

## Chapter 9

# The Impact of Traffic Information Acquisition on the Traffic Conditions of the Athens Greater Area

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### ABSTRACT

*The main objective of this article is to gain fundamental understanding on the effect of real time information acquisition, on the traffic conditions of the Athens greater area. Activity scheduling is a dynamic process, where individuals often need to modify their schedule, as a result of new insights. Research so far hasn't analyzed the effect of traffic information acquisition, in activity scheduling, although several studies have been conducted to capture the factors that influence the rescheduling of activities. An integrated latent variable model has been estimated, that predicts the probability of rescheduling activities as a function of flexibility, mode choice constraints and travel information. The analysis of the results indicates that one of the biggest impacts of traffic information acquisition is reflected in the rescheduling of activities. Therefore, traffic information not only can significantly improve the travel experience of individuals but may directly affect the performance of the transportation system.*

### INTRODUCTION

After many years of Advanced Traveler Information Systems (ATIS) research, and many successful (and less successful) implementations, there is today a considerable amount of knowledge accumulated on the subject. The research community has generally acknowledged that traffic informa-

tion influence, more or less, travelers' choice behavior (Polydoropoulou, & Ben-Akiva, 1999; Hato, Taniguchi, Sugie, Kuwahara, & Morita, 1999; Tsirimpa, Polydoropoulou, & Antoniou, 2007; Casas, & Kwan 2007; Choocharukul, 2008; Zhang, Shen, & Clifton, 2008; Politis, Papaioannou, Basbas, & Dimitriadis, 2010). However, the majority of the studies that have been conducted

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so far limit themselves to specific trip related decisions (e.g. mode choice, route choice, etc.), and do not account for the overall decision making spectrum, such as individuals activity scheduling and rescheduling. The aim of this paper is to answer how ATIS acquisition influences the rescheduling of the daily activities of individuals and identify the impact of the “intention to change” travel related decisions on this process.

A case study was developed for the Athens Metropolitan Area, Greece in 2008 and 2009. Travel information sources available in Athens greater area encompass both conventional forms of information, such as radio and TV traffic reports, and advanced traveler information systems, such as variable message signs (VMS) (Sermpis, Babis, & Theofilis, 2006b), web traffic map (<http://www.transport.ntua.gr/map/el/index.php>) that has been designed and is continuously updated from the National Technical University of Athens (Stathopoulos, & Tsekeris, 2004) and in-car navigation systems. It should be also noted that this is one of the few studies concerning ATIS usage in Greece, mainly because the implementation of ATIS, as well as the provision of real time traffic information is only recent.

The remainder of this paper is organized as follows. Section two presents a brief review of the state-of-the-art of modeling ATIS impact on travelers' behaviour and activities rescheduling. Section three presents a behavioral framework and the modeling methodology used. Section four presents the data used for the model development. Section five presents the model estimation results, section six presents the model application, section seven presents policy implications and section eight presents the conclusions.

## **FINDINGS FROM THE LITERATURE**

Several models have been presented in the literature the past two decades that captures the effect of ATIS on travelers' decisions (route choice,

mode choice, departure time choice, destination choice) and the factors that influence these decisions. It appears that travel related characteristics, such as knowledge and familiarity of alternative routes (Hato et al., 1999; Bierlaire, & Thémans, 2005), delays experienced on the current route (Mahmassani, Huynh, Srinivasan, & Kraan, 2003; Han, Timmermans, Dellaert, & van Raaij, 2008) play an important role in travellers route switching behavior, while travelers' socioeconomic characteristics, are not always found significant (e.g. Mahmassani et al., 2003; Choocharukul, 2008). In the case that socioeconomic characteristics found to be significant, the most important are, gender (Jou, Lam, Liu, & Chen, 2005), age (Ettema, & van de Horst, 2005), education level (Kyoung-Sik, 2003) and income (Jou et al., 2005). Information characteristics are also important attributes in travelers switching behavior. Dia (2002) found that individuals' response (route choice) to information is influenced significantly by the information type and the way that the information was provided to the individuals, while Tsirimpa et al. (2007) found that the time of information acquisition (pre-trip vs. en-route), the source and the content of provided information significantly affect commuters' response to ATIS. Gao, Frejinger, & Ben-Akiva (2010) studied the effect of information provision through Variable Message Signs on route choice, while Ben-Elia and Shifatan (2010) found that both information and past experience have a significant effect on drivers' route-choice behavior. Moreover, Sermpis, Babis, and Theofilis (2006a), investigated whether an Advance Warning message informing the drivers about the location of an incident and possible delays would result in different driver behaviour compared to a Travel-time Information message in which the effect of an incident is reflected in the increased travel times. The findings of their comparison indicated that there is no statistical significant difference between these two types of messages or drivers behavior.

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