An analysis of inbound tourist behavior after the Great East Japan Earthquake

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ABSTRACT

This paper examines the travel behavior of the Chinese and Korean tourism market following the Japan Earthquake in a bid to identify travelers who are likely to be most and least resilient in the event of a significant disaster. The post disaster travel behavior of travelers from these two countries is analyzed to reveal the circumstances under which travelers would go to Japan despite the earthquake (resilient travel market) and the characteristics and concerns of those who cancelled their travel indefinitely. Relationships are explored between post disaster travel behavior and defining variables such as demographic background, past travel experience, trip purpose, and image perception. Significant differences are revealed between travelers from different countries. Practical implications for recovery and resilience decision-making of inbound tourism industry in Japan are provided.

1. Introduction

The tourism industry is highly vulnerable to interruption by natural disasters, as it relies heavily on perceptions of safety, functioning infrastructure and visitor mobility (Ritchie, 2008). The occurrences of natural disasters in countries including China, Taiwan, New Zealand, Australia, the United States, and Peru have demonstrated the catastrophic impact on tourism industry. So far, a considerable number of studies have been conducted to provide implication for post-disaster recovery planning in those countries (Huang & Min, 2002; Orchiston, 2012; Ritchie, 2008; Sharpley, 2005; Tsai & Chen, 2010; Yang, Wang, & Chen, 2011).

However, most of the existing studies on post-disaster tourism focus on the supply side to provide guidelines for tourism recovery. Conversely, limited effort has been made on the demand side, especially the research of tourists' post-disaster behavior process and its implication for the disaster recovery of tourism industry. This is surprising given that the influence of natural disaster on tourism industry is largely shaped by the response of tourists, as they have the flexibility to decide on tourism destination, travel timing, and tourism activities they engage in. Consequently, a better understanding of tourist behavior response is essential to evaluate the impact of natural disaster on tourism industry and to derive implication for recovery policy. In addition, with an increase in the frequency and intensity of natural disaster (floods, earthquake, cyclones, etc.) in recent years, the study about tourists' post-disaster behavior becomes increasingly important for future risk management of tourism industry. Despite that, research on tourist behavior in the context of natural disaster is limited to date.

To address such research gaps, this study aims to investigate the international tourists' behavior response after the Japan earthquake. The 2011 earthquake off the Pacific coast of Tohoku has dramatically damaged the inbound tourism in Japan. The disaster saw the total number of international tourism arrivals in 2011 drop by 28% to 6.2 million, compared to 8.6 million tourism arrivals in the previous year. In order to attract tourists back, the Japanese government has implemented a series of swift countermeasures to revitalize the tourism industry. In addition, a New "Tourism Nation Promotion Basic Plan" has been approved by the Cabinet, which lays out the objective to achieve 18 million international visitors to Japan by 2016. From the end of 2012, inbound tourism demand has recovered to the level before the earthquake. However, the recovery process of different markets showed different patterns and the travel intention to Japan still remains low among some segmentation of international tourists. In order to address these issues and provide the tourism industry in Japan with critical insights for their tourism recovery and resilience decision-making, it is necessary to get a better understanding of international tourists' behavior response to the earthquake.

In this study, we are especially focusing on the following questions: (1) What are the key reasons international tourists would / would not travel to Japan following the disaster? (2) Are these reasons different across tourists with different demographic factors (age, gender, income, etc)? (3) What are the drivers of tourists' behavior response to the earthquake? More specifically, how do demographic background, past travel experience, trip purpose, and image perception influence the behavior response?

2. Survey

For the purpose of this study, a questionnaire is designed, which consists of three main sections. The first section includes questions regarding respondent's information source of the earthquake and their perception about what happened in Japan due to the earthquake. The questionnaire presented several statements of what was happening after the earthquake. Respondents were then asked to indicate their level of agreement to these statements on a seven-point scale ranging from 1 (strongly disagree) to 7 (strongly agree).

The second section includes detailed information on individual's behavior response after the earthquake. The respondents were firstly asked whether they had made plans to travel to Japan before the earthquake. If the answer is yes, they were asked specific questions about their planned trip, including travel date, destination, motivation, companion, travel budget, duration of stay, and their behavior response to the earthquake. For the respondents who cancelled their travel plan, we asked why they would not travel to Japan after the earthquake. They were asked to indicate the importance they would assign to different reasons in their decision to not visit Japan on a five-point scale (1: very unimportant, 5: very important). For those who changed the plan, we asked about their actual trip, including travel date, destination, motivation, companion, travel budget, duration of stay, and the reason they travel to Japan after the earthquake. They were asked to indicate the importance they would assign to different reasons in their decision to visit Japan on a five-point scale (1: very unimportant, 5: very important). If they still travel as planned, they were asked about the factors that prevent their trip and the reason they travel to Japan after the earthquake. The reasons are also measured on a five-point scale (1: very unimportant, 5: very important).

The third section collects information of individual characteristics, including gender, age, education level, household annual income, and previous travel experience to Japan.

The questionnaire was written in English and translated to Chinese and Korean by professional translators and back translated into English to assure accuracy of meaning. The survey was conducted in China and South Korea over three week period in January 2014 with the help of an Internet survey company. For South Korea, the survey was conducted nationwide. In terms of China, Beijing and Shanghai were chosen as the survey area, due to the fact that they are two major origin markets of inbound tourism to Japan and because of the great diversity of its population. As a result, 1,050 and 500 questionnaires were obtained from China and South Korea, respectively. To our best knowledge, this was the first time that such a relatively large-scale survey was conducted in China and South Korea to investigate tourists' response to the 311 Japan earthquake.

The sample is made up of an approximately even distribution of those who were under 30 years old (47.1) and those who were 30 years or older (52.9). Most of the respondents had an annual household income between $10,000 and $50,000 (60%). In terms of past travel experience, about one quarter of them have never travelled to Japan within the past five years. The major two motivations are nature/scenery sightseeing (50.5%) and experience Japanese culture (21.5%). Further, more than half of tourists travel with family, and an overwhelming majority of them (73.2) plan to stay in Japan between 5 and 7 days.

3. Data analysis

3.1 Reasons why tourists would / would not travel to Japan after the earthquake

In the questionnaire, different items were provided to measure reasons behind tourists' decision of traveling or not traveling to Japan after the earthquake. In order to indentify factors underlying these reasons, principal component analysis with varimax rotation was used. In terms of reasons why tourists chose to not travel to Japan after the earthquake, principal component analysis identified three factors, explaining 75.1% of overall variance (Table 1). The KMO (Kaiser-Meyer-Olkin) measure was calculated to 0.66, which exceeds the acceptable minimum value 0.6. The Bartlett's test of Sphericity was found to be significant ($p<0.001$). The internal consistency of the factors, measured with Cronbach's alphas showed good reliability with the scores ranging from 0.79 to 0.88.

The first factor is labeled as "accessibility damage" and incorporates two items "The flight I planned to take was cancelled" and "The group trip organized by my travel agency was cancelled", which exhibits most of the variance (28.9%). The second factor integrates four items, all associated with tourists' worry about either disaster itself or nuclear leakage caused by the disaster. This factor, which is labeled as "internal worry", explains 23.2% of the total variance. The third factor is labeled as "external events", which includes three items "appreciation of Japanese currency", "increase of fuel tax", and "political conflict". This factor accounts for 23% of the variance.

Table 1 Reasons why tourists would not travel to Japan after the earthquake

	Factor loading	Explained variance	Cronbach's α
Factor 1: Accessibility damage		28.9	0.88
The flight I planned to take was cancelled	0.88		
The group trip organized by my travel agency was cancelled	0.87		
Factor 2: Internal worry		23.2	0.82
I was worried about aftershock	0.73		
I was worried about the occurrence of natural disasters in Japan (e.g., earthquake, tsunami, typhoon, etc)	0.79		
I was worried about nuclear disaster	0.85		
I was worried about food being polluted by nuclear leakage	0.81		
Factor 3:External events		23.0	0.79
Appreciation of Japanese currency	0.79		
Increase of fuel tax	0.85		
Political conflict	0.74		
Total variance explained		75.1	

As for reasons why tourists chose to travel to Japan after the earthquake, principal component analysis identified three factors, which account for 75.1% of the total variance of variables (Table 2).

The KMO (Kaiser-Meyer-Olkin) measure of sampling adequacy (KMO=0.9) and the Bartlett's test of sphericity ($p<0.001$) confirmed that the analysis was appropriate. The internal consistency of the factors, measured with Cronbach's alphas showed good reliability with the scores ranging from 0.86 to 0.92.

Table 2 Reasons why tourists would not travel to Japan after the earthquake

	Factor loading	Explained variance	Cronbach's α
Factor 1:Accessibility improvement		26.7	0.89
The travel package provided by my travel agent was cheaper than before	0.85		
Flights became cheaper than before the earthquake	0.89		
A direct flight from my residential area to Japan became available	0.64		
Low cost carriers from my residential area to Japan became available	0.72		
It became easier to get a tourism visa	0.68		
Factor 2:Information communication		22.9	0.86
Advertisement on TV, newspaper, magazine.	0.71		
Recommendation from my friend who has traveled to Japan	0.85		
Recommendation on Social networking service (Facebook, Twitter, etc)	0.86		
I watched a drama which is shot in Japan, and I want to experience by myself.	0.75		
The media lessened my concerns regarding nuclear leakage	0.68		
Factor 3:Internal willingness		22.3	0.92
I would like to witness how things have changed after the earthquake	0.69		
I would like to help the Japanese tourism industry to recover	0.84		
I feel sorry for the Japanese people affected by the disaster	0.79		
I believed I could offer some assistance	0.86		
I would feel guilty if I didn't do anything to help the tourism industry in Japan	0.86		
Total variance explained		71.9	

Table 2 shows that the first factor incorporates five items, which are related to lower cost or more convenient access. Together they account for 26.7% of overall variance. The first factor is labeled as "accessibility improvement". Five items associated with advertisement, recommendation,

and media report emerge into the second factor. This factor, which is labeled as “information communication”, explains 22.9% of the total variance. The third factor is labeled as “internal willingness”, which accounts for 22.3% of the variance.

3.2 Difference in the reasons why tourists would / would not travel to Japan after the earthquake

A one-way analysis of variance (ANOVA) is conducted to determine whether these reasons are different across tourists with different characteristics. Table 3 shows the results for reasons why tourists would not travel to Japan after the earthquake. Significant differences are found between different groups. Specifically speaking, while male tourists are more likely to be influenced by objective barrier and external events, female tourists are more likely to be influenced by subjective worry. Significant differences are also found among tourists from different age group. With age increase, the influences of objective barrier and subjective worry decrease, but influences of external events increase. As for tourists from different countries, all of the three factors show significant difference. By comparing with Korean tourists, tourists from China are more likely to cancel their trip because of objective barrier and external events, but the influence of subjective worry is lower for them. In terms of tourists with different travel experience, results show that repeat tourists are more likely to be influenced by accessibility damage and external events, while first time tourists are more likely to be influenced by internal worry. Tourists with different travel motivation also show significant difference. Accessibility damage has relatively higher influence on business trip; internal worry has lower influence on tourists with motivation of culture; external events have larger influence on tourists with motivation of natural, culture, or shopping. As for different travel party, it shows that tourists who travel with family or friends are more likely to cancel their trip because of internal worry.

Table 3 ANOVA results for reasons of not traveling to Japan

	Objective barrier	Subjective worry	External events
Gender	F=11.3**	F=6.12**	F=5.76**
Male	2.08	3.47	2.35
Female	1.52	4.04	2.03
Age	F=7.98**	F=6.72**	F=10.76**
< 30 years old	2.09	4.18	1.85
30~40 years old	1.75	4.08	2.33
> 40 years old	1.41	3.79	2.58
Education level	F=4.62**	F=0.61	F=0.71
University or above	1.79	4.01	2.13
Otherwise	1.37	3.92	2.18
Nationality	F=65.4**	F=6.5**	F=24.8**
China	2.11	3.77	2.33

South Korea	0.79	4.12	1.68
Travel experience	F=15.4**	F=7.21**	F=3.92*
None	1.35	4.15	2.05
Once	2.14	3.72	2.08
More than Once	2.28	3.66	2.43
Motivation	F=7.27**	F=8.21**	F=2.37*
Natural	1.31	4.23	2.28
Culture	1.36	3.79	1.94
Shopping	1.58	4.27	2.01
VFR	1.21	4.36	1.71
Business	1.94	4.22	1.66
Travel party	F=0.91	F=4.28**	F=1.10
Alone	1.89	3.77	2.21
With family	1.97	4.07	2.21
With friends	1.91	4.05	1.99
Others	1.85	3.85	2.32

Table 4 shows the results for reasons why tourists would travel to Japan after the earthquake. It can be concluded from the results that accessibility improvement is more effective to promote repeat tourists to visit Japan; information communication is more effective to promote female, younger, Chinese, first-time, tourists with motivation of natural and culture, and tourists who travel with family to visit Japan; male tourists, elderly tourists, Chinese tourists, repeat tourists, and tourists with motivation of natural, culture or business are more likely to travel to Japan out of internal willingness.

Table 4 ANOVA results for reasons of traveling to Japan

	Accessibility improvement	Information communication	Internal willingness
Gender	F=1.02	F=8.08**	F=5.29**
Male	2.94	3.09	2.41
Female	2.81	3.35	2.03
Age	F=0.21	F=8.34**	F=4.08**
< 30 years old	2.83	3.29	2.12
30~40 years old	2.89	3.09	2.18
> 40 years old	2.82	2.94	2.33
Education level	F=6.89**	F=10.37**	F=3.18*
University or above	2.31	3.08	2.21

Otherwise	2.92	2.36	1.73
Nationality	F=0.82	F=31.4**	F=2.86*
China	2.87	3.11	2.21
South Korea	2.63	1.81	1.72
Travel experience	F=2.79*	F=4.31**	F=6.14**
None	2.68	3.19	1.71
Once	2.74	2.96	1.93
More than Once	3.12	2.74	2.43
Motivation	F=0.68	F=2.91**	F=5.71**
Natural	2.95	3.11	2.26
Culture	2.79	3.11	2.11
Shopping	2.78	2.78	1.41
VFR	2.62	2.55	1.71
Business	2.62	2.45	2.36
Travel party	F=1.52	F=3.09**	F=0.49
Alone	2.76	2.41	2.11
With family	2.89	3.07	2.23
With friends	2.54	2.76	1.96
Others	2.85	2.39	2.17

3.3 Tourists' travel decision after the earthquake

In this study, tourists' post-disaster decision is analyzed by using the multinomial logit (MNL) model. There are three alternatives: cancel the travel plan, change the travel plan, and still travel as planned. The utilities of these alternatives can be defined as:

$$U_{nj} = V_{nj} + \varepsilon_{nj}$$

where, n and j indicate individual n and alternative j, V_{nj} and ε_{nj} are deterministic term and error term of utility U_{nj}, respectively.

The multinomial logit (MNL) model assumes that a decision maker chooses the alternative with the highest utility among all the alternatives in choice set under the principle of random utility maximization. The probability that individual n choose alternative j can be represented as:

$$P_{nj} = \Pr ob\{U_{nj} \geq U_{nj'},\ for\ j' \neq j,\ j \in C\}$$
$$= \frac{\exp(V_{nj})}{\sum_{j'} \exp(V_{nj'})}$$

where C refers to the choice set of all alternatives. The deterministic term V_{nj} can be specified as:

$$V_{nj} = \alpha_j + \sum_h \beta_{hj} X_{hj}$$

where, α_j is constant term for alternative j; X_{hj} is the hth attribute describing alternative j.

Table 5 lists the explanatory variables used in this study. The explanatory variables are selected based on the literature review and correlation analysis. Seven attributes related to tourists' perception are also included into the model to examine the impact of perception on tourist behavior.

Table 5 Explanatory variables

Explanatory variables	Description
Gender	1: Male; 0: Female
Age	Actual age
Income	Annual household income
Education	1: having a university degree; 0: otherwise
Travel experience	Travel times to Japan in the last 5 years
Information source	1: Mass media; 0: otherwise
Time interval	Time interval between the occurrence of earthquake and planned travel time
Trip purpose	1: Tourism; 0: Business
Travel party	1: Alone; 0: Otherwise
Duration	Planned stay duration in Japan
Perception1	The majority of Japan was directly affected by the earthquake
Perception2	After the earthquake, Japan was inaccessible
Perception3	Most of the affected area was not open for business after the earthquake
Perception4	Most of the tourism attractions in the affected area were inaccessible
Perception5	It was not safe to travel to Japan because of the aftershock
Perception6	It was not safe to travel to Japan because of the nuclear leakage
Perception7	Food in Japan has been polluted by nuclear leakage

Estimation results are presented in Table 6. As all the explanatory variables are alternative generic variable, it is necessary to fix the parameters for one alternative to zero. Here, "still travel" is

chosen as the reference alternative, and all the parameters of “still travel” are set to zero.

Table 6 Model estimation results

Explanatory variable	China		South Korea	
	Cancel	Change	Cancel	Change
Gender	0.31	-0.09	-0.92	-1.31
Age	0.21	-0.22	0.38	0.49
Income	-0.04 *	-0.04	0.26	-0.11
Education	0.04	0.32	-1.61 *	-1.38
Travel experience	-1.08 **	0.06	-1.05 **	0.01
Time interval	-0.31 **	-0.24 *	-0.51	-0.37
Purpose	1.89 **	1.26 *	1.82	1.33
Travel companion	-0.42	-0.84	-0.14	-2.24
Perception1	0.35 **	0.45 **	0.85 **	0.49
Perception2	0.08	0.21	1.09 **	0.81 *
Perception3	0.06	0.12	0.03	0.12
Perception4	0.02	-0.01	-0.24	0.01
Perception5	0.58 **	0.28 *	1.07 **	0.55
Perception6	0.04	0.05	0.14 **	-0.35
Perception7	0.40 **	0.19	0.22 **	0.44
Initial log-likelihood	-586.7		-204.3	
Converged log-likelihood	-393.3		-83.4	
McFadden’s Rho-squared	0.32		0.59	

* significant at the 10% level, ** significant at the 5% level

The estimated explanatory variables result in the following findings.

(1) Demographics

In this study, demographics including gender, age, income and education level are included into the model as explanatory variables. The estimation results of tourists from China show income has significant influence on tourists’ behavior response after the earthquake. Specifically speaking, it reveals that people with higher income are less likely to cancel their trip after the earthquake. It could be explained by the reason that higher income might increase their adaptation ability when they travel to a disaster-affected area, such as more travel mode options, among others. As for tourists from South Korea, education level is proved to have great influence on their behavior response. It suggests that tourists with higher education level are less likely to cancel their trip after the earthquake.

(2) Past experience

In the model, tourist's past experience is represented by the travel times to Japan in the last 5 years. It shows significant influence on both Chinese tourists and Korean tourists. The negative parameter of this variable in the alternative "cancel the trip" means that tourists with more travel experience to Japan are less likely to cancel the trip after the disaster. This might be because more travel experience provides them with more knowledge of the destination and higher ability to cope with emergency. It suggests repeat visitors are more resilient to the disaster.

(3) Trip purpose

The influence of trip purpose is included into the model as a dummy variable with 1 indicating tourism trip and 0 indicating business trip. It shows significant influence on tourists from China. The positive parameter of trip purpose suggests that tourists who plan to visit Japan on a tourism trip are more likely to cancel to change their trip after the earthquake. Such result indicates that business trip is more resilient segment after the disaster for Chinese market.

(4) Image perception

From the results of image perception, one can see that for both Chinese and Korean tourists, those who have higher perception that "the majority of Japan was directly affected by the earthquake", "It was not safe to travel to Japan because of the aftershock", and "Food in Japan has been polluted by nuclear leakage" are more likely to cancel their trip. And for tourists from South Korea, the higher perception that "After the earthquake, Japan was inaccessible" and "It was not safe to travel to Japan because of the nuclear leakage" also increase the probability for them to cancel the trip.

5. Conclusion

It is widely recognized that tourism is subject to natural disaster. Recently, the effects of natural disaster for tourism have been the focus of more research, and the existing studies have sought to assess the consequences of different disasters for the tourism industries. However, limited effort has been made for an understanding of tourists' response behavior to natural disasters to provide implication for the risk management of tourism industry.

In line with such consideration, this study has attempted to investigate tourists' behavior responses to the Great East Japan Earthquake. For the purpose of this study, we conducted a web-based survey in China and South Korea to collect information of international tourists' behavior response after the earthquake. The post disaster travel behavior of travelers from these two countries is analyzed to reveal the circumstances under which travelers would go to Japan despite the earthquake and the characteristics and concerns of those who cancelled their travel indefinitely. Furthermore, the influence of different factors, including demographic background, past travel experience, trip purpose, and image perception on tourists' response behavior are clarified. Significant differences are revealed between travelers from different countries.

The above findings have important practical implications for recovery and resilience

decision-making of inbound tourism industry in Japan. The analysis of tourists' response behavior to the earthquake can help government to predict the changes in tourism market that would occur due to the disaster. A better understanding of the impacts of natural disaster on tourist behavior can benefit the tourism industry in better planning for future risk management and exploring effective policy to support the sustainable development of tourism industry. In addition, the research findings of this study are expected to provide the hazard management agencies and the tourism industry in Japan with critical insights for their adaptation decision-making to climate change.

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