

Diversity of Transportation Studies in Asia

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Asia carries more than half of the world's population and no other region in the world exceeds Asia in terms of urban population. From the second half of the 20th century, Asian economies like that of Japan, and the other countries that followed it, have risen to great heights. Now, the economic growth in Asia is the most remarkable in the world. China and India, the two most populous countries worldwide, have been growing as new engines to drive the world economy. Since the rate of urbanization in the region is still low (less than 40%), the region will be likely grow, in line with two interdependent processes: the increasing rates of urbanization and the increasing levels of per capita income. As a result, galloping motorization trends have been observed all over the region (e.g., Senbil *et al.*, 2007). Urban development has also been remarkable and has brought increased prosperity to the region. However, at the same time, these have also given rise to various issues such as overpopulated cities, serious traffic congestion, air pollution, threats of energy crisis, and slums. Although these problems are common to urban conurbations around the world, considering that Asia has specific climate and unique cultures, it seems that different ways from those used by Western cultures may be needed to resolve the above issues.

This journal issue includes nine papers dealing with different aspects in transportation development in the Asian region. Topics cover freight (intra-city, inter-island, and international freight), inter-port competition and queuing management at ports, passenger trips, mobility policies in local cities, BOT (Build, operate, and transfer), and sustainability strategies. Methods adopted include system optimization, equilibrium theory, bi-level programming, game theory, econometric modeling, artificial neural network approach, indicator theory, and capability approach. The details of these are summarized below.

Castro and Delos Reyes proposed measures to effectively reduce the traffic and environmental impacts of restrictions on large freight vehicle in Metro Manila, from both a regional scale and an area-specific scale, where three types of pollutant emissions were estimated: CO, NO_x, and SPM. Their analyses of various scenarios showed that the existing restriction policy is not very effective from a regional point of view. Abolishing the truck ban on ten major arterial roads is suggested as a measure to mitigate the traffic and reduce the environmental impact, from both the regional and area-specific scales.

To explore an optimal inter-island freight transportation network in Indonesia from both demand and supply perspectives, Sjafruddin *et al.* developed a multi-modal multi-commodity freight transportation model by integrating a generalized transport cost model that incorporates the influence of capacity constraints and congestion phenomena. Simulation analysis results from several tested scenarios showed that the potential system improvement by railway development is much higher than by road development, and reorganization of ports into a hub-spoke arrangement could increase the efficiency of freight transfer at ports and reduce the number of inefficient direct links between inter-island ports.

The lack of transport-related statistical data in many Asian countries has been troubling

policy makers for many years. To show how important such statistical data is in the context of the international cargo flow, Shibasaki *et al.* examined how the availability of data influences the accuracy of an international cargo simulation model the researchers developed. It was found that detailed zoning seems to be more useful than simply using more realistic data in enhancing the model accuracy, especially for worldwide international cargo flow. However, the impacts of using more realistic data on estimating the land cargo flow crossing national borders are significant.

Focusing on container port systems in Japan, China, and Korea, Le and Ieda conducted a comparative analysis of the evolution dynamics of port concentration from the year 1975 to 2005. They proposed a Geo-Economic Concentration Index (GECI), based on the Herfindahl-Hirschman Index (HHI), which incorporates the competitive interaction among ports and the geographic and economic characteristics of countries making this index comparable among port systems in different countries. Using this new index, port governance structures and development policies were also analyzed and discussed.

To support the effective use of bulk carrier berths, Laih and Sun developed pricing schemes as a practical way to manage the arrivals of bulk carriers queuing at a port and also to establish a framework for predicting bulk carrier owners' decisions regarding changes to arrival time from the non-tolled case to the tolled case. The researchers theoretically derived all arrival time values, equilibrium conditions, equilibrium queuing costs at the anchorage, and the equilibrium derivative costs due to queuing under their optimal step toll scheme. A case study using the statistical data of Keelung port in Taiwan was conducted to demonstrate and explain the proposed methods.

Aiming to support transportation policy decisions in small-sized local cities in Japan, which are confronted with both depopulation and aging trends, Eitoku and Mizokami proposed a new quality of mobility (QOM) index, based on the capability approach, which has the core concepts of "functionings" (i.e., beings and doings) and capabilities. The structural equation model with latent variables was used to capture the complex cause-effect relationships existing in the measurement of the QOM index as well as transportation policy variables. Furthermore, the Atkinson index was used to measure the inequality of mobility across the population. It was concluded that policies of persuading the people to live in the city center and the improvement of main roads should be implemented.

Based on an integrated transportation-land development framework, Ong *et al.* examined various options to promote sustainability in several regions (Altanta, California, Portland, and Arlington) of the United States and summarized the lessons learned. They then discussed efforts to integrate transportation and urban development in Asian countries, including China, Singapore, Thailand, Korea and Japan. They concluded that the primary obstacle to the implementation of sustainable policies stems from inadequate legislative provisions and jurisdictional structures at the regional and local levels. The conditions required for successful integration of transportation and urban development plans were also discussed.

As described above, this journal issue has put together a diverse set of transportation studies covering various transportation modes in Asia. These studies have provided a set of promising methodologies and policies to effectively tackle Asia-specific transportation issues. The authors have also raised various unresolved issues related to data availability, suitability of models constructed in developed countries to be applied in the context of developing countries, comprehensive policy evaluation, the implementation of policies and plans (e.g., economic and financial feasibility study, legislative provisions and jurisdictional structures) and the ability of policy makers.

REFERENCES

- Senbil, M., Zhang, J., Fujiwara, A. (2007) Motorization in Asia: 14 countries and three metropolitan Areas. *IATSS (International Association of Traffic and Safety Sciences) Research*, 31 (1), 46-58.