



## Representing tourists' heterogeneous choices of destination and travel party with an integrated latent class and nested logit model

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### ABSTRACT

Aiming at a better understanding of heterogeneous interdependencies between destination and travel party choices in tourism, this study attempts to simultaneously represent these two choices by integrating the nested logit model with the latent class modeling approach to accommodate both types of nested model structures together. Empirical analysis confirmed the effectiveness of the developed model, using a data collected from more than 2000 tourists in Japan. It was observed that on average the two types of nested model structures are almost equally shared by samples and the model structures could significantly vary with income level and gender. Influential factors related to choices of destination and travel party were also explored. Concretely speaking, travel time, attractiveness of destination and number of tourism spots were found to be important influential factors in destination choice, and gender, age, marital status have important effects on travel party choice.

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### 1. Introduction

Tourists' travel decisions usually involve a number of choices that are made over time and across space, including choices of destinations, composition of the travel party (with whom they travel with), dates of departure, budgets, choices of accommodation and travel modes, travel routes, activities, dining and retail shopping (Dellaert, Ettema, & Lindh, 1998; Woodside & MacDonald, 1993). Some of the choices are made before travel (e.g., destination and travel party) while others are made during travel (e.g., travel routes, shopping, and on-site activities). Although the above choices can be made at different timings, they may interact with each other. Outcomes of choices that are made first might influence the choices made sequentially. For example, a tourist first chooses a destination and then makes a choice of accommodation considering prices and available rooms of hotels at the destination. Therefore, tourists' choice behavior should be regarded as a multi-stage choice process that consists of a number of separate but interdependent choices. To represent such multi-stage choice behavior, it is important to specify the sequence in which tourism decisions are made regarding different choice dimensions (e.g.,

destination, composition of the travel party) (Dellaert et al., 1998). However, it is difficult to expect that there is a consistent sequence in which all tourists make such decisions. Existing studies suggest that the sequence of decision making varies among tourists and contexts (Bansal & Eiselt, 2004; Dellaert et al., 1998; Fesenmaier & Jeng, 2000; Hyde, 2004; Hyde & Lawson, 2003; Woodside & King, 2001). Furthermore, the above choices themselves might differ across tourists, i.e., heterogeneity might exist. For example, different tourists might show different responses to the same factor (e.g., the attractiveness of a destination), and this type of heterogeneity can be represented by segmenting the population based on some observed information (e.g., individual attributes like age and gender), or by assuming that parameter of the factor follows a certain probability distribution (e.g., the mixed logit model). In case of choosing two or more behavioral elements (e.g., destination, travel party, travel mode, and accommodation), the nested logit model is applicable; however, if different tourists show different nested choice structures, then it becomes problematic how to specify such nested model structure. Properly representing the behavioral interdependency and heterogeneity is essential to a better understanding of tourists' behavior and can be consequently expected to provide more appropriate insights into tourism marketing and policy decisions. Careful review however suggests a lack of such studies in literature (Zhang, 2010).

With this background, this study attempts to develop a model that incorporates the interdependency between choices of destination and travel party by reflecting heterogeneous choice model structures. Destination and travel party are two important

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elements of tourists' behavior (e.g., Dellaert et al., 1998). A destination choice (or choice of travel party) can be conceptualized as a tourist's selection of a destination (or a type of travel party: e.g., travel alone or travel with other persons) from a set of alternatives. Even though the destination choice (the choice of travel party) could be influenced by various factors (e.g., tourists' individual attributes and attributes of destinations), to represent such choice behavior, the principle of random utility maximization is usually adopted. In other words, it is usually assumed that the tourist chooses the destination (the travel party) that generates the highest level of utility. This study deals with the joint choice of destination and travel party. To represent such joint choice behavior, the nested logit (NL) model could be applied under the principle of random utility maximization, same as the above single-faceted choice behavior. The NL model first groups the choices of destination and travel party into two nests, e.g., the upper level describes the choice of destination and the lower level explains the choice of travel party. And then, the NL model incorporates the interdependency between destination choice and choice of travel party with the help of an inclusive value, which is, in fact, the maximal utility of the alternatives in the choice set of the lower level nest. In reality, there may be existing different nested choice structures among different tourists. To represent such heterogeneous nested choice structures, one could first segment the population into several groups and then build the NL model separately. However, it is difficult to decide what kinds of variables could be used to best segment the population, and the segmentation becomes more difficult if the same tourist shows different nested choice structures depending on choice situations (e.g., the length of holidays, domestic or international travel). In this sense, it is necessary to represent such heterogeneous nested choice structures in a more flexible and convincing way. To this end, this study attempts to integrate the latent class (LC) modeling approach with the NL model in the context of domestic tourism of Japan.

The rest of this paper is organized as follows. Section 2 gives a brief review of relevant existing studies. Section 3 describes how to combine the LC modeling approach with the NL model in order to represent tourists' heterogeneous nested choice structures. The developed model is estimated using a data collected in Japan and model estimation results are discussed in Section 4. Finally, conclusions are summarized along with a discussion about important future research issues in the last section.

## 2. Review

Tourists' destination choice behavior, one of the targets in this study, has been examined to be influenced by various factors. According to the existing research, these factors can be generally classified into three categories:

- 1) Decision maker-specific factors: Existing studies confirm that age, gender, marital status, income, education, car ownership and lifestyle have great effects on tourist's destination choice (Ankomah, Crompton, & Baker, 1996; Van Raaij & Francken, 1984). In addition to such objective factors, some studies show that personal values should be used to explain why consumers choose a particular location (Van Raaij & Francken, 1984), and other studies emphasize the importance of travel motivation on destination choice (Hsu, Cai, & Wong, 2007; Kim & Chalip, 2004).
- 2) Alternative-specific factors: These factors include the attributes of destinations (e.g. attractiveness of destination, tourism resource, facility fare, quality services) and the accessibility of destinations (e.g. available travel mode, travel distance, travel

fare) (Ankomah et al., 1996; Awaritefe, 2004; Seddighi & Theocharous, 2002; Van Raaij & Francken, 1984).

- 3) Situational factors: These factors include weather situations: some studies included weather condition as a constraint factor to influence tourist behavior (Stemerding, Oppewal, & Timmermans, 1999); cultural situations: Kozak (2002) examined different behavior of tourists with different cultural background; social situations: studies conducted by Seddighi, Nuttall, and Theocharous (2001) investigated the impact of political instability on tourists' destination choice; and so on.

It has long been recognized that travel party has a strong influence on tourists' behavior (Chadwick, 1987; Christensen & Yoesting, 1973; Fisher, 2001; McIntosh & Goeldner, 1990; Stewart & Vogt, 1999). For example, Basala and Klenosky (2001) and Philipp (1994) found that there is an association between size of the travel party and content of the vacation plan and revealed that the single tourist has considerable freedom to choose where to travel and what to do, while the larger party, such as a family group, is more constrained in its vacation choices and vacation behavior. Crompton (1981) conducted an interview about tourist's interpersonal association in pleasure vacation, from which he derived four kinds of influence of travel party on individual's selection of a destination. March and Woodside (2005) studied the influence of travel party composition and size on tourist behavior. In their study ANOVA analysis was conducted to investigate the influence of travel party on destination choice, length of stay, spending. Basala and Klenosky (2001) pointed out that preference for choosing a destination could differ according to travel party composition. Presence of children in the travel party cannot be ignored in representing tourists' behavior (Thornton, Shaw, & Williams, 1997). In this sense, size of travel party is sometimes introduced as an explanatory variable into the destination choice model (e.g., Zhang, Qu, & Tang, 2004). Moreover, Woodside and MacDonald (1993), Woodside and Dubelaar (2002), and Beckena and Gnoth (2004) emphasize the interactions among members of a travel party, activities, and related decisions. 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).

Thus, tourists' behavior is seldom an isolated individual decision and properly representing the interaction between travel party choice and destination choice becomes important. However, existing studies have not presented a satisfactory way to model the above two choice aspects. This study attempts to fill in this gap.

## 3. Methodology

This study deals with two types of discrete choice behavior at a disaggregate level (i.e., each tourist is treated as the unit of analysis): destination and travel party. To represent such choice behavior, discrete choice models built under the principle of random utility maximization have been widely applied (e.g., Crouch & Louviere, 2004; Haider & Ewing, 1990; Huybers, 2003). To jointly describe the choices of two or more behavioral elements, the nested logit (NL) model (Ben-Akiva & Lerman, 1985) has been often applied to logically incorporate the interdependency among the behavioral elements with the help of expected maximal utility (also called logsum variable or inclusive value) (e.g., Eymann &

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