Environmentally Sustainable Development and Transport in Asia

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The history of Asia seems to be marked with the unprecedented rapid development in the second half of the 20\textsuperscript{th} century. Billions of Asian people could be eyewitnesses of the economic growth in their countries, in particular with the high rate of urbanization and rapid motorization. While they could enjoy with the increasing living standard, the concerns on unwanted issues related to negative side of economic development are rising more and more. Since pollution is one big among these issues, environmentally sustainable development has become an imperative requirement of the whole world.

Transport plays undoubtedly an important role in the economic development but this sector could impact improperly to the environment, for example, CO\textsubscript{2}-transport emission, a well-known major pollution source, grows currently faster than GDP\textsuperscript{1}. In the Joint Statement of the 6th APEC Transportation Ministerial Meeting in Manila, Philippines, 27-29 April 2009, the ministers recognized this “major global challenge to the environment and the need for transportation to make its contribution to the global response to this challenge”\textsuperscript{2}. So, Environmentally Sustainable Transport (EST) is now the target of numerous efforts. Among the essential measures, the development of public transport is undoubtedly most well-liked.

This journal issue includes eight papers dealing with different aspects in transportation development in the Asian region, at different countries and different cities/areas, but all are tried to contribute to the environmental sustainability. Topics of first five papers cover mainly with public transport, the rest ones refer to special issues of urban transport. The major feature consists in the shift/change: the change of local urban operator by the participation of international firms, the mode-changing behavior from cheap, uncomfortable service to expensive but comfortable one; the shift from personal vehicles to bus, the travel behavior change under downpour disaster or the actions of citizens to shift the drivers from their residential roads etc. Methods adopted include comparative analysis through extensive literature research and interviewing, utility theory, choice logit model, the two-factor theory of job satisfaction, survival duration analysis, mobility management approach etc. The details of these are summarized below.

Historically, public transport is mainly operated by local firms. To understand the participation of international ones in local public transport, Shibayama and Ieda dealt with the concept of “Multinational Operators for Local Transport Services” (MOLTS) and analyzed the status quo in the world and in Europe. Through activities of eight current significant MOLTS, four possible motivations of their expansion in the global market could be pointed out, especially the business model as “Low-Risk Low-Profit Business with Authorities”. The authors analyzed the status quo and the expansion background in Asia and showed that

\textsuperscript{1} http://www.unhabitat.org/downloads/docs/7802_3713_STRATEGIES%20FOR%20ENVIRONMENTALLY%20SUSTAINABLE%20TRANSPORT%20IN%20ASIA_CAI.pdf

\textsuperscript{2} http://www.apec.org/apec/ministerial_statements/sectoral_ministerial/transportation/2009transport.html#f
“development” of new urban railway would be a possibility for application of MOLTS there.

Park et al. tried to discover the relationship between job satisfaction and the service quality of bus drivers through a comprehensive survey in Gyeonggi Province of Korea with a questionnaire of 32 questions that relate to the demographic information and levels of job satisfaction as well as the self-rating for customer service. The authors identified the key factors that would result in better public transport service by analyzing firstly the impact of two features (personal characteristics, satisfier and dissatisfier) on job satisfaction of bus drivers and secondly the impact of two other features (personal characteristics, job satisfaction of drivers) on service quality to passengers.

Although various negative features, jeepney is still one of most popular public transport modes in the Metro Manila. The Fx megataxi Express Service has been introduced with the hope to provide better alternative for the commuters. Fillone studied the features that could impact on the choice of the urban travelers regarding this Express Service among other transport mode alternatives including jeepney, by using multinomial logit, two-level and three-level nested logit models. It showed that these features would be the point of origin and destination as well as points of transfer.

To support establishing a strategic planning for introducing a proper bus service in the city of Phnom Penh, which is suffering from the traffic congestion by motorcycles, Choocharukul and Ung analyzed commuters’ behavior with the data obtained from a stated preference survey. Five attributes of bus service were chosen, such as bus fare, bus headway, walking time, and bus comfort. Statistical models were developed to analyze passengers’ trade-offs between attributes and identify factors influencing mode change. From the analysis, non-motorized users are found to be potential users for bus service. In terms of bus service attributes, bus fare, and comfort are found to be the most important and significant aspects for passengers in Phnom Penh.

Prediction of the probable shift of the personal vehicle users to bus due to increase in its level of service such as provision of exclusive bus lanes on Indian city roads was performed by Thamizh Arasan and Vedagiri. Mode-choice logit models and mode-choice probability curves to explain the shift behavior of the users of motorized two-wheeler, auto-rickshaw and car to bus were developed using the data of the identified variables to explain modal choice behavior. The developed models were proved to be statistically valid indicating the relatively high significance of the variable in explaining the modal shifts. It was inferred that at traffic flow condition pertaining to level of service C, the probabilities of shift from motorized two-wheeler, car and auto-rickshaw to bus were significant.

Focusing on the household behavior of vehicle holding duration and annual traveling distance, Kuwano et al. proposed a Copula-based Multivariate Survival (CMS) model to capture the interdependence between these two behaviors. An empirical analysis was carried out based on the web-survey data obtained in the Chugoku region of Japan in 2006. Among various copulas, the Clayton copula was found to be the most suitable marginal function to describe both holding duration and annual travelling distance. The relevant CMS estimated that vehicle holding duration and vehicle use were significantly correlated with each other and ignoring interdependency between holding duration and annual travelling distance could lead to seriously biased estimates of household annual travelling distance.

The change of travel behavior was considered by Fujita et al. in other aspect: under downpour disaster. The paper aimed to clarify the characteristics of the return-home behavior of citizens during the downpour disaster at Tokai, Japan, in September 2000. The disaster affected dramatically on the normal transportation: many problems were observed because the people confused and could not know how to return home. Analyzing collected survey information by statistical calculations and by a chi-square test together with a structural
equation modeling, the authors clarified the individual behavior of public transport users during disaster and their awareness of prevention for another downpour disaster in future.

Defining “Rat-runner MM (Mobility Management)” as a “soft” measure to prevent from driving through residential street to avoid traffic congestion on the main roads, Kojima and Kubota analyzed its effectiveness by an experiment. In the experiment, questionnaire survey to the rat-runners was conducted to make the rat-runners aware that through traffic causes nuisances to neighborhoods. After the experiment, traffic volume on the residential street was found to decrease by about 10%. The authors also concluded that the Rat-runner MM did not face any resistance unlike other hard measures: speed humps and chokers from a resident attitude survey.

As described above, this journal issue has put together a diverse set of transport studies covering various shift/change in urban travel behaviors of road users in Asia. These studies have provided a set of promising methodologies and policies to effectively ensure the environmental sustainability in solving Asia-specific transport development issues. The authors have also raised various unresolved issues related to data availability, the relationship between the public and industrial investors with the expansion of urban transport service abroad, hidden dynamics regarding car-sharing behavior of households, further feasibility studies for the proposed measures, etc.