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## The effects of rational and habitual factors on mode choice behaviors in a motorcycle-dependent region: Evidence from Taiwan

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### ABSTRACT

This paper aims to explore the effects of rational and habitual factors on mode choice behaviors in a motorcycle-dependent region. Both a discrete choice model and theory of planned behavior (TPB) are employed to examine mode choice behaviors. A sample was obtained from two major cities in Taiwan to examine the contextual effect of public transport development. The empirical results reveal that psychological (rational and habitual) factors have stronger influences on mode choice behaviors than socio-economic factors, and furthermore that habitual factors explain traveler mode choice behaviors better than rational ones. The contextual effect with regard to public transport development is found to be significant for motorcyclists' mode choice behaviors. The practical implications of the results of this study are discussed.

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### 1. Introduction

Rapid growth of travel activities due to significant economic growth has led to a huge demand for motorized vehicles in several developing Asian countries, such as, Taiwan, Malaysia, Thailand and Vietnam (Chang and Wu, 2008; Lai and Lu, 2007). Because of being relatively inexpensive, the number of motorcycles has risen more significantly than the number of automobiles, although both markets have experienced rapid growth in these countries. The high mixed traffic flow of motorcycles and cars on roads has caused worse congestion and increase in accidents. In addition, the emissions produced by such vehicles have caused a significant decline in the air quality.

To solve the problems derived from the rapid growth of motorized vehicles, many Asian and western countries alike mainly adopt the so-called 'push/pull' strategies. This means using price mechanisms and usage management as push strategies to reduce the usage demand of motorized vehicles on the one hand, and on the other hand improving the service quality of public transport as the pull strategy to attract more public transport users as well as to reduce the market share of motorized vehicles.

However, the effects of both strategies in motorcycle-dependent regions/countries such as Taiwan, Thailand and Vietnam are arguable. For example, a push strategy of increasing the costs of

using private vehicles might make car users switch to using motorcycles instead of public transport. In addition, restrictions on motorcycle ownership are quite likely to trigger political concerns, as motorcyclists, compared to car users, are more likely to be having lower incomes. In addition, investment in public transport is always costly and takes a long period to complete and start operations. Even though the improved service quality of public transport can go some way to reducing the use of motorized vehicles, long-standing habits are still difficult to change in the motorcycle-dependent areas (Chang and Wu, 2008; Lai and Lu, 2007). Thus, motorcycle usage in such areas has been still experiencing continuing growth, even despite the implementation of various 'push/pull' strategies.

The question of whether the 'push/pull' strategies can effectively reduce motorcycle usage can be answered by means of exploring travelers' mode choice behaviors. Factors affecting mode choice behaviors can be categorized into four types, including traveler's socio-economic characteristics, modal attributes, psychological factors and contextual factors (i.e. physical environment of public transport). Private vehicles are by and large private cars in Europe and America, as car use has flourished in these areas due to land use and planning regulations, governmental financing programs, private industry support and personal habits and preferences (Brown et al., 2003; Fujii and Kitamura, 2003; Gardner, 2009; Thøgersen and Møller, 2008). Therefore, car travel is the main focus of similar studies looking to reduce the use of private vehicles in the literature, and to the best of the authors' knowledge, no prior works have examined the effects of attempting to switch motorcycle use to public transport.

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