

MASTER'S THESIS

Impacts of e-shopping on urban transportation: an integrated network equilibrium model of shopping and travel choices

Li, Jiukun

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**Impacts of e-shopping on Urban Transportation: An Integrated Network
Equilibrium Model of Shopping and Travel Choices**

LI Jiukun

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Principal Supervisor: Dr. WANG Donggen

Hong Kong Baptist University

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Abstract

The fact that ICT-based shopping allows people to shop through Internet and travel becomes unnecessary has prompted speculations on the possible impacts of e-shopping (or Internet shopping) on urban transportation. As one of the attempts to examine this impact, this study adopts a deductive approach and develops a theoretical model to simulate the interactions between shopping choice and travel choice. This model integrates network equilibrium model with shopping and travel choices on a congested transport network. The concept of perceived utility was applied to define the attractiveness of shopping mode and shopping destination. The nested logit model was applied to model the choice of shopping mode and the choice of shopping destination (or service provider in the case of e-shopping). The multinomial logit model was used to model route choice. A solution algorithm, implemented in MATLAB, was applied to solve the network equilibrium model. The model and its solution algorithm were applied to a numerical example. Policy simulations were conducted to assess the impacts of e-shopping on transportation and the effects of various factors on the choice of e-shopping. The results clearly demonstrate that the theoretical model developed in this study was able to simulate various policies regarding transportation and e-shopping. The simulation results were logic, reasonable and interesting. Although the simulation results were applicable only to the specific numerical example, it nevertheless verifies the applicability of the model. The flexibility of the model is demonstrated by the possibilities of calibrating the model in different ways and thus different situations can

be mimicked. In conclusion, the theoretical model developed in this study is useful and flexible. The present study provides an example that the deductive approach is feasible for the study of impacts of ICT on transportation.

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