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# **Increasing the Use of Smart Mobility Approaches to Improve Traffic Conditions in Urban Areas of South-East Asia**

Policy Guidelines

## Acknowledgements

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## Executive summary

**S**outh-East Asia is one of the fastest growing economies in the world, with a total population of more than 600 million. In 2019, the Gross Domestic Product (GDP) of the subregion was more than US\$3 trillion, representing 6.25 per cent of global GDP. The rate of urbanization in South-East Asia reached 49 per cent in 2018 and is projected to reach 56 per cent in 2030. Such rapid urbanization has brought heavy traffic congestion, serious safety issues and growing urban inequality. Further, the transport sector in South-East Asia consumes more than 25 per cent of the country's total energy, which is directly related to an increase in CO<sub>2</sub> emissions. As a result, there have been various notable attempts to address such concerns and provide cost-effective mobility options in South-East Asia through the adoption of smart transport systems. An example of this approach is the "ASEAN Smart Cities Network", where smart mobility is an intrinsic element in the smart cities concept.

To further the scope of smart transport systems, this report details the concept of "smart mobility" which can be interpreted as transport systems and services that use advanced information and communications technology which increase users' convenience in their trips. Taking into consideration such characteristics and the United Nation's 2030 Agenda for Sustainable Development, smart mobility is inclusively defined herein as: "The integrated user-oriented transport systems and services that can make travelling safer, smarter and greener using innovative technologies." The concept differs from "transport", which relates to the movement of people and goods utilizing a vehicle, whereas "mobility" is the ability to move freely and easily. Smart mobility, under the umbrella of the wider notion of smart transport systems, is a result of the evolution of mobility delivered as an output from the fourth industrial revolution through the advent of smart devices.

Smart mobility can stretch across our cities and urban environments to enhance our travel experience. This shifts traditional paradigms by disrupting the presence and legacy of private transport, public transport, and paratransit with customized and user-orientated services. This reduces inefficiency and inequity, while helping people make more informed choices about how and where they travel using real-time information. This also offers societal benefits in South-East Asia in a safer, smarter, and more sustainable way by integrating information, technology, infrastructure, vehicles, and users in order to enhance traffic conditions.

The concept also has merit in that it adopts a paradigm shift that can take full advantage in the achievement of the Sustainable Development Goals (SDGs). The 2030 Agenda for Sustainable Development, which consists of 17 SDGs and 169 indicators, was formally adopted in 2015 by 193 countries. Several of the goals are directly linked to transport, which are crucial for economic and social well-being. These include: Target 3.6 – Halve the number of worldwide deaths and injuries from traffic accidents; Target 9.1 – Develop quality, reliable, sustainable and resilient infrastructure; and Target 11.2 – Access to safe, cheap, accessible and sustainable transportation systems.

Despite it being a relatively new concept, some South-East Asian countries have already started relevant initiatives, such as the "Mobility-on-Demand" service in Singapore and the "EV-Shared Mobility" initiative in Thailand. Other examples include ride-sharing, bike-sharing, demand-responsive transport, personal mobility and Mobility-as-a-Service (MaaS). Initial efforts have yielded positive benefits. Carpooling has been shown to improve vehicle availability in hot spot areas during peak hours as well as reduce travel distances.

The benefits accrued from carpooling could be redirected to other infrastructure projects. In Singapore, ride-sharing has shown improvements in safety in terms of reductions in driver-related crashes and driver-related offences by 1.2 and 1.9 times respectively, when compared to Singapore taxi industry standards. Travel externalities such as CO<sub>2</sub> emissions can also be reduced by ride-sharing through a smaller number of cars on the road. In China bike sharing has seen a reduction in car travel by 3 per cent or 170,000 cars across 50 cities, resulting in reductions in annual emissions. In Shanghai alone, bike-sharing saved 8,358 tonnes of petrol and decreased CO<sub>2</sub> and NO<sub>x</sub> emissions by 25,240 tonnes and 64 tonnes in 2016 respectively. Demand-responsive transport can provide an affordable and convenient transport service for those with limited access to a private vehicle in areas where public transport is inconveniently located.

This study aims to reveal the traditional relationships between various transport modes and discuss how barriers can be broken down to welcome the advent of a new paradigm for smart mobility. This will enable policymakers to make relevant policy and strategy changes that will greatly enhance the efficiency of transport systems and their associated societal benefits in achieving the SDGs in South-East Asia.

A comprehensive overview of the current and evolving deployment of smart mobility has been derived while highlighting their estimated benefits for Asia and the Pacific. The trends and the role of Big Data have also been assessed at the strategic, tactical and operational levels. With Big Data playing an increasingly important role in overcoming quantitative constraints, the study has provided adequate information for a successful smart mobility adoption plan as well as for future transport related strategies.

An in-depth policy analysis of the transport plans and strategies in South-East Asia has been undertaken, coupled with an assessment of their current status, challenges, needs and expected benefits from smart mobility. The analysis has shown limited mention or emphasis of smart mobility from a strategic perspective and that more efforts are required to include the concept in future strategies under the umbrella of smart transport systems.

A survey has also been conducted among relevant experts in South-East Asian countries to gauge the level of understanding, familiarity, current situation, challenges and benefits, future directions and types of support to increase the awareness and understanding of smart transport systems and smart mobility. The survey has highlighted the fact that only a small handful of experts are well-versed in the concept of smart mobility, whereas the concept of smart transport systems is better understood.

Specific case studies concerning Bangkok, Hanoi, Jakarta, and Singapore have also been conducted. Two newly-developed indices – the Mobility Boost Power Index (MBPI) and the Mobility Boost Equity Index (MBEI) – have been employed to assess the efficiency and equity of public transport and to delineate any mobility-vulnerable living zones where public transport is limited. The findings of the case studies have concluded that smart mobility does indeed improve the accessibility, interconnectivity, reliability and convenience of mobility services in mobility-vulnerable zones in target cities.

As investigated in this report, there is great potential in using smart mobility to address transport issues by improving overall efficiency and equity within the transport sector. At the same time, there is a need for timely intervention through policies that promote smart mobility to achieve the maximum potential for sustainable development. As such, national and subregional level policy recommendations are offered. These recommendations include the identifying and specifying the needs of smart mobility within a country, prioritizing smart mobility services, establishing national smart mobility plans and strategies, utilizing Big Data for smart mobility, developing subregional strategies, and cooperating and collaborating with neighbouring countries. Applying such recommendations will enable policymakers to make relevant changes to policies and strategies that greatly enhance the efficiency of transport systems and their associated societal benefits derived from achieving the SDGs in South-East Asia.

In conclusion, this study is expected to (a) provide a bridge to increasing the awareness and understanding of smart mobility among stakeholders, (b) highlight their usefulness to society and (c) serve as a good reference in showing how smart mobility can be used as a new tool to address urban transport challenges in South-East Asia. Welcoming the advent of a new paradigm for smart mobility, while breaking down the barriers to its development, can lead to a completely new generation of predictive seamless mobility that takes the transport experience of today to the next level. For South-East Asia to explore its smart mobility potential, the public and private sectors and academia need to collaborate in bringing smart mobility to the forefront of the subregion's transport strategies.

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