Characterizing and Modeling Combined Use of Folding Bicycle and Metro in Nanjing, China

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Abstract

China used to be a kingdom of bicycle. But the market share of bicycle in urban passenger transportation is decreasing rapidly in past two decades, causing some serious sustainable problems in the field of urban transportation. Since 2005, the central government and many local municipal governments have realized the unsustainability of motorized transportation, and reconsidered the role of bicycle in sustainable urban transportation. On the other hand, with rapid urbanization and city expansion, urban metro systems have been built and are being built in many large cities in China. Integration of old-fashioned bicycle and new metro system seems to become a viable part of the search for more sustainable transport solutions. Folding bicycles are more and more popular among bicyclists because they may use along the metro journeys. Many US and European cities made initiatives to promote the combined use of folding bicycle and metro in a trip, in order to further encourage this environmentally friendly mode of transportation. While bring folding bicycle into the metro is prohibited in many Chinese cities including Beijing, Tianjin, Dalian and Shanghai, Nanjing became one of few that set the policy allowing this behavior. The purpose of this paper is to study this combined use of folding bicycle and metro in Nanjing by characterizing such behavior of local residents and modeling the frequency of such behavior.

The questionnaire survey on regular metro riders and folding bicycle users was conducted in 2010. There are 333 valid responses, of which 78 are from folding bicycle users. Based on the survey datasets, three questions are answered in this study. First, what are characteristics of folding bicycle users and their combined trips? And what are general perceptions of folding bicycle use among all metro users. Second, what are the impacts of urban built environment at station level on the frequency of combined use of folding bicycle and metro? To answer this question, a multinomial logit model is estimated with frequency of use as dependent variable and station-level land use variables as independent variables of interest. Results of the model will show that how the initiative of allowing folding bicycle into metro works in the areas around different stations. Third, the time-savings, cost-savings and carbon reduction of the folding bicycle + metro trips at city level are to be estimated in the future scenarios. The modeling results will provide us with ideas of to what extent such folding bicycle initiative will benefit the environment in terms of saving costs and reducing carbon emissions, when the metro network is completed by 2030.

Key Words: Folding bicycle, metro, built environment

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