One of specific characteristics of Hanoi city is the motorcycles. This private mode is the preferred choice of the citizens including all socio-segments and level of incomes. The main reasons may come from their convenient and high flexibility in usage: they could provide a higher mobility in relative short distances and frequent trips and motorcycles often travel faster than automobiles. However, the rapid increasing of motorcycle ownership and usage has been leading to various transportation problems mainly related to traffic jam, traffic accident as well as air pollution. Thus, a matter of great urgency is how to use motorcycle in a way that maximizes its merits and overcome its demerits. In other words, we have to consider how to satisfy people’s travel need by providing convenient transport modes while at the same time ensuring convenient, traffic safety, clean environment, and other social demands.

To deal with the complicated duplicity of motorcycle usage issues as presented above, the adequate understanding of travel behavior pattern is certainly needed. However, we still have many behavioral phenomena which have not adequately addressed yet. Thus, I try to deepen our knowledge on the motorcycle users’ travel behavior by discovering the pre-conditions of their decision making or also known as context dependencies. Base on their most specific characteristics, I categorized all attributes factors into 3 different contexts including household context, spatial context and temporal context.

This study applies a new approach which has opposite viewpoint from demand-side, called A-S-I approach (Avoid/Reduce, Shift/Maintain and Improve). The approach tries to find the ways mainly: to avoid/reduce motorcycle’s travel demands, to shift from motorcycle to current bus system and to improve public modes by introducing new transit mode, the Light Rail Transit system (LRT). These achievements could reach a suitable motorcycle utilization, contribute significantly in greenhouse gas emission and energy consumption reductions, less congestion, with the final objective to create more livable city for Hanoi.

The dissertation consists of 8 chapters with the following contents. The overview of current situation, problem statement, research objective and scopes and outline of the dissertation are presented in Chapter I. Chapter II presents literature review which relevant to the fields of the study. First, the concept of context dependencies and the definition of three contexts which shall be used in the study are introduced. Second, the A-S-I approach is described with its original purposes as well as some suitable revising for Hanoi situation. Third, the review on modal shift studies that focus on shifting from motorized-private modes to non-motorized and public modes is provided. Then, in the conclusion of this chapter, the present research is positioned. Chapter III introduces the
characteristics of data sources, survey design and initial findings. There are total three data sources which collected in different times including the Hanoi Person Trip survey data in 2005, the one week household travel survey in 2010 and the Stated Preference (SP) survey data in 2005.

Applying the A-S-I approach, the main body of the dissertation which contains comprehensive analyses is divided into 3 parts: the Chapter IV and V represent for the Avoid/Reduce part, the Chapter VI represents for the Shift part and the Chapter VII represents for the Improve part.

The first Avoid/Reduce part is the combination of two chapters, IV and V, in which, chapter IV focuses on motorcycle usage and ownership in household context while chapter V focus on motorcycle usage in spatial context. The findings of two chapters may give us some ideas from demand side view point to avoid or reduce the need to travel by motorcycle. Thus, in chapter IV, with Hanoi Person Trip survey data, I first analyzed the mode choice behavior of pupils base on their daily school trips. By applying a multinomial logit model, I found a significant of elementary school’s pupils is motorcycle-dependent (they were picked up/dropped off by their parent of other family members) with the main reason that their school’s location are out of their residential neighborhood. I then examined the relation between motorcycle ownership and mobility level with taking into account the different in household composition (i.e., whether child existence or not) by using the one week household travel survey data. An endogenous switching model was developed to examine of child effects in the relation between motorcycle ownership and the number of trips. The results reveal that motorcycle may have a smaller effect on the number of trips and those who want to generate the higher number of trips may self select to own him/herself a motorcycle. In addition, those who have child are less affected by motorcycle ownership compared to those who don’t have child.

To continue the Avoid/Reduce part, the Chapter V analyzes motorcycle usage in spatial context by using the Hanoi Person Trip survey data with 3 parts. The first part focused on how residential land use patterns affect on modal choice behavior. Total 59,569 home-based non-work trips were selected for the analysis, the findings could bring a clearer view on the relationship between household location, travel purposes and motorcycle dependency levels. The second part tried to measure the land use impacts on motorcycle choice. Applying a multi-level binary logit model, I found that the land use impacts on non-mandatory trips (9.17%) is higher than that of commuting trips (4.92%) and Origin-Destination impacts (i.e., land use impacts of total spaces created by combining Origin and Destination zones which an motorcycle user travel in) are much larger than Residential neighborhood impacts (i.e., land use impacts of his household location’s surrounding). To explore the motorcycle trip frequency in different residential location spaces, in the third part, I analyzed total 44,107 trips made by motorcycle. I found that individuals with their household location in Central Business District (CBD) have higher tendency to use motorcycle.

The findings in both chapters IV and V revealed the motorcycle’s travel demand as well as factors related were almost belong to household and spatial contexts. Thus, to prevent the increasing motorcycle ownership as well as motorcycle usage, policy makers and urban planners should focus on how to avoid/reduce travel demand from people rather than to prevent motorcycle ownership.

Chapter VI is the second part of the dissertation’s body (as Shift in A-S-I approach) which explored modal shift behavior which could usually observe in temporal context (i.e., when and in which conditions motorcycle owners may shift to use bus and non-motorcycle owners may shift to use motorcycle for their travel). The data of one week household travel survey is used to developed two different multilevel binary logit models. Results shown that: 1) Non-motorcycle owners may use other’s motorcycle in some cases: for short distances (i.e., less than 5 km), for related to work or personal need purposes, in the evening time and accompany with their family member. 2) Motorcycle owners may shift to use buses in some cases: for long travel distances (i.e., more than 5 km), in the day time, travelling alone and in bad weather. The findings suggest for policy makers that: to encourage motorcycle owners shift to buses, those who have long commuting trip are the most potential; to
prevent the motorcycle usage propensity from non-motorcycle owners, neighborhood designing to satisfy personal need (i.e., shopping/leisure purposes) is very important as well as improving buses’ service density and operation in off-peak hours.

Chapter VII represented the last part (as Improve in A-S-I approach). This chapter attempted to capture the people’s travel mode choice in the future, which may also considered as Temporal context, by considering the changes in both travel and socio-economic environments, when the LRT system is introduced. An SP survey data set is applied to estimate a combined RP/SP model (Nested Logit Model). Based on the model estimation results, simple simulation analyses were conducted by setting up in different hypothetical scenarios on levels of income and services in the future. The findings suggest policy makers that the improving public modes’ level of service is the key strategy in modal shifting from private modes users. At the end of this chapter, further discussion on how to encourage people to use public modes is provided.

Chapter VIII is the conclusion of this study. Firstly a summary of all findings from previous parts and a general conclusion were provided: to achieve more livable environment for a motorcycle dependent city like Hanoi. The A-S-I approach which entails three main avenues was employed: to Avoid school trip by motorcycle and to Reduce travel demand of motorcycle users; to Shift from motorcycle to public modes, and to Improve public transportation system by building up new public mass transit system. Next, it was confirmed that the spatial context is the most involved context in applying A-S-I approach. Concretely speaking, the role of neighborhood design for avoiding travel demand and encouraging modal shift to more environmental friendly modes is very important. For more detail, then a brief discussion was described on motivators as well as barriers in applying A-S-I process. Finally, the priority policies and future researches are given.

備考 論文の要旨はA4判用紙を使用し、4,000字以内とする。ただし、英文の場合は1,500語以内とする。
Remark: The summary of the dissertation should be written on A4-size pages and should not exceed 4,000 Japanese characters. When written in English, it should not exceed 1,500 words.