two groups: ■ Industry specific digital skills gap – Where several digital skills are bundled together as required by the relevant industries (e.g. digital skills in automotive). It is important that in such boot camps training bundles digital skills with other vocational skills for the industry in question. This may include non-technical skills such as behavioural and mindset skills (see lessons learnt) ■ Skill-specific digital skills gap – Where focus lies on a particular skill or group of skills that may be applicable to several jobs across several industries (success of such programs has been limited and where possible the former format should be prioritised) There needs to be consensus not only on the type of skills but the sophistication for digital skills required, which may well differ by industry or skill. 'Digital skills' can have many interpretations ranging from basic digital literacy to very advanced uses. For example, there is a large difference between requiring workers with basic knowledge of spreadsheet-type software (e.g. Excel) to conduct simple analysis (e.g. preparing charts and graphs) versus using the same applications for say task automation (e.g. programming macros).
Carry out poverty, social and gender assessment resulting in Social Inclusion Action Plan	To ensure effective gender mainstreaming, projects should include a Social Inclusion or Gender Action Plan (GAP) which is conducted after an assessment of the social and gender divide and interaction with focus groups on this. It is important that any digital skills training solutions do not amplify inequalities in education outcomes (e.g. if inequalities to STEM education exist). Further, the action should result in equal employment opportunities and importantly pay across gender, age and groups with disabilities. Tailored boot camps may be required for different groups.
Socialise findings through a diagnostic workshop with the three stakeholder groups as well as local education sector and technology firms to verify findings and agree on priority industries or priority digital skills areas	The workshop should also be used to test the willingness of stakeholders, specifically industry, to get involved in industry boot camps. The workshop could facilitate developing early partnerships between city officials, industry, solution providers as well as technology providers (i.e. software companies).

Activities	Comments
	Representatives from marginalised groups must be included in the consultation. For example, experts recommend a minimum 20-30 percent representation of women is recommended. Consultation should be conducted in two phases: i) individual consultations with specific groups separated to prevent the drowning out of their opinions. Experience has shown that minority groups do not speak up otherwise. ii) between groups once individual concerns have been heard. i.e. get differentiated information first, then bring it back together and overlay.
Summarise findings in a report or document (e.g. report, city blue print, white paper, study) that can be used for stakeholder engagement	
Output 2: Assessing industry engagement and feasibility of digital skills industry boot camp opportunities in the city based on findings from Output 1	
Engage with prioritised industries to gauge willingness to commit to digital skills training	This would involve socialising the report generated under Output 1 in direct engagements with industry representatives through focused discussion groups. It is important to identify key employers that could become champions for the action, driving excitement within their industry. At this stage it is also important to understand the willingness of industry to commit financial resources, physical resources (e.g. ICT hardware), personnel resources (e.g. trainers) as well as intake commitment post boot camp (i.e. the willingness to hire graduates from the boot camp). The latter is a particularly crucial factor as previous experiences with industry boot camps have shown that probability of employment is a key success factor. Industry associations could be a good first point of contact.
Identify list of potential providers for digital skills training delivery	Most boot camps will require multiple providers to teach different skills and parts of the syllabus. Potential providers include local industry players (i.e. future employers provide trainers); broader industry experts; private sector training providers – these can include professional education providers (e.g. for accompanying soft skills) as well as technology companies i.e. software providers (e.g. for digital skills and digital certification); community and TVET centres; universities and poly-technics; and secondary schools.
Design syllabus, certification and graduate allocation mechanism post boot camp	Syllabi should be designed in close cooperation with industry representatives, software providers and education experts. If the boot camp will be industry administered, it is important professional educators are consulted. At this stage alternative teaching methods can be considered that could be employed to cut down on physical resource requirements, such as e-learning and self-study.

Activities	Comments
	The design process should also incorporate some form of official certification for graduates, ideally pre-existing certification (e.g. Microsoft Office Specialist, Udacity). In the absence thereof, the transferability of taught skills may be brought into question. The allocation of graduates post boot camp among employers involved also needs to be formalised. This involves pre-allocation of hiring quotas, fairly distributing access to top students as well as the form of employment offered (e.g. full-time positions versus part time or internships). There should also be mechanisms to continuously support graduates that are not placed immediately.
Identify physical ICT requirements as well as capacity requirements for trainers	In addition to training providers, physical requirements for boot camps need to be assessed. While some providers may have access to such others would be required to rent facilities and equipment. In particular, ICT infrastructure and equipment required to conduct boot camps is crucial. Requirements for capacity training for trainers should also be assessed.
Identify appropriate financing and funding model	While pilot implementation as well as initial capital expenditure (e.g. for required ICT equipment) may rely on donors or philanthropy financing, a sustainable funding model is required. There are several options for funding of industry boot camps: ■ *Fee based approach where students pay for attending the boot camp*. This may only be appropriate if graduating from the boot camp increases general employability and grants certification beyond the administering industry. Further, benefitting industries should not profit from this and any profits should go to providers of the training. ■ *Industry led funding where employers involved invest in boot camps in return for a steady stream of potential hires*. This could include both firms seeking to hire workers, but also firms that may be making workers redundant (potentially as part of an automation programme) and seek to ensure the welfare of these workers. True sustainability of the action will require at least partial industry funding. Subsidies by local government or donor agencies should only be considered if the running costs of boot camps would make access prohibitive to citizens from weaker economic backgrounds as any subsidy towards bootcamps would be an indirect subsidy to the benefitting industry which could have distortionary effects.
Convene workshop for consultations with key stakeholders and the community to share proposed boot camps and refine based on input received	See above

Activities	Comments
Output 3: Development of phased implementation plan (from Output 2) and pilot implementation of priority industry boot camps	
Develop a phased implementation plan for digital skills industry boot camps in the city	The implementation plan should establish a clear pipeline of boot camps to address digital skills gaps across different industries and demographics. Insights from Output 2 should be utilised to identify the boot camps that should be included and which can be implemented in a timely fashion versus ones that will require longer time to set up. Inclusion should be determined by four criteria that need to be satisfied: 1. Sufficient employer base – i.e. sufficient employers to take on graduates as well as provide trainers and mentors 2. Funding in place (see above) 3. Sufficient learner base, ideally focussed on a particular group (e.g. single mothers) 4. Learners have access to the right social support to partake in boot camps and access jobs – e.g. transport, childcare, mentorship, financial support through stipends. This support needs to be guaranteed post boot camp. Industry coordination will be one of the key issues affecting timeline (i.e. where there are boot camps with clearly identified champions these can be implemented quickly). The implementation plan should identify metrics for measuring progress and process for gathering data (see section on 'monitoring and review mechanisms').
Select providers and ready resources for pilot solutions	In the case where a professional education provider is required, more time may be needed to allow for a tender process. Physical requirements for the administration of the boot camp then need to be selected jointly with the provider.
(If required) Train key stakeholders on administration of individual training solutions	In the case of an industry administered boot camp, 'train the trainer' programmes should be implemented to ensure industry trainers are familiar with the latest teaching techniques.
Pilot digital skills industry boot camp for at least one priority industry / digital skills gap / key demographic	Time should be allowed to advertise the pilot boot camp to potential intake. This includes marketing the programme to job seekers and target demographic groups.
Measure the impact of pilot solution	This would be based on metrics developed as part of Output 1.

Activities	Comments
Convene a workshop between stakeholders to provide feedback on the pilot results, share experience on implementation challenges, discuss best practice, and how to develop potential partnerships	See above
Summarise pilot outcomes in form of a document (e.g. report, city blue print, white paper, study)	The outcomes and lessons learnt from the pilot should be captured in the form of a document (e.g. report, city blue print, white paper, study) that could be shared more widely and be used to replicate as well as gather further support.
Output 4: Phased implementation of digital skills industry boot camps across the city	
Identify agency responsible for action monitoring, coordination of digital skills boot camps and reporting as well as coordinating with external stakeholders such as Ministry of education, industry bodies etc.	To ensure the tracking and monitoring of impact on the action objective it is advisable to establish one coordinating agency that administers the boot camps. This will depend on the number of boot camps created. The more industries decide to run boot camps, the more synergies and economies of scale can be generated by having a single agency overseeing the process.
Update approach based on pilot programme in Output 3	This should include improving training packages for key officials to improve the long-term efficacy of implementation.
Work with key stakeholders to implement additional digital skills industry boot camps across the city	
Continue monitoring and evaluation of activities to identify areas for future improvement and the expected outcomes	

MONITORING AND REVIEW MECHANISMS

Progress could be assessed at three levels: performance indicators, output, and input.

Performance indicators:

Possible indicators which could be used include:

- Number of participants in industry boot camps
- Proportion of participants that complete industry boot camps
- Number of participants that are placed in full-time employment after completing the industry boot camps
- Changes in income / wage levels for participants that complete industry boot camps
- 'Cost of employed day' – While not as easy to measure, this has been established as the best practice indicator by previous efforts. This measure combines placement, employee retention and the cost of the boot camp into one indicator that can be compared to post boot camp wage.

Note – this data will need to be gathered by the city and the data collection process should be designed as part of Output 3.

Output metrics:

- Completion of outputs listed earlier
- Number of people having undergone digital up- and re-skilling
- Number of women as a proportion of total having undergone digital up- and re-skilling

Input metrics will be linked to the specific implementing activities (see the key activities above for further details).

MANAGEMENT OF RISKS AND LESSONS LEARNT

Below are a list of key risks and potential options for managing them:

- *Inequalities in access to training*. Higher income residents often have access to a better baseline of digital skills thanks to access to devices, better schooling etc. Actions on digital skills must ensure that access is equitable, and the inequalities do not become entrenched (Output 3).
- *Substitution of existing interventions and education.* Industry boot camps must complement (not substitute) for the existing school curriculum and other education channels. A crucial aspect of this will be on thoroughly understanding the skills gap and the mismatch between students, training providers and industry. It might be that alternative solutions already exist, but student or employers are not aware of them, this includes options for distance learning.

While there have been limited interventions leveraging *industry led* boot camps to improve digital skills, there are several lessons that can be learnt from Technical and Vocational Education and Training (TVET) industry led boot camps, as well as training provider led digital skills boot camps:

- *Quality of instructors is crucial.* A key driver of success is the quality of instructors, and particularly their industry and digital knowledge. Given the challenge in finding instructors with these skill sets, a preferred approach can be to use corporate volunteers. For example, the 'Corporate Skills Sharing Project' developed by Digital Outreach Ltd in the

UK, utilised knowledge sharing by getting corporate sector volunteers to conduct tailored basic online skills training sessions in voluntary and community sector organisations. Looking across a range of basic online skills (e.g. setting up a Facebook page, increasing social media awareness or adjusting privacy settings), for each skill, at least 70 percent of participants rated their knowledge and understanding as basic or non-existent prior to trainings. Post trainings, these responses for each skill shifted, with at least 60 percent rated their knowledge and understand as good or excellent per skill.[533]

- *Contextualising skills taught in industry situations can improve learning outcomes.* Contextualising digital skills in a work environment is crucial for success. Up-to-date and relevant tools, such as the newest software, are important to ensure that the courses deliver appropriate training. To assist with this, it is useful to have as many trainings as possible in the facilities of industry partners. As such, the training programmes should be located as close as possible to key industry clusters. Academic evidence also shows that on-the-job training and hands-on learning are the most effective instructional techniques. For example, in a survey conducted amongst 500 SMK students in Java, Indonesia, on-the-job and hands-on training scored 1st and 3rd out of all teaching techniques. Industry boot camps should, therefore, make sure to include significant hands-on-components, ideally on-site or in a work context. In addition, it is crucial that trainers have professional industry experience.
- *Digital skills need to be supplemented by non-technical skills.* While the focus of boot camps can be on digital skills it is important that learners also receive training in industry-specific nontechnical skills such as people and behavioural training. The need for such skills will differ by industry but work both by Generation and the JPM foundation has shown this to be a crucial driver of success.[534]
- *Probability of employment is a crucial driver of success.* The prospects of being placed with an employer at the end of the programme significantly increase the willingness of workers to commit to the training programme. For example, since its inception, 13,500 people have gone through the training with the Generation programme with 83 percent finding jobs within three months of finishing the programme and 80 percent of those stayed with their jobs for at least three months.[535] Ensuring the commitment of industry partners, designing programmes around specific employment gaps, and providing placement support can help to maximise the probability of successful employment. In addition, ensuring the programme is relatively short (e.g. no more than 2-3 months) can reduce the time-related costs for workers.
- *Stipends can have adverse incentive effects.* Early lessons from the Generation programme showed that unless stipends were properly managed, and recipients had to take on obligations it could lead to negative incentives. In extreme cases, it resulted in stipend recipients that moved from programme to programme receiving financial support but never intending to actually take on jobs.
- *Certification is an important aspect.* While a high probability of placement with an employer is extremely important, it is also crucial that the training leads to some form of industry certification that can ensure an important signalling device to other employers.
- *Delivering digital skills training can have non-employment related benefits for corporate organisations.* Experience of existing programmes have shown that there are several benefits for industry partners beyond finding skilled workers. These include enhancing their corporate image and reputation, and higher morale of industry volunteers.[536]

[533] *Pilot programme evaluation: Capacity building – digital skills in front-line VCS organisation*, Digital Outreach, 2015

[534] Information obtained from interviews and website (www.generationinitiative.org).

[535] *Ibid.*

[536] *Pilot programme evaluation: Capacity building – digital skills in front-line VCS organisation*, Digital Outreach, 2015

ASEAN PARTNERS ACTIVE IN THIS AREA

A number of potential sources of funding:

- Australia's Department of Foreign Affairs and Trade (DFAT)
- Japan International Cooperation Agency (JICA)
- United States Agency of International Development (USAID)
- Asian Development Bank (ADB)
- Asian Infrastructure Investment Bank (AIIB)
- World Bank (WB)
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)

Glossary

ACCC	ASEAN Connectivity Coordinating Committee
ADB	Asian Development Bank
AEC	ASEAN Economic Community
AIESC	ASEAN Initiative on Environmentally Sustainable Cities
AIIB	Asia Infrastructure Investment Bank
AMS	ASEAN Member State
APAC	Asia-Pacific
APEC	Asia Pacific Economic Cooperation
ASC	ASEAN Smart Cities
ASCN	ASEAN Smart Cities Network
ASEC	ASEAN Secretariat
ASUS	ASEAN Sustainable Urbanisation Strategy
AWGESC	ASEAN Working Group on Environmentally Sustainable Cities
BIMP-EAGA	Brunei Darussalam-Indonesia-Malaysia-Philippines East ASEAN Growth Area
BPO	Business Process Outsourcing
BRT	Bus Rapid Transit
CLC	Centre for Liveable Cities
CO2	Carbon Dioxide
CPI	City Prosperity Index
DFAT	Australia's Department of Foreign Affairs and Trade
DP	Dialogue Partner
EDGE	Excellence in Design for Greater Efficiencies
EIU	Economist Intelligence Unit
EPZ	Export Processing Zone
ERIA	Economic Research Institute for ASEAN and East Asia
ESCI	Emerging & Sustainable Cities Initiative
FDI	Foreign Direct Investment
FTZ	Free Trade Zone
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIZ	German Organisation for International Cooperation / Deutsche Gesellschaft für Internationale Zusammenarbeit
ICT	Information and Communications Technology
IDB	Inter-American Development Bank
IDR	Indonesian Rupiah
IEA	International Energy Agency
IFC	International Finance Corporation
ILO	International Labour Organization
IMT-GT	Indonesia-Malaysia-Thailand Growth Triangle
IoT	Internet of Things
IP	Internet Protocol

ISO	International Standard Organization
JICA	Japan International Cooperation Agency
KPIs	Key performance indicators
LED	Light-Emitting-Diode
LIB-SI	Lead Implementing Body for Sustainable Infrastructure
LGU	Local Government Units
MGI	McKinsey Global Institute
MPAC	Master Plan on ASEAN Connectivity
MSMEs	Micro, Small and Medium Enterprises
MSW	Municipal Solid Waste
MTOE	Million Tonnes of Oil Equivalent
NGO	Non-Government Organisation
OECD	Organisation for Economic Cooperation and Development
OEP	Other External Partner
PPP	Public Private Partnership
RFID	Radio-frequency Identification
ROI	Return on Investment
SDG	Sustainable Development Goal
SEZ	Special Economic Zone
SMART	Specific, Measurable, Actionable, Realistic, and Timely
SME	Small and Medium Enterprises
STEM	Science, Technology, Engineering and Mathematics
TDM	Traffic Demand Management
TVET	Technical Vocational Education and Training
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNODC	United Nations Office on Drugs and Crime
USAID	United States Agency for International Development
WCCD	World Council on City Data
WHO	World Health Organization

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