

## SUMMARY

### Travel Behavior Analysis Focusing on Private Vehicle Usage and Switch to Public Transport in Ho Chi Minh City

ホーチミン市における自家用車の利用と公共交通への転換に着目した交通行動分析

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A public transport system is a low carbon transport option that is vital for sustainable urban development. However, introducing this type of system in developing cities may be a challenge given residents' common practice of using private vehicles, especially motorcycles. Take Ho Chi Minh City as an example, the usage preference of private vehicle users for their own vehicles, the current bus system, and the future public transport system were investigated. This research aims to develop analyses based on using practical data on vehicle usage and applying feasible methods and/or improving them for understanding the situation and for finding solutions for boosting sustainable travel behaviors in the city. Methodologies of demand modeling, discrete choice models were used to explore individual behaviors on the private vehicle usage and switch to public transport. The advantage of revealed preference data, stated preference data, and experiment design were taken in specific analyses.

The preference of private vehicle users on their own vehicle is analyzed using a revealed data. A joint discrete-continuous model based on the copula approach is used to overcome selectivity bias in the data and to address the relationship between vehicle type choice (a discrete outcome) and usage (a continuous outcome) by specifying a joint distribution. The analysis found significant roles of socio-economic attributes on the individual choice, a trend of modal shift from motorcycles to cars, and CO<sub>2</sub> emissions from this trend.

The motivations so that the private vehicle users switch to public transport was analyzed using a revealed-stated preference data. The analyses followed a two-stage approach consisting of a multiple-indicator–multiple-cause model for capturing psychological determinants and a bivariate ordered probit model for explaining the decisions of each

user group on usage frequencies of the current buses and the new public transport system. The new public transport usage was found to be correlated with bus usage. The significant roles were explored in factors of access/egress time, fare/cost, congestion/comfort, social interaction, agreement to the public transport projects, dissatisfaction with public transport, distance from home to workplace, motorcycle ownership, occupation, and age. In addition, by adding a component of latent class assignment, the heterogeneity among motorcycle users was detected in choice models in the latent classes. The “collectivistic” and “individualistic” tendencies in the two latent classes were found to make the individuals behave in different ways.

Lastly, by adding a dimension of in-vehicle occupancy into the traditional social interaction that reflects individual’s behavior and other people’s behavior, an equilibrium calculation on both positive and negative mass effects was able to conduct based on loop procedures. The results give envision on travel demand for commuting trips by public transport in the future situation.