Accommodating Taste Variations in Tourist Satisfaction Analysis

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<center>**ABSTRACT**</center>

It has been indicated that tourists' satisfactions with each component of the destination have significant, positive, and direct effects on overall satisfaction. However, the existing researches have not satisfactorily represented individual heterogeneity in tourist satisfaction analysis. It is expected that the levels of importance attached to each component will vary across different tourists. To accommodate such kind of taste variations, this study employs the ordered probit model with random effect parameters to investigate the influence of component satisfaction on overall satisfaction. The model is applied to analyze tourist satisfaction in Kyusyu, Chugoku and Shikoku regions of Japan. The empirical results confirm the existence of taste variations in tourists' valuation of three components, namely tourism resource, transportation system and supporting facilities. The finding has important practical implications for both destination management and policy making.

Keywords: *overall satisfaction, component satisfaction, ordered probit model, random coefficient, taste variation.*

<center>**INTRODUCTION**</center>

Tourist satisfaction is important to successful destination marketing because it may affect expectations for the next visit (Kozak 2001), and may also have some learning effects on tourists' future decisions. Another outcome from the post-evaluation of travel is word-of-mouth information. The importance of word-of-mouth information in travel decisions has been long recognized by both researchers and marketers (Boulding et al. 1993; Zeithaml, Berry, and Parasuraman 1996). Given the vital role of tourist satisfaction, it is necessary to get a better understanding of it.

So far, there are a large number of studies focusing on measurement of tourist satisfaction. Kozak (2001) gave a comprehensive review of the existing research and identified four approaches: expectation-performance, importance-performance, disconfirmation approach and performance-only approaches. In addition to the analysis of the overall level of tourist satisfaction, more and more research has been devoting to investigating attribute-level satisfaction recently (Oliver 1993; Chi and Qu 2008; Hasegawa 2010). Since every tourism destination is composed of diversified components, understanding tourists' satisfaction with each component is thus essential to destination managers for improving products and services. Until now, a number of studies have been carried out to investigate tourists' satisfaction with the attractions (Bigne, Andreu, and Gnoth 2005; Martin-Ruiz, Castellanos-Verdugo, and Oviedo-Garcia 2010; Rojas and Camarero, 2008), the transportation (Kim and Shin 2001), the accommodation (Tsaura, Chiub, and Huang 2002), the shopping facilities (Wong and Law 2003; Chang, Yang, and Yu 2006).

Furthermore, some studies attempt to examine the influence of attribute-level satisfaction on the overall satisfaction. As pointed out by Veloutsou et al (2005), tourists' overall satisfaction is an aggregation of satisfaction with each service aspect. According to Oliver (1993), attribute satisfaction has significant, positive, and direct effects on overall satisfaction. Likewise, many other studies also found out that tourists' satisfaction with individual component of the destination leads to their overall satisfaction (Mayer et al. 1998; Hsu 2003; Chi and Qu 2008). Following this idea, Pizam and Ellis (1999) represent tourists' overall satisfaction as a function of satisfaction with the individual elements of the destination, such as accommodation, weather, natural environment, social environment, etc. Similar idea is also adopted in study by Song et al. (2012) to develop tourist satisfaction index.

Understanding the relationship between component satisfaction and overall satisfaction will allow management to concentrate on the major influencing factors that lead to tourists' overall satisfaction. However, there remain some unsolved issues in the existing research. First, the existing studies have not satisfactorily represented individual heterogeneity in tourist satisfaction analysis. It is expected that different tourists will place different levels of emphasis on each aspect of service. Such heterogeneity can be caused by not only objective factors (e.g., age, gender, income), but also psychological factors (e.g., motivation, taste/liking, attitude). Taking account of individual heterogeneity is essential in segmentation strategy. Second, studies about tourist satisfaction often use Likert-type scales (5-point, 7-point or 11-point scales) to represent different degrees of satisfaction. Most of the existing studies use such kind of ordinal data directly and employ structural equation models (SEM) to analyze tourist satisfaction. However, as Hasegawa (2010) pointed out, the numerical values of ordinal data are meaningless but just represent the order of the satisfaction degrees. In addition, such kind of ordinal data could be highly skewed (i.e., the meaning of discrepancies between two scales could be different). It will therefore cause some problem if we use the numerical values directly.

To solve these problems, this study employs the ordered probit model with random effect parameters to investigate the influence of component satisfaction on overall satisfaction that accommodate taste variations. The model is applied to analyze tourist satisfaction in Kyusyu, Chugoku and Shikoku regions of Japan. The empirical results confirm that different tourists will place different levels of emphasis on each aspect of service. The results of this study have important practical implications for destination management.

STUDY METHOD

Data collection

The data used in this study was collected at 29 major tourism destinations in Kyusyu, Chugoku and Shikoku regions of Japan in the summer of 2002 based on a face-to-face interview. To guarantee the population representative of the collected samples, respondents were randomly selected at each destination in proportion to the number of visitors during the survey season at each destination zone, reported by official governmental information sources. The survey consisted of three sections. The first section comprised travel-related questions, including destination, travel party, travel mode, and duration of stay, to get the information about tourist's travel behavior. The second section is about subjective evaluations of destinations. The respondents were asked to evaluate the tourism destination using a 5-point Likert scale, with "1" indicating least satisfied and "5" indicating most satisfied. Twelve individual components and overall satisfaction were included in the questionnaire to obtain information of tourists' evaluation. The third section included information about individual characteristics, such as gender, age, occupation, annual income, and marital status, etc. As the questionnaire sheet was lengthy, 1 000 Japanese Yen was provided to each respondent as incentive. As a result, about 2 500 questionnaires were obtained. The data characteristics are summarized in Table 1. The satisfaction items are listed in Table 2.

Table 1
Summary of Data Characteristics

Individual characteristic	Percentage	Trip characteristic	Percentage
Gender		Travel mode	
Male	51.4	*Public transportation*	33.1
Female	48.6	*Private car*	66.9
Age		Travel party	
< 30	33.7	*Alone*	15.1
30 - 50	46.1	*With family members*	53.0
> 50	20.2	*With friends and others*	31.9
Occupation		Stay duration	
Employee	62.9	*1 day*	35.4
Student	12.5	*2 days*	29.4
Housewife	18.2	*3 days*	17.5
Other	6.4	*>3 days*	17.7
Annual income		Travel experience	
<4 million yen	58.6	*Visited before*	86.9
4-10 million yen	25.1	*Have not visited before*	13.1
>10 million yen	16.3		

Table 2
Satisfaction components

Satisfaction components	Satisfaction level
There are a lot of tourism attraction	1 2 3 4 5
Be able to get a good rest	1 2 3 4 5
Be able to get experience different from daily life	1 2 3 4 5
Be able to enjoy sport activities	1 2 3 4 5
There are famous tourism attractions	1 2 3 4 5
There are nice accommodations	1 2 3 4 5
It is convenient to go from accommodation to airport or bus station	1 2 3 4 5
There are nice restaurants	1 2 3 4 5
There are nice souvenir shops	1 2 3 4 5
There are many available travel modes	1 2 3 4 5
There is no traffic congestion	1 2 3 4 5
It is convenient to transfer between different travel mode	1 2 3 4 5
Overall satisfaction	1 2 3 4 5

Exploratory factor analysis

In this study, we attempt to examine how the satisfactions of individual components influence the overall satisfaction. As the twelve components might be interrelated, it will cause some problem if we use them as explanatory variables directly. Therefore, exploratory factor analysis was used to derive the underlying dimensions of satisfaction. The analysis was conducted using SPSS 16.0. The results are shown in Table 3. The Kaiser-Meyer-Olkin (KMO) overall measure of sampling adequacy (0.83) was above the recommended requirement for good factor analysis. One can see from the result that three factors were derived. These three factors can be explained as tourism resource, supporting facilities and transportation system, respectively.

Table 3
Result of Factor Analysis

	Factor loading	Explained variance
Factor 1: Tourism resource		26.9
Be able to enjoy sport activities	0.75	
Be able to get a good relaxation	0.71	
Be able to get experience different from daily life	0.66	
There are a lot of tourism attraction	0.56	
There are famous tourism attractions	0.53	
Factor 2: Facility		22.5
There are nice restaurants	0.71	
There are nice souvenir shops	0.69	
There are nice accommodations	0.56	
Factor 3: Transportation		21.3
There is no traffic congestion	0.81	
It is convenient to transfer between different travel mode	0.75	
It is convenient to go from accommodation to airport or bus station	0.69	
There are many available travel modes	0.61	
Total variance explained		70.7

Ordered probit model

In order to investigate the influence of component satisfaction on the overall satisfaction, ordered probit model is adopted to include the underlying three dimensions of satisfaction as explanatory variables and overall satisfaction as dependent variable. The ordered probit model is appropriate for analyzing the ordinal choice data. Recently, some studies have employed it to investigate tourist satisfaction (Oliveira and Pereira 2008; Hasegawa 2010). The ordered probit model takes the following form:

$$y_n^* = \sum_s \beta_{ns} x_{ns} + \varepsilon_n \tag{1}$$

$$y_n = \begin{cases} 1 & if -\infty \le y_n^* < \mu_1 \\ 2 & if \ \mu_1 \le y_n^* < \mu_2 \\ 3 & if \ \mu_2 \le y_n^* < \mu_3 \\ 4 & if \ \mu_3 \le y_n^* < \mu_4 \\ 5 & if \ \mu_4 \le y_n^* < \infty \end{cases} \tag{2}$$

Where

y_n : overall satisfaction level for tourist n;

y_n^* : latent unobserved continuous satisfaction value for tourist n;

x_{ns} : satisfaction value of factor s ($s =1,2,3$) for tourist n;

β_{ns} : parameters for x_{ns};

ε_n : error term, assumed to be standard normally distributed

Then, the probabilities $P(y_n=1)$, $P(y_n=2)$, $P(y_n=3)$, $P(y_n=4)$, $P(y_n=5)$ can be written as:

$$P(y_n = 1) = \Phi(-\sum_s \beta_{ns}x_{ns} + \mu_1) \tag{3}$$

$$P(y_n = 2) = \Phi(-\sum_s \beta_{ns}x_{ns} + \mu_2) - \Phi(-\sum_s \beta_{ns}x_{ns} + \mu_1) \tag{4}$$

$$P(y_n = 3) = \Phi(-\sum_s \beta_{ns}x_{ns} + \mu_3) - \Phi(-\sum_s \beta_{ns}x_{ns} + \mu_2) \tag{5}$$

$$P(y_n = 4) = \Phi(-\sum_s \beta_{ns}x_{ns} + \mu_4) - \Phi(-\sum_s \beta_{ns}x_{ns} + \mu_3) \tag{6}$$

$$P(y_n = 5) = 1 - \Phi(-\sum_s \beta_{ns}x_{ns} + \mu_4) \tag{7}$$

Here Φ is the standard normal cumulative distribution function. Since different individual might place different levels of emphasis on these three factors, the parameter β_{ns} might take different values across whole sample. Such taste variation might be caused by some observed factors (individual characteristics such as age, gender, and trip characteristics such as length of stay) and unobserved factors (e.g., motivation, taste/liking, attitude). Therefore, in this study, the random coefficient model is adopted to represent tourists taste variation. Concretely speaking, β_{ns} are represented by a function of some observed attributes z_{nq} and a random effect v_{ns} as shown by equation (9). The random effect v_{ns} is assumed to follow a normal distribution with mean 0 and standard deviation σ_s ($v_{ns} \sim N(0, \sigma_s^2)$).

$$\beta_{ns} = \alpha_s + \sum_q \gamma_{sq}z_{nq} + v_{ns} \tag{8}$$

Here, α_s is a constant term and γ_{sq} is the parameter of variable z_{nq}.

The likelihood function is given as follows:

$$L = \int_{v_{n1}}\int_{v_{n2}}\int_{v_{n3}} \prod_{n=1}^{N} P_n \times f(v_{n1}) \times f(v_{n2}) \times f(v_{n3})dv_{n1}dv_{n2}dv_{n3} \tag{9}$$

$$P_n = P(y_n = 1)^{\delta_{n1}} P(y_n = 2)^{\delta_{n2}} P(y_n = 3)^{\delta_{n3}} P(y_n = 4)^{\delta_{n4}} P(y_n = 5)^{\delta_{n5}} \tag{10}$$

Here, N indicates the total number of samples, δ_{nq} ($q=1$, 2, 3, 4, 5) are dummy variables that are equal to 1 when satisfaction level of tourist n is q, otherwise 0.

To estimate such model, some simulation methods are usually adopted, such as a series of Monte Carlo methods and numerical quadrature methods. In this study, a hierarchical Bayesian procedure based on Markov Chain Monte Carlo (MCMC) method (e.g., Train 2003) is adopted. The method incorporates prior distribution assumptions and, based upon successive sampling from posterior distribution of the model parameters, yields a chain which is then used for making point and interval estimations. Draws from the posterior are obtained using the software WinBUGS (Bayesian inference Using Gibbs Sampling) (Lunn et al. 2000). In the Gibbs sampling, draws of each parameter are obtained from its posterior conditional on the other parameters (Train 2003). The convergence of the estimation results can be checked using the Geweke diagnostic (Geweke 1992).

ESTIMATION RESULTS

The estimation result of ordered probit model is shown in Table 4.

Table 4
Model Estimation Results

Explanatory variable	Parameter	t-statistic	
μ_1	-4.08	-49.6	**
μ_2	-2.50	-69.1	**
μ_3	-0.67	-33.7	**
μ_4	1.37	60.8	**
Parameter of tourism resource (β_1)			
Constant term	0.77	12.7	**
Gender (1:male, 0: female)	0.06	2.29	**
Age	0.02	1.82	*
Stay Duration	-0.01	-0.55	
Travel alone (dummy)	0.11	3.13	**
Travel mode (1: car, 0: otherwise)	0.02	0.58	
Experience (dummy)	-0.09	-1.99	**
Random effect	0.10	10.2	**
Parameter of transportation (β_2)			
Constant term	0.74	13.6	**
Gender (1:male, 0: female)	-0.03	-1.02	
Age	-0.03	-2.77	**
Stay Duration	0.01	1.71	*
Travel alone (dummy)	0.02	0.59	
Travel mode (1: car, 0: otherwise)	-0.04	-1.65	*
Experience (dummy)	-0.03	-0.76	
Random effect	0.03	9.02	**
Parameter of facilities (β_3)			
Constant term	0.37	6.58	**
Gender (1:male, 0: female)	0.02	0.74	
Age	0.04	4.14	**
Stay Duration	0.01	1.08	
Travel alone (dummy)	-0.11	-2.64	**
Travel mode (1: car, 0: otherwise)	0.08	2.77	**
Experience (dummy)	-0.10	-2.24	**
Random effect	0.08	10.6	**

* significant at the 90% level, ** significant at the 95% level

Based on the estimation result, parameter β_1, β_2, β_3 can be calculated for each individual. By comparing the calculated value of parameter β_1, β_2, β_3, we can get information about how different individual place different levels of emphasis on these three factors. The whole sample is classified based on the calculated parameter β_1, β_2, β_3 using cluster analysis. As a result, the whole sample is classified into three clusters. The average values of β_1, β_2, β_3 for cluster 1 are 0.86, 0.64, 0.41, respectively. It can be concluded that individual belonging to cluster 1 pay most attention to tourism resource, second to transportation system and least to supporting facilities. For the cluster 2, the average values of β_1, β_2, β_3 are 0.74, 0.72, 0.48, respectively. It indicates that tourists who belong to this cluster attach equal and most importance to tourism resource and transportation system, and less to supporting facilities. In terms of cluster 3, the average values of β_1, β_2, β_3 are 0.82, 0.56, 0.56, respectively. It implies that tourism in cluster 3 pay most attention to tourism resource, while less and equal attention to transportation system and supporting facilities.

Table 5
Result of Cluster Analysis

	Parameter of tourism resource (β_1)		Parameter of transportation (β_2)		Parameter of facilities (β_3)	
	Mean	SD	Mean	SD	Mean	SD
Cluster 1 (21.1%)	0.86	0.04	0.64	0.03	0.41	0.07
Cluster 2 (43.2%)	0.74	0.03	0.72	0.02	0.48	0.04
Cluster 3 (35.7%)	0.82	0.05	0.56	0.03	0.56	0.05

Then, cross aggregation analysis is conducted between several factors and the three clusters (Figure 1-6). The results imply that female pay more attention to transportation than male; older people attach more importance to tourism resource; tourists who have shorter stay duration pay more attention to transportation; tourists who travel with others emphasize more about transportation service; tourists who travel by public transport mode attach more emphasis on transportation; first time tourist pay more attention to tourism resource.
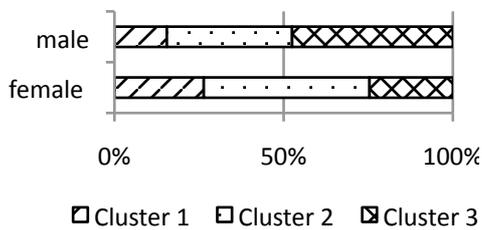

Figure 1 cross aggregation between
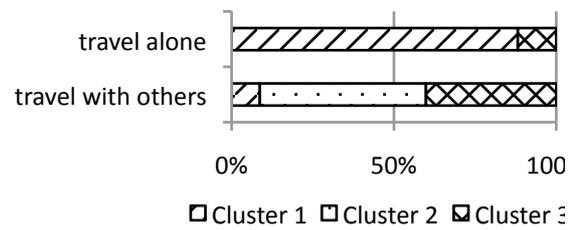gender and cluster type

Figure 4 cross aggregation between
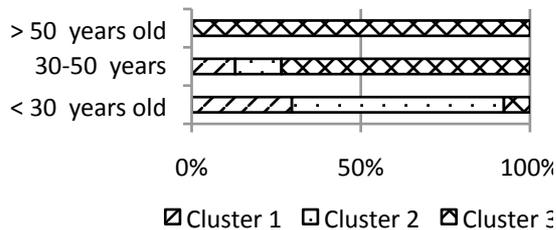travel party and cluster type

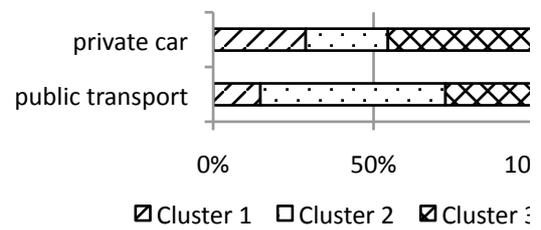Figure 2 cross aggregation between
age and cluster type

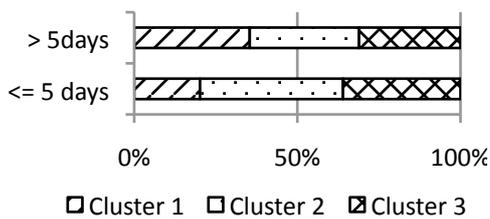Figure 5 cross aggregation between
travel mode and cluster type

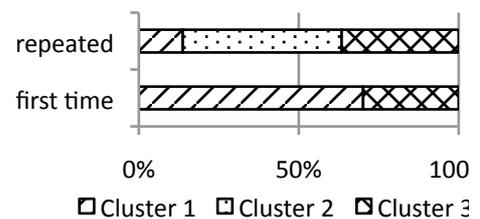Figure 3 cross aggregation between
stay duration and cluster type

Figure 6 cross aggregation between
experience and cluster type

CONCLUSION

Tourism destination is an integrated system that comprises various components such as attractions, accommodation, restaurants, shops, transport, etc. Tourists will experience these components when they visit a destination and they may evaluate each component separately. Existing researches have indicated that tourists' satisfaction with these

components lead to overall satisfaction. However, it is expected that the levels of importance attached to each component will vary across different tourists, which has not been well represented in the existing studies. To accommodate such kind of taste, this study employs the ordered probit model with random effect parameters to investigate the influence of component satisfaction on overall satisfaction. The model is applied to analyze tourist satisfaction in Kyusyu, Chugoku and Shikoku regions of Japan. The empirical results confirm the existence of taste variations in tourists' valuation of each service aspect.

The finding has important practical implications. Determining the component that contributes most to overall satisfaction in different segmentation of tourists is essential to tourism marketing and management. Destination managers can improve overall satisfaction of their target populations by allocating resources to the component with greater importance. For example, in this case study, it is found out that repeated tourists attach more importance to transportation service, which implies that improvement in transportation system is more likely to increase overall satisfaction of repeated tourists. In addition, it has significant implications for policy makings as well. For instance, since older people attach dominant importance to tourism resource, Japanese government would need to invest more on tourism resource given that they are facing an aging society.

There are some research issues remaining as future tasks. First, model estimation results show that three random effects are also significant, which imply that tourists' taste variations are also caused by some unobserved factors such as tourists' motivations and attitude. Therefore, more influential factors should be explored in future research. Second, the empirical analysis is only conducted to analyze tourist satisfaction in Kyusyu, Chugoku and Shikoku regions of Japan. It is also necessary to conduct such kind of analysis in other regions to find out whether there are spatial variations in tourist behavior.

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