

学位論文の要旨 (論文の内容の要旨)
Summary of the Dissertation (Summary of Dissertation Contents)

論 文 題 目

Dissertation title:

Neighborhood Planning based on Self-Containment: A Perspective of Travel Behavior with Social Network

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Background and motivations

Rapid urbanization can have positive effects on the economy, but has also brought a number of negative effects, such as congestion, housing shortages, high urban population density, and growth in energy consumption. The development of new neighborhoods and new towns in many countries has been considered an effective way to relieve a lack of housing and high density in urban areas. While these new neighborhoods were constructed in many developed countries about fifty years ago, the development of new neighborhoods and new urban areas has just emerged in the last decade in developing countries. In recent years, many new towns in developed countries have run into numerous problems. In addition, aging population is a current issue in developed countries, while the aging population and aging rate are predicted to become serious issues in developing countries in the next coming years.

As an aspect of sustainable neighborhood planning, the concept of self-containment has been embodied in a variety of neighborhoods. It has beneficial for neighborhood development and management in developed cities, where it was conventionally interpreted as a balance between job locations and housing. However, in the developing countries of Asia, which are following their own paths of rapid urbanization and motorization, this concept of self-containment may not be appropriate, and thus may need to be adapted or expanded to reflect their particular contexts. Besides, social goals have been the keystone of neighborhood design, and hence the social engagements or social capital of residents should be addressed in travel choice behavior models.

Research purposes

The purpose of this study is to shed light on people's travel choices for the sustainable development of new urban areas by expanding the concept of self-containment in a neighborhood and examining it empirically.

Data

Data was collected at two sites: an aging new town in Japan and several recently developed new towns in Vietnam. Data using a panel survey was collected in an aging new town in Japan in 2010 and 2011. During the two-week survey period at each wave, respondents were asked to fill out a paper-based travel diary and to record each trip trajectory using a GPS logging device. Around 50 households participated in each wave, with 38 households common to both waves. To study a neighborhood society before population aging, a separate set of data was collected through a cross-sectional survey conducted in three new urban areas in Hanoi Metropolitan Area (Vietnam) in 2015, with a total of 462 individuals with 4,649 trips reported in travel diaries for two days

(one weekday and one weekend day).

Contents of chapters and major findings

Chapter 1 includes the background, research motivation, research objectives and questions, and outline of the thesis.

Chapter 2 broadly reviews the literature on neighborhood planning, with a focus on the concept of self-containment. Generally speaking, a majority of urban planners have approached neighborhood design through physical design and attempted to build a sense of community via specific design elements. The idea of creating a sense of community is difficult to support if it is placed as an end state rather than as a fluid process, and the process is primarily nurtured through the promotion of social solidarity and resident bonding, whereby existing problems are handled collectively. The conventional concept of self-containment was associated with job-housing balance embodied in neighborhood planning. However, with rapid motorization and the evolution of complex social networks and modern lifestyles, residents could not entirely conduct their activities inside the limited boundaries of neighborhoods and town. As a result, the concept of self-containment in a conventional sense would not be appropriate as a framework for analyzing new neighborhoods.

Chapter 3 describes the study locations and surveys used in this study.

Chapters 4 and 5 then consider travel behavior from the perspective of travel mode choice. Chapter 4 focuses on a travel mode choice model developed based on a panel mixed logit model by using the panel survey conducted in Japan. The results show that (1) altitude difference and maximum slope factors, among four topographical factors under the study, have significant impacts on elderly people's mode choice decisions; (2) owning non-motorized vehicles would further enhance the self-containment of the neighborhood; and (3) elderly-oriented personal mobility vehicles can be useful in mitigating the negative effects of topographical factors.

Chapter 5 focuses on travel mode choice in the three areas in Vietnam and develops a path model with multiple discrete choices. In the path model, a mediation model is proposed, in which the mediation effects of income on travel mode choice are captured via residential location choice being modelled as a discrete mediator which generates non-linear indirect effects of income on mode choice. The result shows that (1) income has both direct effects and indirect effects on travel mode choice behavior via a mediator: i.e., residential location choice behavior; (2) income has a non-linear indirect effect; (3) the relationship between motorcycle usage and income is quadratic with a minimum of motorcycle share at a certain income level.

Chapters 6 and 7 look at travel behavior from the perspective of destination choice. Chapter 6 explores the self-containment status of a new town for discretionary activities (shopping, volunteer, recreation and so on), by using the panel survey data collected in Japan. For this purpose, a panel mixed logit model of destination choice with a focus on the impacts of social networks is developed. The results show that (1) the status of social network significantly influences destination choice sets, and hence is an influential factor of the self-containment status of the new town; (2) the more friends the respondents have in the neighborhood, the more subjective well-being they would obtain.

Chapter 7 examines the impacts of social capital measured in two dimensions, social network and participating in local community activities, on travel choice for discretionary activities. For this purpose, using data collected in Vietnam, a logit model for destination choice and an ordered probit model for trip generation were developed. The results show that (1) social engagement at an individual level has more impact on travel choice compared with one at the community level; (2) having a more self-contained neighborhood enhances subjective well-being, and thus improves the quality of life for residents living there.

Chapter 8 focuses on the endogenous effect of social network on destination choice in the neighbourhood. For this purpose, a logit model for destination choice was developed with a consideration of acquaintance network inside the neighborhood. As an initial example, the model is estimated using data collected in Vietnam. The results show that (1) the endogenous effect of the social network is statistically significant with positive sign; (2) without controlling the group fixed-effects, the social interaction effects on destination choice are over-estimated.

Chapter 9 summarizes the main findings, limitations of this research as well as some suggestions for future studies.

Major contributions

This is one of the first attempts in the literature to expand the concept of self-containment in theory and examine it empirically using travel choice behaviors, taking into account different types of neighborhood societies in a consistent and comprehensive way. Major contributions are summarized as follows.

- Academic contributions: The concept of self-containment in neighborhood planning is expanded in theory both for developed and developing societies. In particular, this study could successfully:
 - Establish a theoretical approach of self-containment which can be used in quantitative analysis for neighborhood planning;
 - Propose a framework to understand the mechanism of self-containment for neighborhood planning.
- Practical Contributions:
 - While neighborhood planning has been solved mainly based on neighborhood attributes, the previous studies did not handle income increase directly. Income is an important factor in developing cities, and also can be mediated by neighborhood attributes.
 - This study found the development of social capital in neighborhoods helps to increase the level of self-containment and thereby improves the quality of life for residents.
 - Endogenous effect is a non-negligible factor to make neighborhood more sustainable with a long-term aspect, to dispel the planning fallacy.
 - The concept of self-containment with a consideration of social interaction could be a key concept to design and plan the neighborhood in both developed and developing countries.
- Contributions to policy implications:
 - Self-containment contributes to the improvement of the quality of life. Therefore, policy-makers should pay more attention to the mismatch between social networks and activity locations, especially for those who have higher mobility constraints.
 - Policy-makers can enhance social multiplier effects for residents living in neighborhoods by understanding the level of self-containment existing in each neighborhood.
 - Local resources can be utilized to maintain or revitalize the neighborhood since residents tend to invest economically and socially in their neighborhood.
 - For the neighborhood in aging society, one of the important factors is topography, pointing to the need to pay more attention to providing appropriate and user-friendly modes for the residents. For the neighborhood before aging population, it is important to pay more attention to the built environment of the neighborhood in order to have a self-contained neighborhood.

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