

SCHEDULING BEHAVIOR MODELS IN TOURISM RESEARCH: STATE-OF-THE-ART AND FUTURE RESEARCH DIRECTIONS*

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1. Introduction

Travel occurs when some of desires/wants inherent in human being are triggered by the goal(s) that could satisfy the relevant desires/wants, and barriers to travel (e.g., cost, time, health condition, and family stage) are cleared away. Travel is an activity, from which people want to experience some pleasures that cannot be satisfactorily experienced in their daily lives. To make effective use of their limited time and have a highly satisfied travel, tourists have to make careful decisions. Such decisions usually involve a number of separate but interdependent choices that are made over time and across space, such as destination, travel party, duration, traveling route and activity participation during travel etc. Some of the choices result from long-term decisions (e.g., destination, season/duration, and travel party) and others are made during travel (e.g., traveling route and shopping). This paper focuses on tourist's scheduling behavior, which refers to the decisions about the arrangement of various travel activities across space and over time. In a broad sense, the scheduling behavior could include the travel schedules across different points in time, but this paper only focuses on the scheduling behavior related to a single travel made at one specified period of time.

As long as the scheduling behavior is concerned, package tours (e.g., Cohen, 1972; Turner and Ash, 1975; Wang et al., 2000) might be relevant. Package tour is defined as a travel planned and paid for a single price in advance, which partially or completely covers commercial transportation and accommodation, meals and sightseeing, and sometimes with an escort or guide (Yamamoto and Gill, 1999; Mok and Armstrong, 1995; Sheldon and Mak, 1987; Wong and Kwong, 2004). Tourists joining the package tours partially or completely follow the tour schedule prepared by travel organizations (travel agents, couriers, or tour coordinators). Even though the travel organizations need to properly reflect the potential tourists' preferences in the package tours, the tourists purchase the tours with pre-prepared schedule and can hardly modify the schedule according to their own conveniences, especially in the group package tours. Since this paper is only interested in the decisions about the scheduling behavior made by tourists themselves, schedule arrangement in the package tours is beyond the scope of this paper. However, the research findings in this paper could contribute to the plan, design and marketing of package tours.

Since failure of travel decisions is very costly and risky, and travel decisions are very complicated, tourists need to make a lot of efforts to plan their travels in a more satisfactory way. Even though some of the planned travel activities might not be realized because of some unexpected events and the existence of such unrealized planned activities is usually one of major reasons to lower tourists' satisfaction. Travel without plan might be even worse. Therefore, conditional on various constraints including monetary and time constraints, tourists have to properly arrange various travel activities in advance across space and over time in order to avoid the failure of travel decision. On the other hand, experiences during the travel are the major factors to influence tourists' satisfactions and the satisfactions in turn influence their intentions to return and/or to recommend the destinations to other people. It is expected that a well-prepared travel schedule usually results in a good experience and consequently a more satisfactory travel. Therefore, how to provide the tourists with better tourism services that are more useful to tourists' travel schedules is crucial for tourism marketers. At the same time, public sectors are required to provide infrastructures with sustainably higher performance (e.g., convenient transportation networks, attractive transit-mall at city center and accessible tourist facilities) and public services with higher quality (e.g., non-congested driving environment, and friendly tourist information center) that can support the smooth scheduling behavior during travel. Thus, understanding the tourist's scheduling behavior is very important for both public and private sectors.

To represent tourist's scheduling behavior, ideally, it is necessary to build a model system, into which all the relevant choice aspects related to scheduling behavior are rationally and systematically incorporated. Note that

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understanding the scheduling behavior needs the knowledge about decision-making process, but scheduling behavior and decision-making process are not equivalent. Decision on scheduling behavior pays more attention to the interdependencies of various choices over time, across space, and/or within travel party. Up to now, various models describing a certain aspect of the above-mentioned scheduling behavior in tourism research have been proposed. However, little research has been done with respect to the simultaneous representation of multi-faceted choice aspects. To systematically represent tourists' scheduling behavior, one needs to keep an open mind because there are so many promising approaches. There exists no "one-size-fits-all" theory.

Under such circumstances, aiming to explore a more general scheduling model system in tourism, in this paper existing studies are first reviewed by focusing on various single dimensions of tourist's scheduling behavior. Secondly, a review is given with respect to the existing integrated modeling frameworks that deal with the multi-faceted dimensions. Thirdly, the relevant underlying theories and some representative (spatial and temporal) choice models are described. Finally, the paper is concluded with the state-of-art and future research issues.

2. Dimensions of Tourist Scheduling Behavior

Tourism behavior, as a very comprehensive and complicated behavioral phenomenon, has been studied in a variety of disciplines such as geography, psychology, sociology, marketing science, regional and urban planning, transportation, archaeology, cultural anthropology, and agriculture. It is almost not possible to give a review to cover all the relevant studies. To draw a general picture about tourist's scheduling behavior, this paper classified the scheduling behavior into the following dimensions of travel: 1) information search and use, 2) social context, 3) resource, 4) activity participation, 5) spatial choice, and 6) temporal choice. About 50 relevant studies were reviewed.

Better scheduling needs reliable and comprehensive information. Such information includes pre-travel, during-travel and post-travel information. Pre-travel information is used to make a decision of going on to travel, during-travel information is used to modify the planned schedule and support the smooth decisions during travel. Information might be also needed after travel (i.e., post-travel information), for example, to evaluate the realized activities. Such post-consumption evaluation significantly determines tourist's satisfaction (Westbrook and Oliver, 1991). Satisfaction (Dissatisfaction) is believed to strengthen (weaken) the attitudes toward the visited destinations and may in turn affect the expectations for future visits (Westbrook and Newman, 1978). And tourists might also communicate some experienced information to the people around them (word-of-mouth information).

Social contexts refer to whether and how travelers decide to travel with other people, and/or make use of travel agencies/guides. In case of traveling with other people, travelers have to be influenced by coupling constraint, which refers to the fact that people have to stay together with other people at a specific place and a point of time. Another aspect of social context is that tourism decisions usually involve some group decisions (Davis, 1976; Van Raaij and Francken, 1984), especially in the case of travel with other people (e.g., family members, friends, and colleagues).

Time and money are main resources to perform travel activities (Zimmermann, 1982; Zhang, et al., 2006). Because of the availability and scarcity values of these two resources, participations in various activities are constrained. This forces tourists to seriously decide what to do and what not to do.

Performing on-site activities is the purpose of travel and usually influenced by authority constraints such as programs of some on-site events and opening hours of attractions, shops and stores. Spatial choices refer to the choices of destinations, accommodations, traveling routes and stops, on-site dining places and shops/stores and so on (Seddighi and Theocharous, 2002). Temporal choices concern when and how long the spatial choices are made. To realize and support the above-mentioned decision dimensions, travel mode choice behavior is also indispensable.

3. Integrated Modeling Frameworks

It is expected that decisions about some of the above six dimensions of scheduling behavior are interdependent from contexts to contexts and consequently usually involve a complex decision-making process. As mentioned by Sirakaya and Woodside (2005), one of the first foundational models of travel decision-making is that of Clawson and Knetsch (1966), who proposed an outdoor recreation experience model with five-phase decision-making process starting with the anticipation phase, followed by travel to actual site, on-site experiences and activities, travel back, and concluding with recollection of experiences. Woodside and MacDonald (1994) introduced a concept of trip frame, which

describes a set of interdependent travel choices (i.e., destination, route/mode, accommodation, activity performance, and visiting shops) that are made at different points in time.

Dellaert et al. (1998) proposed a conceptual framework to represent and understand multi-faceted tourist travel decisions that involve subsequent choices for different facets of a single trip as well as the constraints that may limit the number of feasible travel alternatives, and empirically identified some interdependencies in the following choice process after deciding to go travel: 1) pre-travel choices (destination, accommodation, travel party, travel mode, departure time for and duration of travel), and 2) during-travel choices (special attractions to visit, travel route to follow, day-to-day expenditure, and rest and food stop locations and timing). Dellaert et al. argue that to account for the interdependencies, multidimensional choice models like the nested logit or probit type models can be applied. Since these choice models cannot directly incorporate timing decisions, they further suggest applying hazard-based duration models (e.g., Hensher and Mannering, 1994). Their suggestion is operational and practical, but those duration models are statistically oriented and cannot properly reflect the behavioral mechanisms in timing decisions.

Aiming at understanding the relationships among traveling to one versus several destinations during a travel, King and Woodside (2001) made a qualitative comparative analysis of travel and tourism purchase-consumption system, which is the sequence of mental and observable steps a consumer undertakes to buy and use several products for which some of the products purchased lead to a purchase sequence involving other products and conclude that travelers' decision-making behaviors have various behavioral aspects in relationships that are interactive rather than linear. King and Woodside also conceptualize a framework of purchase-consumption system in leisure travel, which starts with information search and use, followed by three sequential levels: level 1 with choices of destination, activity and attraction, level 2 with choices of accommodation and mode/route to destination, and level 3 related to on-site shopping and dining behavior, and choice of mode/route in and around destination. Post-travel evaluation is also included in the proposed purchase-consumption system in leisure travel. Woodside and Dubelaar (2002) extended the King and Woodside's model by defining a tourism consumption system as the set of related travel thoughts, decisions, and behaviors by a discretionary traveler prior to, during, and following a travel, and showed that there exist behavioral patterns among visitors to one destination (Becken and Gnoth, 2004).

Fujiwara and Zhang (2005) developed a new scheduling model by combining a destination/route choice model of nested paired combinatorial logit (NPCL) type and a time allocation (TA) model. The NPCL model represents choices of destination and route, where the lower level indicates choice of destination and the upper level does choice of route. The TA model applies Becker's theory to determine the time allocated to each touring site. On the other hand, utility of destination choice is influenced by the time spent at each site. Different route choices result in hourly variant level-of-service of road network, which consequently gives rise to varying available time used in the TA model. Moreover, the TA model endogenously incorporates the influence of hourly variant level-of-service at the site of interest, which is affected by the allocated time. Consequently, an iteration estimation procedure is proposed to consistently estimate the parameters in the NPCL and TA models.

Based on the careful review of exiting literature, to the authors' knowledge, research focusing on the comprehensive framework about various decision aspects of travel is very limited. Furthermore, existing research have empirically examined the necessity of incorporating the interdependencies in travel decisions, there does not exist any model, which can simultaneously incorporate all the interdependencies in travel decisions in a systematic way. It might be impossible to develop such systematic models, considering the complexities of travel decisions.

Since there are not so many studies about such integrated models, about 10 studies were reviewed.

4. Underlying Theories and Relevant Models

The reviewed theories cover the random utility maximization theory, expected utility theory, prospect theory, regret theory, satisfying theory, theory of reasoned action and its derivative theory of planned behavior. The models cover discrete and continuous choice models, where the former further includes the utility-based and rule-based choice models and the later includes time allocation and timing models, etc. The discrete-continuous choice models are also reviewed. Especially, there are many discrete choice models that can be used to represent tourists' scheduling behavior. The representative model is the multinomial logit model with IIA (Independence of Irrelevant Alternatives) property. Up to now, various non-IIA discrete choice models have been proposed to overcome the shortcomings of

the MNL model (Zhang *et al.*, 2004). The existing non-IIA choice models can be classified into three categories. The first group avoids the IIA property by relaxing the assumption of identically and independently distributed error terms, or allowing for different variances of error terms, or allowing for positive correlations between error terms, or allowing for both. The second group circumvents the IIA property by extending the utility specification to account explicitly for similarity between choice alternatives. The third group assumes a hierarchical or sequential decision-making process. Here, more than 70 studies were reviewed.

5. Conclusions

The review shows that there are many studies dealing with the single-faceted scheduling behavior in tourism, but studies of the multiple-faceted modeling frameworks are very limited. No model has been proposed to simultaneously incorporate all the interdependencies in travel decisions in a systematic way. There are some models to deal with special context, but little has been done with respect to temporal context. Therefore, research efforts should be focused on the development of such integrated scheduling models that could explicitly incorporate all the travel activities in sequence. For this purpose, it might be a good idea to integrate the underlying theories and models reviewed here. Integration should be paid attention to address both long-term and short-term decisions. Especially, the integrated models should provide the ability to evaluate tourism policies in a systematic way.

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