Research Introduction

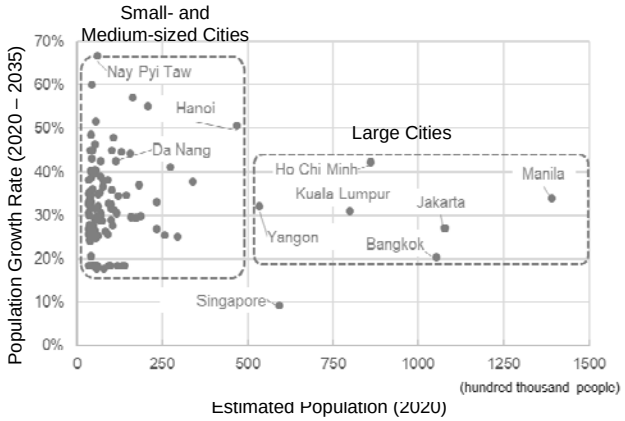
Solutions To Urban Issues Through Urban Networks

Associate Senior Researcher, Social Innovation Policy Initiative Promotion Office
Takashi Yamaguchi

As urbanization progresses in countries where the urban population ratio is increasing, solving the social challenges associated with urban growth is becoming ever more important. Hitachi Research Institute is conducting research on (1) the utilization of digital technologies and (2) the formation of urban networks that aim to solve problems through cooperation among cities, mainly in Southeast Asian countries.

1. Urban Challenges Complicated by Urbanization

In Southeast Asia, half of the population will be living in urban areas by 2020. The vertical line in Figure 1 shows the population growth rate from 2020 to 2035, and the horizontal line shows the estimated population for each city as of 2020, based on figures from the United Nations. The demographics show a remarkable increase in the population of not only large cities but also small- and medium-sized cities as well. In large cities, where industrialization and commercialization are progressing, urban problems such as traffic jams and air pollution are becoming apparent as the population continues to increase. Many cities, regardless of their population, are expected to face similar urban challenges in the future.



Note: For cities with a population of 300,000 or more (as of 2018)

Source: Prepared by Hitachi Research Institute from "World Urbanization Prospects: The 2018 Revision" (2019), United Nations

Figure 1 Estimated Population (2020) and Population Growth Rate (2020 – 2035) by City in Southeast Asia

Specifically, the progress of urbanization is accompanied by an increase in the inflow of people and freight from outside the city. Urban infrastructure such as roads, ports, airports, and water and sewage systems will be in short supply and high demand, and various urban problems such as traffic congestion and environmental pollution caused by overcapacity of sewage and wastewater treatment plants will arise.

For example, in the city of Da Nang in central Vietnam, the growth of the tourism industry in recent years, such as the rapid increase in the number of tourists using beaches, has led to an increase in the number of commuters from neighboring areas and freight transportation from both inside and outside of the country, resulting in a rapid increase in the volume of traffic for both people and goods, and congestion is becoming a social issue. At the same time, environmental problems have arisen, such as water pollution caused by overcapacity leading to the inability to properly treat sewage and waste, leading to concerns about adverse effects on the tourism industry. In urban areas, social, environmental, and industrial development issues are linked, and problems are becoming more complex.

As with Da Nang, major cities throughout Asia will face increasingly complex social challenges in the future due to population growth and the increasing concentration of people and goods.

As a solution to these urban issues, Hitachi Research Institute is focusing on two points: (1) the use of digital technologies centered on information and communications technology, and (2) social implementation of solutions through intercity collaboration.

2. Solving Challenges Using Digital Technology

For the use of digital technologies in solving urban problems, Hitachi Research Institute pays attention to the development of "Smart Cities". In Southeast Asia, Thailand aims to develop 100 smart cities nationwide by 2022, and there are initiatives being made toward the development of smart cities in countries such as Indonesia and Vietnam as well. Many of these efforts aim to achieve efficient management and operation of social infrastructure services and to improve the quality of life (QoL) in cities by utilizing electronic devices such as sensors as well as information and communication technologies.

In an advanced initiative in Southeast Asia, Singapore's "Virtual Singapore[1]" offers a vision for the future of urban management using digital technology. By applying modeling technology for buildings, the city is converted into 3D data, and changes in the landscape and sunshine due to buildings, the flow of people during events, etc., are simulated, making it possible to predict the occurrence of problems caused by changes in economic activities of the city in advance.

In the future, the types and amount of data that can be collected and processed will increase due to the lower cost and miniaturization of various sensors and advances in AI and machine learning technologies, and the accuracy of real-

[1] Singapore National Research Foundation <https://www.nrf.gov.sg/programmes/virtual-singapore>

time urban problem analysis and future prediction will increase. In addition, by utilizing APIs, data linkage between social infrastructures can be expanded, making it possible to provide high quality urban infrastructure services to users through the linkage of services across fields such as energy, transportation, and administrative services.

In order to utilize digital technologies, it is important to first identify causal relationships among urban issues that are becoming increasingly complex and identify the important issues before focusing on the related social infrastructure for implementation. For the selective implementation of appropriate digital technologies, it is also necessary to consider cooperation with foreign companies in some fields. Development authorities of national and local governments are required to evaluate new technologies, draw up budgets based on the expected effects of introduction, and examine the requirements and conditions for bids and contracts.

3. Solving Problems through Urban Networks

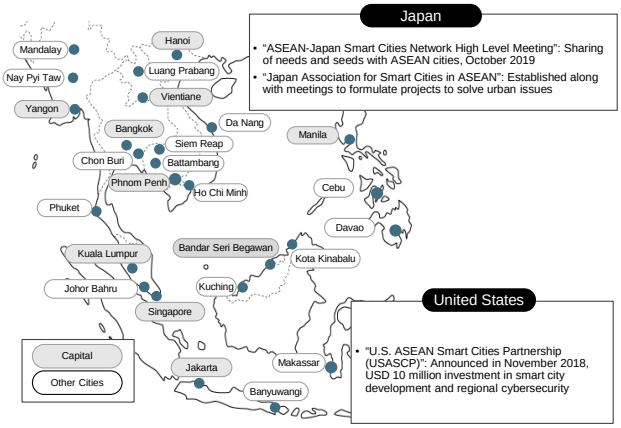
As urban issues become more serious and complex and it becomes more difficult to examine countermeasures such as the implementation of digital technologies, development authorities of national and local governments are collaborating to form “urban networks” to respond to urban issues. Hitachi Research Institute is focusing on two kinds of urban networks.

3.1 Urban networks for sharing know-how

In Southeast Asia, the ASEAN Smart Cities Network was established under the leadership of Singapore, the Chair of ASEAN for 2018, with participation by various ASEAN countries and a total of 26 cities. In the meetings, wherein various countries, local governments, and private companies participated, cross-sectoral sessions on the implementation of digital infrastructure and sessions on specific issues such as traffic and environmental challenges were held, as well as panel discussions for explaining the issues and policies of each city, discussing solutions to urban issues, and the entering into a memorandum for cooperation regarding countermeasures. These large-scale urban networks enable cities to share know-how on urban issues through meetings and social media, and includes meetings with countries outside the region, such as Japan, China, South Korea, the United States, and Australia (Figure 2).

3.2 Urban networks for regional cooperation

Hitachi Research Institute believes that for small- and medium-sized cities in Southeast Asia that have weak financial foundations compared to large cities and are facing the emergence of social issues due to rapid population growth, the formation of “regional cooperative urban networks” will begin in the future, in which neighboring cities cooperate in policy coordination to develop and operate infrastructure.



Source: Compiled by Hitachi Research Institute from various materials

Figure 2 Support from Countries Outside the Region for ASEAN Smart City Network Cities

As an example, the Duong River Surface Water Treatment Plant in Hanoi has been in operation to supply water to a total of 3 million people, including the city and parts of neighboring Bac Ninh and Hung Yen provinces. This is a good example of how to solve urban challenges through regional cooperation. Here, it is unnecessary for neighboring local governments to construct individual water purification plants, and residents can improve their QoL by stopping the use of groundwater, which may cause health problems. [2]

In the future, efforts to reduce investment and operating costs will expand, mainly in medium-sized cities, by utilizing economies of scale through regional cooperation on specific social infrastructure and services.

4. Future Outlook for Solving Urban Issues

At the 8th Asia Smart City Conference held in Yokohama in October 2019, the concept of CMaaS (City Management as a Service), which provides city management functions as a service using digital technology, was proposed.

And, the Global Smart Cities Alliance was established in October 2019 to address the privacy and security concerns arising from the collection of data on urban socioeconomic activities. Good examples of policy approaches are being collected with the aim of promoting the formulation of global basic principles and common guidelines regarding the use of digital technologies and data in cities.

Hitachi Research Institute will continue to analyze urban issues and study solutions to urban issues through digital technologies and urban networks.

[2] Aquaone <https://aquaone.vn/en/2019/05/08/surface-water-plant-of-duong-river-area-plant/>