ABSTRACT

Nowadays, shopping travels increasingly contributes a large proportion to urban travels, particularly on peak periods, and provide more congestion and some kinds of environmental problems in urban areas such as center business districts of cities. In view of transportation planning, it is important to recognize and analyze the shopping travel demand accurately in order to match transportation supply or infrastructure efficiently. Regarding travel demand analysis based on the activity-based approach, the behavior of shopping travels have multi-dimension attributes such as time of day, travel pattern, travel destination, and travel mode choices, etc. Concerning one-day shopping activity-travel, individuals may face capability and authority constraints to be considered in deciding the travel attributes. Furthermore, particularly in Islamic society or community, most individuals choose their travel attributes not only consider the lunch time or the dinner time constraints, but also a specific flexible daily temporal constraint (FDTC) for the daily obligations in noon until evening, namely praying time-activity. The last constraint may affect departure time decisions and to the others travel attributes simultaneously. As consequently, the constraint causes accumulative impact such evening congestion becomes much severe, and affection to the destination/shopping place choice, etc. In this regard, the recognizing and consideration the effect of the temporal constraint on the travel demand is an essential task of the transportation planning process for determining strategies for overcome the urban transportation problem in the society.

Regarding the above problem, this dissertation has proposed multi-dimensional decision models for one-day shopping travel in consideration of the flexible daily temporal constraint, the praying time-activity constraint, where lunch time-activity as reference. The multi dimensional-choice models includes choice model of leave time from shopping place, home departure time choice model, a simultaneous choice model of the departure time and trip pattern, and a choice model of the departure time and travel mode simultaneously.
Those models are derived from three processes on one-day shopping travel, i.e. the processes of leave home, stay at shopping place, and return home. The processes lead to four disutility types, disutility of earliness home departure time, disutility of shortage and disutility of length of stay at shopping place, and disutility of lateness home arrival time. Additionally, in regard to consider the distinguishing implication of each travel mode utilization, disutility of parking charge for private travel mode and disutility of inconvenience due to uncertainty of travel time for public transit mode are accommodated. Particularly, the models also accommodate the effect of the flexible daily temporal constraint. Further, the construction of the models adopted disutility minimizing model (DMM) approach. The approach assumes that only time attributes of travelers due to the operational features of transit system affected traveler’s choice or decision, and travelers attempt to minimize the sum of all disutility types that may be faced in order to choose their travel decision attributes.

The proposed models were applied to one-day shopping travelers in Makassar, Indonesia, the country in Asian developing countries where majority of its citizen have to conduct the praying time constraint. In addition, the study provides a comparison for departure time choice model in case lunch time as main temporal constraint of travelers in developed countries, particularly in Fukuoka, Japan.

According to the calculation results using higher order multiple integrations method which have to be made repeatedly, we can reveal that the models and estimated parameters provided acceptable reproducibility of leave time, departure time, travel pattern and travel mode choices at the same time or simultaneously. The flexible daily temporal constraint could be observed in the all above choice models.

Briefly, the models with estimated parameters can be tested further by applying to others situations, and we can expect that the model can be applied in forecasting travel demand such as leave or departure time, and travel pattern or mode on one-day shopping travel, and developed for more comprehensive model in the future studies.