

論文の内容の要旨

論文題目

Exploring Household Structure Effect on Elderly Travel Needs under Variations
in Mobility and Accessibility

A Case Study of the Seoul Metropolitan Area, South Korea

(世帯構成およびモビリティとアクセシビリティが高齢者の交通需要に及ぼす影響 — 韓国ソウル都市圏を対象として —)

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(本文)

Population aging has recently come to the fore as a prevalent social issue all over the world. The case of Korean Society is not an exception in the world-wide phenomenon. However, there are two distinct differences in Korea as compared with other countries. The first distinct difference is the intensity of aging as a result of a very low fertility rate (1.24 for Korea in 2010, 1.87 for France, 2.07 for U.S. 1.37 for Japan). According to the official population projections, the elderly population will reach 14% (aged society) of the national population in 2018, only 18 years after it first exceeded 7% (aging society) in 2000. It took France 115 years and the U.S. 73 years to go from an ageing society to an aged society; it took Japan 26 years for this change. Second, Korea has a traditional custom of adult children living with and supporting their old parents. As a result, despite of rapid population aging, the associated problems have not been frequently observed and consequently, the issue of aging has not received enough attention from the Korean society. However, recently, the trend of living with their old parents has been rapidly decreasing due to a low fertility rate, rapid industrialization, and the influence of western culture. According to "Social Survey, 2008", 55% of household heads in 1998 were living with their parents when one of their parents was still alive and about 40% in 2008. From these changes, it is clear that single and couple

elderly people will proliferate who cannot receive support from their adult children. In this context, this thesis aims to understand the effects of household structure changes on elderly travel needs under variations in mobility and accessibility. In addition, this study focused on non-work activities rather than work-related activities because non-work activities account for the majority of elderly activities. To achieve the research goal, three main works were conducted as follows.

First, majority of previous findings reviewed in the literature review part were not from Korea due to few amounts of published studies on this field in Korea. In addition, it is expected that more Korean elderly people will live in single or couple households without their adult children. As such, this step first divided households into single, couple, and multi-generational households in order to look at the differences in elderly travel behavior by household structure based on the previous findings in the literature. As data source, two time period data, 2002 and 2006 travel survey data were chosen to look at the effects of household structure changes. Based on the previous findings from other countries, elderly travel behavior was analyzed and compared by household type, year, and age group using cross-tabulations and trip-based going-out models (binary logit). Although the time difference between two datasets is only 4 years which can be considered quite small, there were very clear differences in number of trips, meaning very rapid changes. Compared to the previous findings in the literature, most of them corresponded to those of this step in the context of Korea; however several differences were also found.

Second, it is generally agreed across accessibility-related studies that "greater accessibility leads to more travel". However, interestingly, some studies showed inconsistent findings with the common hypothesis. In addition, the previous step did not take into consideration the effects of other household members on elderly travel behavior. Therefore, this step focused on the intra-household interaction and the impact of accessibility on tour frequencies. First of all, utility-based accessibility measures were developed using 2006 household survey data and transportation network and O/D data from KTDC. The descriptive analysis section showed that accessibility is negatively related to maintenance tour frequency while it is positively related to discretionary tour frequency. To confirm this uncommon relationship, tour engagement models were developed using ordered probit model. This model also showed the same uncommon pattern.

Third, the final step started with the findings and limitations of the previous steps which were mainly caused by the existing dataset, thus an original

survey was conducted based on the limitations of the existing dataset and also 5 hypotheses. The hypotheses were tested through two types of approaches: descriptive analysis and structural equation modeling. The descriptive analysis part examined the variations in the frequencies, accompanying behavior, and enjoyment level of elderly grocery shopping among elderly segments, mainly using basic cross-tabulations. The analysis showed many differences among elderly segments and many variables are strongly interrelated. In other words, elderly grocery shopping behavior is very complicated and many factors cannot be meaningfully be interpreted separately. Therefore, a structural equation modeling technique was adopted to statistically test the hypotheses because this technique has strengths in accommodating complex causal relationships among variables. First of all, using the entire sample, a full structural equation model was estimated to test the hypotheses. Although the model showed a quite good level of goodness-of-fit statistics and confirmed many hypotheses of this study, this model ignored the possibility that there might be two or more subpopulations in the dataset. In this sense, the entire sample was classified into 8 segment groups by 4 segment variables. 4 comparison groups were considered and all segment groups were specified in the same way for consistent comparison purpose. Through comparing the estimations results, several differences among segments were found which were not found in the baseline model.

Through those steps above, this study identified a number of general findings and also provided several interesting original findings. Key findings were presented below with the implications for both policy makers and practitioners.

First, it was found that accessibility do not always lead to more tours despite the easiness of reaching destinations due to lack of vertical movement consideration in accessibility measures, the impacts of intra-household interactions and different travel needs by activity type. This finding will contribute to better evaluating transportation planning projects or policies and more accurate travel-demand forecasting. Second, household structure change in Korea will increasingly force the elderly to travel for unpleasing activities rather than for pleasure. Three policy solutions for this expectation were suggested: proper policy establishment to encourage adult children to live near to their old parents, regulations for opening new discount stores near to small grocery stores, and more investment to make senior centers into more pleasant entertainment places. Third, there is clear trade-offs among shopping places due to the nature of relatively fixed grocery amount by household and this study explicitly explained the mechanism which has important implications, especially for transportation planners (e.g. more accurate travel-

demand forecasting). Fourth, grocery shopping is a pleasing leisure activity to particular elderly segments to improve their quality of life better than neighborhood leisure activities which account for the majority of Korean elderly leisure activity time. This finding urges policy makers to give more careful attention to elderly grocery shopping behavior, especially for the elderly who are less mobile or live without their adult children.