An Analysis of Tourist Perception and Attitude toward Disasters: A Case Study of Recent Chinese Large Earthquake Disasters

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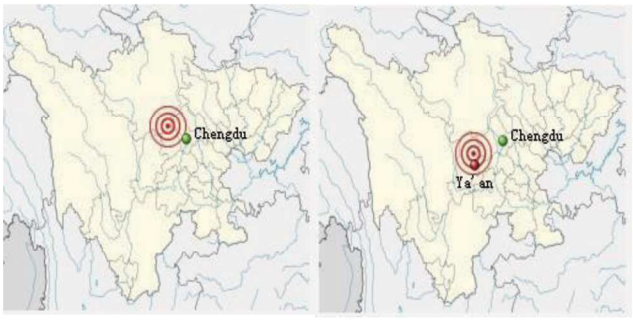
This study tests a structural equation model for tourist risk perception, travel motivation, attitude toward earthquakes' impact on tourism and tourist satisfaction. The conceptual model consists of four latent variables and six path hypotheses, and is tested based on 412 onsite questionnaires from tourists who were traveling in Chengdu and Dujiangyan, Sichuan Province, China which has experienced two large earthquakes, the 2008 Wenchuan earthquake (Mw 8.0) and the 2013 Ya'an earthquake (Mw 7.0). The findings indicated that tourist satisfaction was directly affected by perceived earthquakes' impact on tourism, which was influenced by risk perception and travel motivation. Consequently, the implications for disaster preparedness and post-disaster recovery for the tourism industry are discussed.

Keywords: *risk perception, attitude, earthquakes, structural equation modeling (SEM)*

1. Introduction

Since 2008, Sichuan Province, China experienced two large earthquakes, the 2008 Wenchuan earthquake and the 2013 Ya'an earthquake (see Fig. 1). The 2008 Wenchuan earthquake that occurred on May 12 at 06:28 (UTC) in Sichuan Province, had a magnitude of 8.0 on the Richer Scale and caused considerable loss of casualties, including 69,195 dead, 374,177 injured and 18,392 missing [1]. The Ya'an earthquake of 7.0 on the Richer Scale, also hit Sichuan on April 20, 2013. According to official statistics [2], the earthquake resulted in 196 people dead, 21 missing, and 11,470 injured. The earthquakes caused a large number of buildings and infrastructures ruined, highways, water supply and power systems destroyed or affected, and a vast amount of sewage and garbage generated. The earthuqakes significantly affected all industries, including the tourism industry, in the areas in which they struck.



a.2008 Wenchuan earthquake b.2013 Ya'an earthquake

Fig. 1. Main earthquakes in Sichuan. (source: Wiki [3], [4])

Risk has been widely discussed in the existing literature, including tourism research. People commonly travel for recreation, leisure, business, visiting friends and relatives, and so on. In exceptional cases, travelers journey in the interest of taking risk. The individual's safety and security needs take dominate and precedence behavior when one's physical needs relatively satisfied (Maslow, 1943) [5]. Personal safety factor appears to be one of the most critical factors for tourist choice of destination (Hsu et al., 2009) [6].

The tourism industry is vulnerable to a series of disasters, because it is a compressive industry and depends on so many components and individual businesses; more importantly, disasters may endanger the safety of visitors (Sönmez, 1998) [7]. Because safety and security are essential conditions for the development of tourism, they are fundamental determinants of its growth. When tourism ceases to be pleasurable due to actual or perceived risks, tourists exercise their freedom and power to avoid risky situations or destinations (Sönmez et al., 1999) [8]. In addition, tourists are often more vulnerable than locals in disaster situations because they are less familiar with local hazards and the resources on which they can rely on to avoid risk, and they are less independent (Burby and Wagner, 1996 [9]; Drabek, 1992 [10]; Faulkner, 2001 [11]). An abundant of studies indicated that the tourism industry was negatively and significantly affected by shocks (e.g. Wu and Hayashi, 2014 [12]). Examples of main shocks include the 2001 foot and mouth crisis (Thompson, 2002 [13]), the September 11 terrorist attacks (Goodrich, 2002 [14]; Floyd et al., 2004 [15]; Ito and Lee, 2005 [16]), Severe Acute Respiratory Syndrome (SARS) (Chien and Law, 2003 [17]; Wilder-Smith, 2006 [18]), the Indian Ocean tsunami (Henderson, 2005 [19]; Birkland et al., 2006 [20]), and earthquakes (Mazzocchi and Montini, 2001 [21]; Huang and Min, 2002 [22]; Yang et al, 2008 [23]; Mendoza et al., 2012 [24]; Wu and Hayashi, 2013 [25]).

Existing research on tourism disasters primarily focused on assessment the impact of disasters on tourism and tourism disaster management. HIowever, to date, relatively little research has been conducted on tourists' perception of risk. Among these studies, the majority concentrated on international travelers' perception of risk and a few discussed domestic tourists' perception. A limited understanding exists of the relationship among tourist's risk perception, travel

motivation, the impact of perceived disasters and tourist satisfaction. This study centers on domestic perception after the two earthquakes in Sichuan. Specifically, this exploratory investigation draws from a sample of domestic travelers to examine tourists' attitude toward the impact of disasters on tourist destinations. This study uses structural equation modeling (SEM) approach to explore the inter-relationship among risk perception, travel motivation, attitude toward the earthquakes' impact on tourism in Sichuan (AEITS), and tourist satisfaction. The outcomes of this study are expected to contribute to the tourism industry by providing knowledge of tourists' risk perception and their attitude toward earthquakes' impact on tourism, and then by improving planning for future crisis management.

The remainder of this paper is organized as follows. Section 2 reviews the relevant literature. Section 3 introduces the data and approach. In section 4, data analysis and the findings of the survey are addressed. Finally, section 5 concludes this paper and discusses the results and their implications.

2. A literature review

In recent years, there has been an increasing interest in discussing the impact of actual and potential threats, such as terrorism, earthquakes, epidemics and tsunamis on tourism industry. Faulkner (2001) [11] noted that we are living in an increasingly disasters prone world. This standpoint was based on the number of disasters has increased in recent decades, and the media report these events causally. Tasci and Gartner (2007) [26] indicated that human caused disasters and natural disasters reported by the media have an even more significant impact on the image of a tourist destination. This image is regarded as an important aspect of successful tourism development and destination marketing given its impact on both the supply and demand sides of marketing. Destination image formation factors comprise supply side, independent side, and demand side. Among them, only demand side is uncontrollable and refers to socio-demographics, psychographics, motivations, experience and prior visit, attitude, and needs (Tousi et al., 2012) [27].

(1) Risk

Risk is defined by the United Nations Office for Disaster Risk Reduction (UNUSDR) as the combination of the probability of an event and its negative consequences. The definition includes two distinguishing connotations: in popular usage the emphasis is usually placed on the chance of possibility, whereas in a technical setting the emphasis is frequently on the consequences [28]. This study focused on the popular usage. In the marketing literature, Bauer (1960) [29] introduced the construct of perceived risk. This concept is frequently used by consumer researchers to define risk in terms of the consumer's perceptions of both uncertainty and magnitude of the possible adverse consequences (Yüksel and Yüksel, 2007) [30].

Tourists perceive different types of risk and/or a combination of these risks, which make tourists perceive a global level of risk (Park and Reisinger, 2010) [31]. Roehl and Fesenmaier (1992) [32] identified three dimensions of the perceived risk and divided travel risks into seven categories: equipment risk, financial risk, physical risk, psychological risk, satisfaction risk, social risk and time risk. Sönmez and Graefe (1998) [33] summarized previous achievements and categorized four main types of risk as associated with tourism, namely, financial, psychological, satisfaction, and time risks. Lepp and Gibson (2003) [34] noted that safety and security were important concerns for tourists and underlined four major risk factors: terrorism, war and political instability, health concerns and crime. Although different researchers classified risk differently, this study focused on health (Pine and McKercher, 2004 [35]; Kuo et al., 2008 [36]), terrorism (Enders et al., 1992) [37], and natural disasters, including catastrophes and general disasters (Milo and Yoder, 1991 [38]; Lo et al., 2001 [39]). These four factors were measured on the basis of the magnitude of the threat and the probability of occurrence, which impacted attitude and behavioral changes (Rogers, 1975) [40].

(2) Travel motivation

Motivation is a critical part of travel consumer behavior. Several theories have been developed regarding travel motivation, such as the push-pull theory (Dann, 1977) [41] and Iso Ahola's Motivational Theory (Iso-Ahola, 1982 [42]; Mackellar, 2013 [43]). Yet, little academic research has investigated disaster management for tourism (Rittichainuwat, 2006) [44] or the relationships among motivation and other behavioral constructs (Yoon and Uysal, 2005 [45]; Hsu et al., 2010 [46]). Rittichainuwat (2008) [47] investigated the travel motivation of tourists visiting disaster-hit beach resorts. Yoon and Uysal (2005) [45] empirically tested the causal relationships among motivation, satisfaction, and destination loyalty. The motivation factor is included in this study as a latent variable.

(3) Attitude

Attitude consists of one's beliefs about the consequences of performing a behavior multiplied by his or her valuation of these consequences (Fishbein and Ajzen, 1975) [48]. Gnoth (1997) [49] suggested that attitudes are the first topic of discussion in the development of a model for tourism motivation and behavior, and specified the relationship between motivation and attitude. According to the existing literature (Gnoth, 1997 [49]; Hsu et al., 2010 [46]; Wong et al., 2013 [50]), attitude toward visiting a destination is directly affected by motivation. Dunn Ross and Iso-Ahola (1991) [51] explored the motivation and satisfaction dimensions of sightseeing tourists and indicated that a considerable similarity between attitude and satisfaction. Therefore, attitude factors are considered in this study.

(4) Satisfaction

A large volume of research discussed satisfaction and its determinant, including for the tourism field (e.g. Dmitrovic et al., 2009 [52]; del Bosque and Martín, 2008 [53]; Armario, 2008 [54]). Although multi-item scales are most commonly used to measure satisfaction, single-item measures of satisfaction have been used in existing literature, i.e. job satisfaction (Wanous and Reichers, 1996 [55]; Nagy, 2002 [56]), work satisfaction (Gardner et al. 1998) [57], citizen satisfaction (Van Ryzin, 2004) [58], and customer satisfaction (Fornell, 1992 [59]; Andreasen, 1984 [60]; Spreng and Mackoy, 1996 [61]; Spreng et al., 1996 [62];

Bolton and Lemon, 1999 [63]; Crosby and Taylor, 1982 [64]; Fornell et al.,1996 [65]; Herberlein et al., 1982 [66]; Tse and Wilton, 1988 [67]). In this study, we treated tourist satisfaction as a perfect measure and measured it with a single item, in accordance with prior research in this field (Bigné et al., 2001 [68]; Armario, 2008 [54]).

Many other factors, such as expectation (Hsu et al., 2010) [46], service quality (Bigné et al., 2001) [68], were studied. They were found to related to the variables in our study. On the basis of the purpose of this study and to smplify the model, we focused on risk perception, travel motivation, attitude, and satisfaction.

(5) The hypothesized structural model

Fig. 2 displays the hypothetical structural model, in which each component was selected on the basis of the literature review. The hypothesized reciprocal relationship between risk perception and travel motivation referred to research by Reisinger and Mavondo (2005) [69] and Chon (1989) [70]. The topics of motivation, attitude, perception, and satisfaction were diffusely discussed in the field of consumer behavior of marketing and psychology. Previous studies revealed that attitude was affected by perception (Um and Crompton, 1990 [71]; Quintal et al., 2010 [72]) and motivation (Gnoth, 1997 [49]; Hsu et al., 2010 [46]; Wong et al., 2013 [50]), and satisfaction is affected by attitude (Chon, 1989) [70], motivation (Dunn Ross and Iso-Ahola, 1991 [51]; Fielding et al., 1992 [73]; Yoon and Uysal, 2005 [45]) and perception (Churchill and Surprenant, 1982 [74]; Alegre and Cladera, 2009 [75]). Based on the literature, it is hypothesized that:

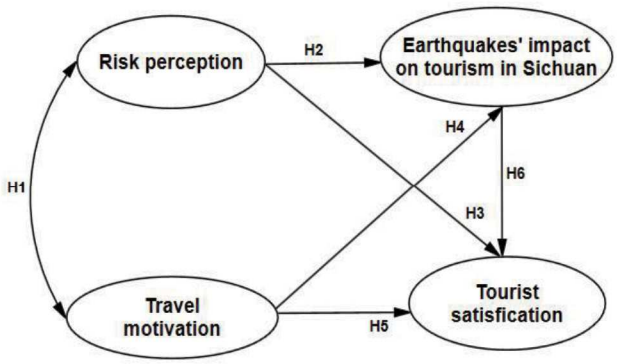


Fig. 2. The hypothesized structural model.

H1: Tourist risk perception is correlated with travel motivation.
H2: Risk perception is positively related to AEITS. Greater risk perception is associated with more significant impacts of the earthquakes.
H3: Risk perception is negatively related to tourist satisfaction. Greater risk perception is associated with lower satisfaction.
H4: Travel motivation is negatively related to AEITS. Stronger motivation to travel in Sichuan is associated with less earthquake damage.
H5:Travel motivation is positively related to tourist satisfaction. More strongly, travel motivation is associated with greater satisfaction.
H6: The perceived impact of earthquakes on tourism is negatively related to tourist satisfaction. Tourist opinion that earthquakes cause greater damage results in lower satisfaction.

3. Method

(1) Study sites

Since 2008, Sichuan Province, China experienced two large earthquakes, the 2008 Wenchuan earthquake and the 2013 Ya'an earthquake. The earthquakes caused a large number of buildings and infrastructures ruined, highways, water supply and power systems destroyed or affected, and a vast amount of sewage and garbage. Chengdu was selected as a survey location because it is the traffic hub of Sichuan Province even southwest in China, is the provincial capital of Sichuan, and is located in the intermediate zone of the main quake-hit areas (see Fig. 1).

Fig. 3 indicates the AAAAA scenic spots [(1)] (until August 2013) in Sichuan [76]. Mount Qingcheng-Dujiangyan, one of the most famous scenic spots in Sichuan, is near the epicenter of the main quake of the Wenchuan earthquake. Therefore, Dujiangyan was selected as the other study survey site.

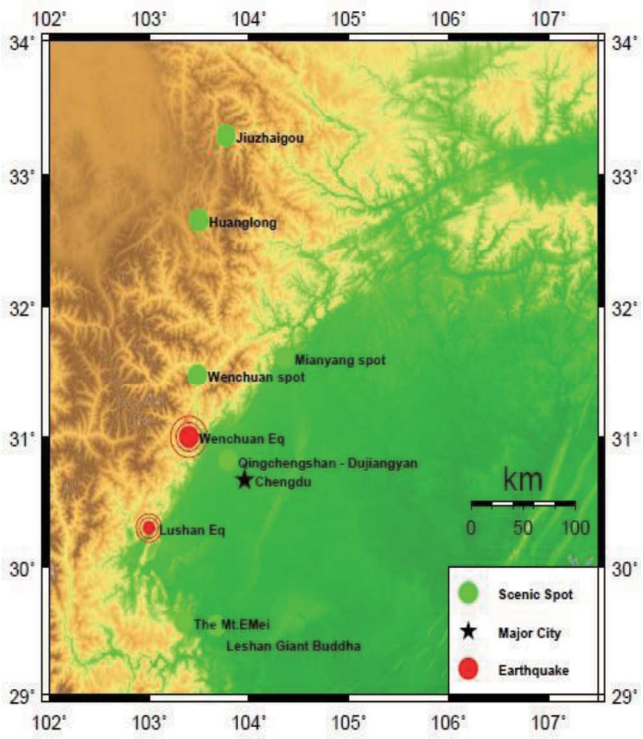


Fig. 3. The distribution of main scenic spots in Sichuan.

The data for this study were collected using a questionnaire given to domestic tourists in Sichuan. Visitors who were traveling in Chengdu (Jinli Street, Kuan-Zhai Lane, Chunxi Road, Tianfu Square) and Dujiangyan (Mount Qingcheng, Hongkou) were randomly invited to fill in the questionnaire with the assistance of local students. The survey was conducted in August 2013, soon after the 2013 Ya'an earthquake.

Based on the purpose mentioned above, we targeted tourists traveling in the two survey sites. After the survey, 412 out of the total sample of 550 were found to be valid for further data analysis. The demographic variables were selected on the basis of the literature review included gender, age, education level, monthly income level and residence. The sample demographic profile shown in Table 1 is deemed a representative sample. Respondents' age distribution was from younger than 18 to older than 66, with the majority in the 18–25 (35%) and 26–35 (24.8%) age groups, given that August is summer vocation for

students in China. The respondents were highly educated, with 56.8% undergraduates and 17.2% technical or vocational college students, which were consistent with age variables. Table 1 shows that more than half (53.2%) of the respondents had a monthly income of RMB 1,500–2,500. The vast majority of the respondents were from Southwest China (86.4%) in accordance with the official government statistics in Sichuan Province that the majority tourists were from Sichuan or nearby provinces. More than 50% of the respondents indiated that thet were "sightseeing," and "growth of knowledge" accounted for more than 45% of the responses.

Table 1 Demographic profile of respondents

Varibale	n	Percent (%)
Gender		
Male	180	43.7
Female	232	56.3
Age		
Under 18	47	11.4
18-25	144	35.0
26-35	102	24.8
36-45	48	11.7
46-55	25	6.1
56-65	26	6.3
66 or above	20	4.9
Education		
less than Senior high school	33	8.0
Senior high school	68	16.5
Technical/vocational college	71	17.2
Undergraduate	234	56.8
postgraduate	6	1.5
Monthly income level		
Less than RMB 1500	82	19.9
RMB 1500-2500	219	53.2
RMB 2501-3500	98	23.8
RMB 3501-5000	10	2.4
RMB 5001 or above	3	0.7
Residence		
North China	5	1.2
Northeast China	1	0.2
East China	7	1.7
South China	28	6.8
Southwest China	356	86.4
Northwest China	8	1.9
Central China	7	1.7

(2) Questionnaire design and research variables

The items in this study primarily originated from a review of the empirical literature, as did the risk perception items (Law, 2006 [77]; Kozak et al., 2007 [78]). The items for travel motivation were derived from the studies by Rittichainuwat (2006 [44] and 2008 [47]). The AEITS items primarily arose from Gan et al. (2010 [79]) and Li et al. (2011 [80]) (see Table 2).

Respondents were first asked questions on demographics, including gender, age, education level, monthly income level and residence. As shown in Table 2, the items of risk perception, travel motivation, and AEITS were measured using a five-point Likert type scale on the basis of what they thought of the items. Risk perception was measured using eight items, through which likelihood of the perceived risks was assigned values ranging from 1 = very low to 5 = very high, and the damage from the risks was scaled using little–huge high format. Travel motivation assessed using 13 items, the AEITS was measured by five items, and satisfaction level was directly assessed on a Likert scale from 1 = strongly disagree to 5 = strongly agree.

Table 2 Latent and observed variables

Latent Variable	Observed Variable
Travel Motivation (13)	beauty of nature
	good climate
	attracting culture
	a variety of foods
	high quality of hotels and attractions
	high quality of service
	friendness of local people
	low-cost of travel
	safe travel in Sichuan
	convenient tranportation
	help the recovery of tourism industry
	curiosity about the debris after the disaster
	curiosity to see the recovery and change
Risk Perception (8)	the probability of pandemic diseases
	the probability of terrorism
	the damage of pandemic diseases
	the damage of terrorism
	the probability of catastrophies
	the probability of natual disasters
	the damage of catastrophies
	the damage of natual disasters
Attitude towards the Earthquakes' impact on tourism in Sichuan(5)	make journey dangerous
	environment became fragile
	tourism resources was destroyed significantly
	the number of tourist arrivals decreased
	tourism transportation was impacted heavily
Tourist satisfaction (1)	satisfaction

(3) Structural equation modeling

SEM is a statistical methodology that takes a confirmatory (i.e., hypothesis-testing) approach to analyzing a structural theory bearing on some phenomenon (Byrne, 2013) [81]. SEM represents an extension of general linear modeling (GLM) procedures, such as regression analysis and analysis of variance. More importantly, compared with other applications of GLM, SEM can be used to study the relationships among latent constructs that are indicated by multiple measures (Lei and Wu, 2007) [82]. SEM had not been frequently applied in the tourism disciplines (Reisinger and Turner, 1999) [83], but its use in constructing predictive conceptual relations in the field of tourism has been increasing (e.g., Alegre and Cladera, 2009 [75]). Generally, structural equation model comprises two sub-models: a measurement model that defines relations between the observed and latent variables, and a structural model that represents the relations among the latent variables (Byrne, 2013) [81]. General steps in SEM are model specification, identification, estimation, testing the model fit, and model modification.

In this study, the observed variables were described using the scale items (27 items) and the latent variables were represented by the four dimensions of travel motivation, risk perception, AEITS and satisfaction (see Table 3). The maximum likelihood method of estimation was applied to estimate all of the models. Analysis of moment structures (Amos) Ver.22.0 was employed to perform the SEM. All

reported results in this study were based on completely standardized solutions.

Table 3 The latent and observed variables for model

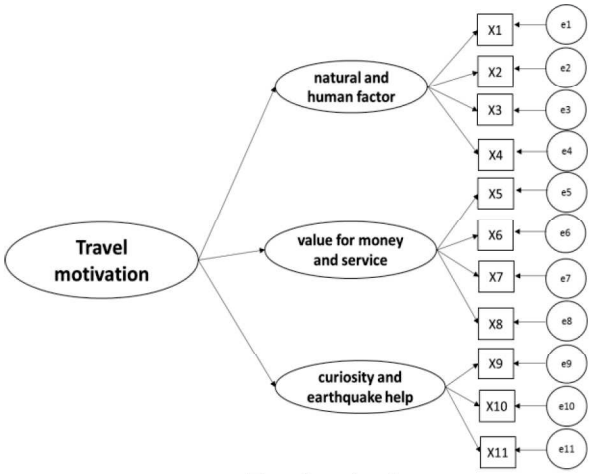
Latent Variable	Common Factor	Label	Observed Variable
Travel Motivation(11)	natural and human factor	x1	beauty of nature
		x2	good climate
		x3	attracting culture
		x4	a variety of foods
	value for money and service	x5	high quality of hotels and attractions
		x6	high quality of service
		x7	friendness of local people
		x8	low-cost of travel
	curiosity and earthquake help	x9	help the recovery of tourism industry
		x10	curiosity about the debris after the disaster
		x11	curiosity to see the recovery and change
Risk Perception(8)	man made disaster	x12	the probability of pandemic diseases
		x13	the probability of terrorism
		x14	the damage of pandemic diseases
		x15	the damage of terrorism
	natrual disaster	x16	the probability of catastrophies
		x17	the probability of natual disasters
		x18	the damage of catastrophies
		x19	the damage of natual disasters
Attitude towards the Earthquakes' impact on tourism in Sichuan(5)		x20	make journey dangerous
		x21	environment became fragile
		x22	tourism resources was destroyed significantly
		x23	the number of tourist arrivals decreased
		x24	tourism transportation was impacted heavily
Tourist satisfaction(1)		x25	satisfaction

4. Data analysis and results

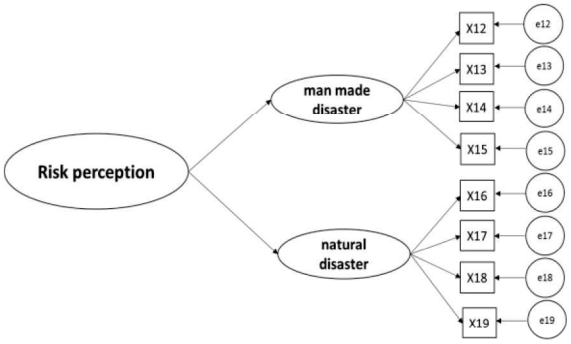
(1) Data analysis

Data analysis was accomplished in three steps. In the first step, a reliability analysis using Cronbach's alpha (1951) [84] was performed for "risk perception", "travel motivation" and "AEITS" by applying SPSS 17.0 to verify the consistency and stability, resulting in the α of 0.903, 0.957 and 0.983, respectively. All of these values are reliable given that an alpha value of 0.7 or higher is acceptable as a good indication of reliability (Nunnally, 1978) [85]. Next, with the aim of simplifying the measurement model, factor analysis was used for "risk perception", "travel motivation" to extract the factors to determine the correlations among the observed variables. The results are shown in Table 3. Factor analysis of the 13 travel motivation items resulted in three significant factors that explained 90.5% of the total variance. The variables of "safe travel in Sichuan" and "convenient transportation" were eliminated because they poorly measured the factors. Fig. 4 shows the simplified measurement models for "risk perception", "travel motivation", in which the ellipses represent latent variables, the rectangles denote observed variables, and the circle indicated measurement errors.

Then, the confirmatory factor analysis (CFA) and SEM were employed to test the hypothesized model with the properties of the four variables (two exogenous and two endogenous). And in this step, the first factor loadings for each latent variable are set to 1 for model identification (UCLA, [86]; Milfont and Fischer, 2010 [87]), as shown in Fig. 5, in which "e" and "r" are error terms. Because tourist satisfaction was measured using a single–item measure, David Kenny [88] suggested the conditions for single-indicator latent variables and indicated that single indicators meet either of the following conditions: a. its error variance is fixed to zero or some other a priori value or b. there is a variable that can serve as an instrumental variable in the structural model and the error in the indicator is not correlated with that instrumental variable. We applied the former rule suggested by David Kenny and set the error variance of tourist satisfaction to zero.



a. Travel motivation



b. Risk perception

Fig. 4. The simplified measurement model.

(2) Results

First, the chi-square test statistics were applied for hypothesis testing to evaluate the fit of the SEMs. For a good model fit, the ratio $\chi 2$/degrees of freedom should be as small as possible. Because no absolute standards exist, a ratio between 2 and 3 is indicative of a "good" or acceptable data model fit, respectively. The usual rule of thumb for the goodness-of-fit index (GFI) is that 0.95 is indicative of a good fit relative to the baseline model, whereas values greater than 0.90 are usually interpreted as acceptable fits. A rule of thumb for Comparative fit index (CFI) is that 0.97 is indicative of a good fit relative to the independence model, whereas values greater than 0.95 may indicate as an acceptable fit (Schermelleh-Engel et al., 2003) [89].

Generally, the value for the root mean square error of approximation (RMSEA) should be less than 0.05. Hu and Bentler (1992) [90] suggested a RMSEA of less than 0.06 as a cutoff criterion.

Table 4 Goodness-of –fit measures

Model	CMIN	DF	CMIN/DF	P-value	GFI	RMSEA	CFI
Conceptual model	1134.9	265	4.3	.000	0.825	0.089	0.944
Modified model 1	1138.0	267	4.3	.000	0.824	0.089	0.944
Modified model 2	585.3	257	2.3	.000	0.900	0.056	0.979

Notes: CMIN, X2 or Chi-square; DF, degrees of freedom; GFI, goodness-of-fit index; RMSEA, root mean square error of approximation; CFI, comparative fit index.

As Table 4 shows, the results for testing the hypothesized model exhibited poor model fit: Chi-square (χ2,CMIN) = 1,134.9, degrees of freedom (DF) = 265, CMIN/DF = 4.3, P < 0.05, GFI = 0.825, RMSEA = 0.089, and CFI = 0.944. Because the indices indicated a poor fit, post-hoc modifications were applied in an attempt to develop a better fitting model. All regression weights for the hypothesized structural model estimation were within acceptable ranges (p-value was set at the 5% significance level), with the exception of two regression paths: travel motivation → tourist satisfaction, risk perception → tourist satisfaction. Therefore, these two paths were deleted and a modified model 1 was achieved. The output shown in Table 4 indicates that the modified model 1 was still a bad fit, with χ2 = 1,138 (DF = 267, χ2/DF = 4.3), p < 0.05, GFI = 0.0824, RMSEA = 0.089, and GFI = 0.944. Examination of the modification indices (MI) revealed evidence of misfit in the model and suggested that allowing a number of error terms to correlate would improve the fit of modified model 1. Given that the values of MI and par change, and the maximum contribution to the model improvement fit, ten measurement errors were added and a new revised model, modified model 2, was obtained (see Fig. 6). A chi-square difference test indicated that the modified model 2 was significantly improved by the addition of the error items with a ratio of χ2 equals to 2.3 at the 1% significance level. The value of GFI equals to 0.900 and RMSEA is 0.056, within acceptable fit level. CFI is 0.979, which is regarded as a good. Therefore, the model revision resulted in an improved and acceptable model, as demonstrated in Table 4.

The final structural model, which shows coefficients in standardized form, had three significant regression paths among the latent variables. The dotted lines represent the eliminated paths (see Fig. 6). Table 5 exhibits standardized regression weights including direct effects and indirect effects. Among the direct effects, risk perception → AEITS and travel motivation → AEITS were negative. The correlation between risk perception and travel motivation was -0.140 at the 1% significance level.

Table 5 Standardized regression weights (direct, indirect and total)

Hypothesized causal paths	Direct effects	Indirect effects	Total effects
H2 (Risk perception → AEITS)	0.420***	-	0.420
H3 (Risk perception → Tourist satisfaction)	NS	-0.062	-0.062
H4 (Travel motivation → AEITS)	-0.106 **	-	-0.106
H5 (Travel motivation → Tourist satisfaction)	NS	0.016	0.016
H6 (AEITS → Tourist satisfaction)	-0.148 **	-	-0.148

Notes: * represents at 10% significance level; **, 5% significance level; ***, 1% significance level; NS means non-significant (the paths were deleted).

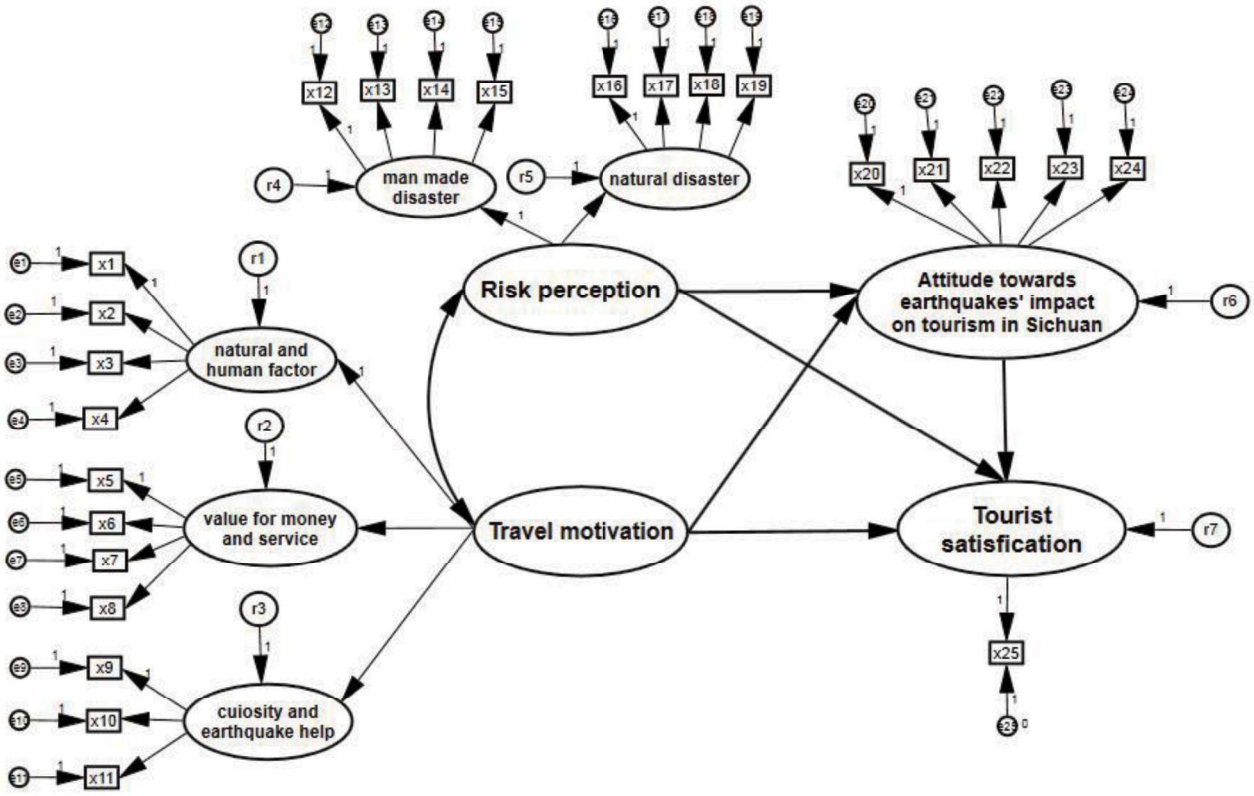


Fig. 5. Initial model for parameter estimation.

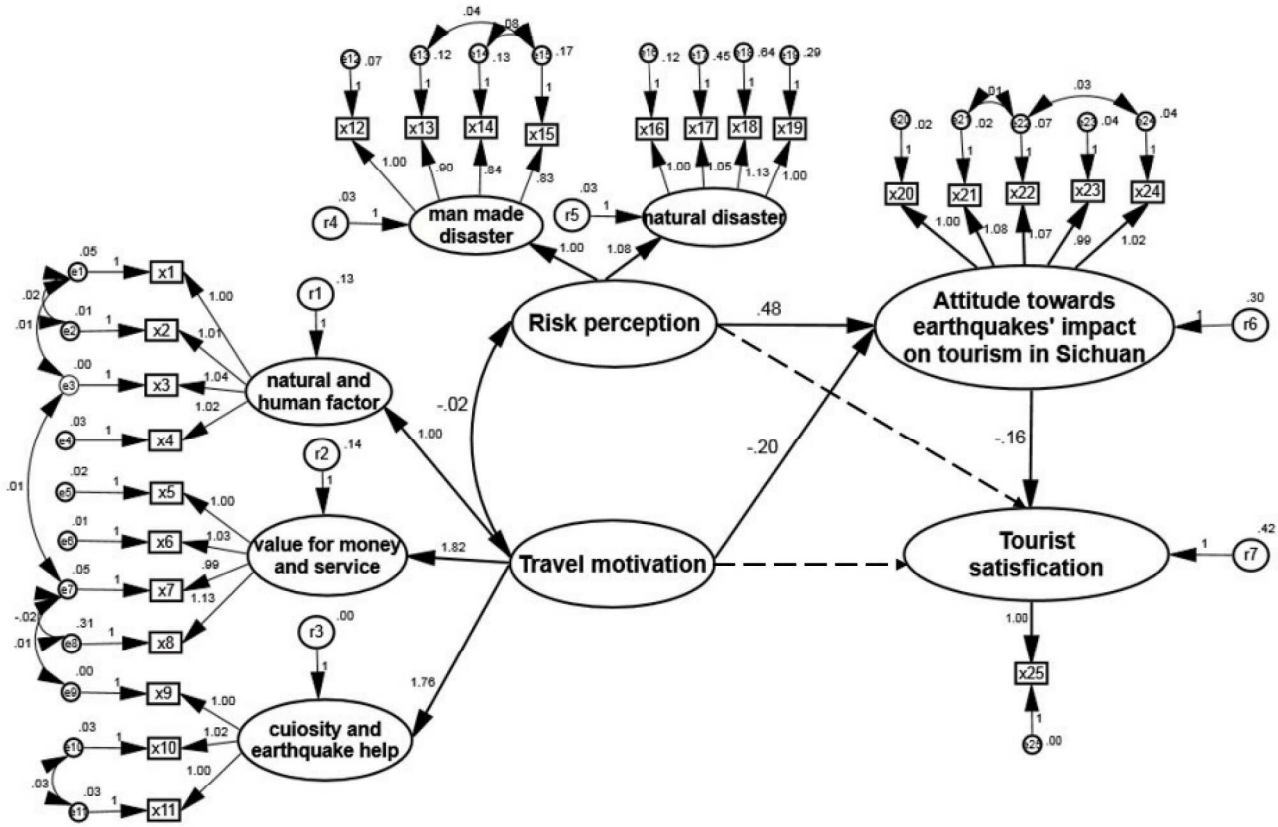


Fig. 6. Final modified model.

Note: Coefficients estimated are all unstandardized. Dotted lines represent non-significant paths.

5. Discussion and implications

The objective of this study is to model tourists' risk perception, travel motivation, AEITS and satisfaction. A conceptual model with six paths was proposed on the basis of literature review. The hypothesized model was tested by applying the SEM approach using data obtained from a questionnaire survey in Sichuan. After the conceptual model was estimated, its fit was investigated. Analysis of the AMOS 22.0 output suggested that the modified model 2 was better than the original hypothesized model and the revised model 1. Therefore, the conceptual model and the revised model 1 were rejected, and the modified model 2 was accepted as the final model.

The hypotheses proposed for the structural model were partially supported by the data. The findings of the study confirmed that the perception of risk was positively associated with AEITS, whereas travel motivation negatively impacted AEITS in a regional southwest China context. The perception of risk was negatively correlated with travel motivation. The perceived impact of earthquakes on tourism in Sichuan likely decreases the level of tourist satisfaction. In addition, the perception of risk is indirectly and negatively associated with tourist satisfaction, and tourist satisfaction is indirectly and positively impacted by travel motivation. The nonsignificant paths of risk perception → tourist satisfaction and travel motivation → tourist satisfaction were deleted.

As Fig. 6 indicates that the coefficient between risk perception and travel motivation is negative, and the negative coefficient of 0.02 shows that a negative relationship exists between risk perception and travel motivation (H1). Therefore, when tourist wants to travel, safety and security factors are somewhat interactive. A stronger motivation to travel is associated with lower risk at the tourist destination. H2 which suggests that risk perception is positively related to the perceived earthquakes' impact on tourism in Sichuan is supported, as the standardized coefficient from risk perception to AEITS is 0.48 and direct effect of regression weight is 0.413. The proposed path from risk perception to tourist satisfaction is not supported by the data, because the path that was not statically significant was deleted in the final model, even thouth the results exhibited an indirect and negative effect of risk perception on tourist satisfaction (H3). H4 which states that that stronger motivation to travel in Sichuan is associated with lower perceived damage caused by earthquakes, is supported. The results are consistent with the findings from Law (2006) [77] and Roehl and Fesenmaier (1992) [32] that generally tourists believe that the destinations they select are with low risk. The findings did not support H5, which suggests that travel motivation is positively related to tourist satisfaction. The results imply that the perception of risk does not directly affect tourist satisfaction, although the standardized regression weight as indicated by the indirect effect coefficient of 0.08 in Table 5. A negative significant relationship was found between AEITS and tourist satisfaction (H6). The significant path as indicated by a negative 0.16 reveals that the perceived damage caused lower satisfaction with travel.

Our findings that the attitude toward the impact of earthquakes, which is directly affected by the perception of risk and travel motivation, is an antecedent of tourist satisfaction makes the observed variables of AEITS (primarily referring to the safety factor) in the model important. Therefore, safety should be emphasized by official agencies and operating sectors. We suggest that local agencies provide support policies

for disaster preparedness, such as building code and tourism recovery that includes infrastructure and facility recovery, and implement strict safety regulations. As the demographic profiles (see Table 1) shows that the vast majority of the respondents were from southwest China (86.4%) and 68% of the respondents claimed that they received their tourism information primarily from their relatives, friends or colleagues, these mean that word of mouth plays an important role in tourism development in Sichuan. Therefore, the need exists for cooperation among numerous stakeholders in a destination to improve tourist' experiences such that the destination's image is improved. Marketing techniques, including advertising, public relations and tourist information organizations that provide accurate information to tourists and potential tourists to avoid reputational rumors and to correct misinformation and perceptions that customers hold about a travel destination (Ritchie, 2004) [91], are helpful for post-disaster tourism destination recovery from the perspective of tourism demand. This study also recommends developing new tourism projects related to earthquakes for post-disaster tourism destinations (Pottorff and Neal, 1994) [92] because the results reveal that the factor loading from curiosity and the earthquake help factor to travel motivation is significant, with a value higher than 1.

This study applied SEM approach to explore the inter-relationship among risk perception, travel motivation, AEITS, and tourist satisfaction using observed variables. It is suggested that the approach is available and is recommended destination policy makers can use this method to analyze tourists' attributes to support references for them during decision making.

The findings of this study indicate that the developed model that supports the model's fit was acceptable. However, as only four factors in the model were considered duing the analysis of Sichuan, therefore, identifying and investigating other factors that may influence tourist satisfaction and loyalty, such as a rumor factor, is necessary. In addition, it is vital to test the model more strictly with different examples.

The current study has several limitations. First, the developed model in this study relied on data collected from tourists limited to Chengdu, Sichuan Province. Future study is necessary required to apply this approach to other destinations. Second, although visitors were randomly invited to fill in the questionnaire, this survey was conducted in August, which corresponds to summer vacation for students in China. Therefore, college age and adult groups accounted for a significant proportion of the sample, which may result in a large number of well-educated respondents with low income. Such a sample may introduce bias in the results and affect the perception of risk that the destination may be low risk, thereby possibly affecting the results of the structure model. Conduct surveys in different seasons is suggested to reduce bias of sample. Finally, given that 86.4% respondents were from southwest China, the sample seems biased toward the visitors from areas near the destination. However, statistical data on visitor residence are unavailable from the official website of Sichuan, except for from 2003 to 2005. The statistical results show that more than 76% of the visitors came from southwest China during the period (Sichuan Tour Agency, 2006) [93].

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Supplementary

(1) 5A classification system, which is administered by China National Tourism Administration for grading the quality of tourist attractions in China, consists of five levels: A (1A), AA (2A), AAA (3A), AAAA (4A), AAAAA (5A), and 5A is the highest level.

References

1) Chinanews.com (2008.7.1), http://www.chinanews.com/gn/news/2008/07-1/1298928.shtml
2) China.com (2013. 4.24), http://news.china.com.cn/txt/2013-4/24/content_28646664.htm
3) http://en.wikipedia.org/wiki/2008_Sichuan_earthquake
4) http://en.wikipedia.org/wiki/2013_Lushan_earthquake
5) Maslow, A. H.: A theory of human motivation. Psychological Review, vol. 50, pp. 370-396, 1943.
6) Hsu, T. K., Tsai Y. F. and Wu H. H.: The preference analysis for tourist choice of destination: A case study of Taiwan. Tourism Management, vol. 30, pp. 288-297, 2009.
7) Sönmez, S. F.: Tourism, terrorism, and political instability. Annals of Tourism Research, vol. 25, pp. 416-456, 1998.
8) Sönmez, S. F., Apostolopoulos Y., and Tarlow P.: Tourism in crisis: Managing the effects of terrorism, Journal of Travel Research, vol. 38, pp. 13-18, 1999.
9) Burby, R. J. and Wagner, F.: Protecting tourists from death and injury in coastal storms, Disasters, vol. 20, pp. 49-60, 1996.
10) Drabek, T. E.: Variations in disaster evacuation behavior: Public responses versus private sector executive decision - making processes, Disasters, vol. 16, pp. 104-118, 1992.
11) Faulkner, B.: Towards a framework for tourism disaster management, Tourism Management, vol. 22, pp. 135-147, 2001.
12) Wu, L.H. and Hayashi, H.: The impact of disasters on Japan's inbound tourism demand, Journal of Disaster Research, Vol. 9, pp. 699-708, 2014.
13) Thompson, D., Muriel, P. and Russell D, et al.: Economic costs of the foot and mouth disease outbreak in the United Kingdom in 2001, Revue scientifique et technique-Office international des epizooties, vol. 21, pp. 675-685, 2002.
14) Goodrich, J. N.: September 11, 2001 attack on America: a record of the immediate impacts and reactions in the USA travel and tourism industry, Tourism Management, vol. 23, pp. 573-580, 2002.
15) Floyd, M. F., Gibson, H. and Pennington-Gray, L., et al. The effect of risk perceptions on intentions to travel in the aftermath of September 11, 2001, Journal of Travel & Tourism Marketing, vol. 15, pp. 19-38, 2004.

16) Ito, H. and Lee, D.: Assessing the impact of the September 11 terrorist attacks on US airline demand, Journal of Economics and Business, vol. 57, pp. 75-95, 2005.
17) Chien, G. C. L. and Law, R.: The impact of the Severe Acute Respiratory Syndrome on hotels: a case study of Hong Kong, International Journal of Hospitality Management, vol. 22, 327-332, 2003.
18) Wilder-Smith, A.: The severe acute respiratory syndrome: impact on travel and tourism, Travel Medicine and Infectious Disease, vol. 4, pp. 53-60, 2006.
19) Henderson, J. C.: Responding to natural disasters: Managing a hotel in the aftermath of the Indian Ocean tsunami, Tourism and Hospitality Research, vol. 6, pp. 89-96, 2005.
20) Birkland, T. A., Herabat, P. and Little, R. G., et al.: The impact of the December 2004 Indian Ocean tsunami on tourism in Thailand, Earthquake Spectra, vol. 22, pp. 889-900, 2006.
21) Mazzocchi, M. and Montini A.: Earthquake effects on tourism in central Italy, Annals of Tourism Research, vol. 28, pp. 1031-1046, 2001.
22) Huang, J. H. and Min, J. C. H.: Earthquake devastation and recovery in tourism: The Taiwan case, Tourism Management, vol. 23, pp. 145-154, 2002.
23) Yang, W., Chen, G. and Wang, D.: Impact of the Wenchuan Earthquake on tourism in Sichuan, China. Journal of Mountain Science, vol. 5, pp. 194-208, 2008.
24) Mendoza, C. A., Brida, J. G. and Garrido, N.: The impact of earthquakes on Chile's international tourism demand, Journal of Policy Research in Tourism, Leisure and Events, vol. 4, pp. 48-60, 2012.
25) Wu, L.H. and Hayashi, H.: The impact of the Great East Japan Earthquake on inbound tourism demand in Japan, Journal of Institute of Social Safety Science, no.21 pp. 109-117, 2013.
26) Tasci, A. D. A. and Gartner, W. C: Destination image and its functional relationships, Journal of Travel Research, vol. 45, pp. 413-425, 2007.
27) Tousi, S. N., Shahab, S. and Masoudi, A.: Recovery plan for post-disaster tourism destinations image in Bam after earthquake, AESOP 26th Annual Congress METU, Ankara, 11-15 July, 2012.
28) The United Nations Office for Disaster Risk Reduction, http://www.unisdr.org/we/inform/terminology
29) Bauer, R.A.: "Consumer behavior as risk taking" in Hancock, R.S. (Ed.), Dynamic Marketing for a Changing World, Proceedings of the 43rd Conference of the American Marketing Association, pp. 389-98.1960
30) Yüksel, A. and Yüksel, F.: Shopping risk perceptions: Effects on tourists' emotions, satisfaction and expressed loyalty intentions, Tourism Management, vol. 28, pp. 703-713, 2007.
31) Park, K. and Reisinger, Y.: Differences in the perceived influence of natural disasters and travel risk on international travel, Tourism Geographies, vol. 12, pp. 1-24, 2010.
32) Roehl, W. S. and Fesenmaier, D. R.: Risk perceptions and pleasure travel: An exploratory analysis. Journal of Travel Research, vol. 30, pp. 17-26, 1992.
33) Sönmez, S. F. and Graefe, A. R.: Influence of terrorism risk on foreign tourism decisions, Annals of Tourism Research, vol. 25, pp. 112-144, 1998.
34) Lepp, A. and Gibson, H.: Tourist roles, perceived risk and international tourism, Annals of Tourism Research, vol. 30, pp. 606-624, 2003.
35) Pine, R. and McKercher, B.: The impact of SARS on Hong Kong's tourism industry, International Journal of Contemporary Hospitality Management, vol. 16, pp. 139-143, 2004.
36) Kuo, H. I., Chen, C. C. and Tseng, W, C, et al.: Assessing impacts of SARS and Avian Flu on international tourism demand to Asia, Tourism Management, vol. 29, pp. 917-928, 2008.
37) Enders, W., Sandler, T. and Parise, G. F.: An econometric analysis of the impact of terrorism on tourism, Kyklos, vol. 45, pp. 531-554, 1992.
38) Milo, K. J. and Yoder, S. L.: Recovery from natural disaster: Travel writers and tourist destinations, Journal of Travel Research, vol. 30, pp. 36-39, 1991.
39) Lo, A. S., Cheung, C. and Law, R.: Hong Kong residents' adoption of risk reduction strategies in leisure travel, Journal of Travel & Tourism Marketing, vol. 28, pp. 240-260, 2011.
40) Rogers, R. W.: A protection motivation theory of fear appeals and attitude change1, The Journal of Psychology, vol. 91, pp. 93-114, 1975.
41) Dann, G.: Anomie, ego-enhancement and tourism, Annals of tourism research, vol. 4, pp. 184-194, 1977.
42) Iso-Ahola, S.E.: Toward a social psychological theory of tourism motivation: A rejoinder, Annals of Tourism Research, vol. 9, pp. 256-62.1982
43) Mackellar, J.: Event Audiences and Expectations, Routledge, 2013.
44) Rittichainuwat, B. N.: Tsunami recovery a case study of Thailand's tourism, Cornell Hotel and Restaurant Administration Quarterly, vol. 47, pp. 390-404, 2006.
45) Yoon, Y. and Uysal, M.: An examination of the effects of motivation and satisfaction on destination loyalty: a structural model, Tourism management, vol. 26, pp. 45-56, 2005.
46) Hsu, C. H. C., Cai, L. A. and Li, M.: Expectation, motivation, and attitude: A tourist behavioral model, Journal of Travel Research, vol. 49, pp. 282-296, 2010.
47) Rittichainuwat, N.: Responding to disaster: Thai and Scandinavian tourists' motivation to visit Phuket, Thailand, Journal of Travel Research, vol. 46, pp. 422-432, 2008.
48) Fishbein, M. and Ajzen, I.: Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research. Reading, MA: Addison-Wesley, 1975.
49) Gnoth, J.: Tourism motivation and expectation formation, Annals of Tourism research, vol. 24, pp. 283-304, 1997.
50) Wong, M. M. C., Cheung, R., and Wan, C.: A Study on traveler expectation, motivation and attitude, Contemporary Management Research, vol. 9, 169-186, 2013.
51) Dunn Ross, E. L. and Iso-Ahola, S. E.: Sightseeing tourists' motivation and satisfaction, Annals of tourism research, vol. 18, pp. 226-237, 1991.
52) Dmitrovic T, Cvelbar L K, Kolar T, et al.: Conceptualizing tourist satisfaction at the destination level, International Journal of Culture, Tourism and Hospitality Research, vol.3, pp.116-126, 2009.
53) del Bosque I R, Martín H S.: Tourist satisfaction a cognitivc-affcctivc modcl, Annals of Tourism Rcscarch, vol. 35, pp. 551-573, 2008.
54) Armario, Enrique Martín.: Tourist satisfaction: An analysis of its antecedents, Universidad, Sociedad y Mercados Globales. Asociación Española de Dirección y Economía de la Empresa (AEDEM), 2008.
55) Wanous, J.P. and Reichers, A.E.: Estimating the reliability of a single-item measure, Psychological Reports vol.78, pp. 631–634, 1996.

56) Nagy, M.S.: Using a single-item approach to measure facet job satisfaction, Journal of Occupational and Organizational Psychology, vol.75, pp. 77–86, 2002.
57) Gardner, D.G., Cummings, L.L., Dunham, R.B., & Pierce, J.L.: Single-item versus multiple-item measurement scales: An empirical comparison. Educational and Psychological Measurement, vol. 58, pp. 898–915, 1998.
58) Ryzin G G Van.: The measurement of overall citizen satisfaction, Public Performance & Management Review, vol. 27, pp: 9-28, 2004.
59) Fornell C.: A National Customer Satisfaction Barometer: The Swedish Experience, Journal of Marketing, vol. 56, pp. 6–21, 1992.
60) Andreasen, A. R.: Life status changes and changes in consumer preferences and satisfaction, Journal of Consumer Research, vol. 11, pp. 784–794, 1984.
61) Spreng, and Mackoy, R.D.: An empirical examination of a model of perceived service quality and satisfaction, Journal of Retailing, vol. 72, pp. 201–214, 1996.
62) Spreng, RA, MacKenzie, SB and Oshavsky, RW: A re-examination of the determinants of consumer satisfaction. Journal of Marketing, vol. 60, pp. 15–32, 1996.
63) Bolton, R. N. and Lemon, K. N.: A dynamic model of customers' usage of services: usage as an antecedent and consequence of satisfaction, Journal of Marketing Research, Vol. 36, pp. 171–186, 1999.
64) Crosby, L. A., Taylor, J. R.: Consumer satisfaction with Michigan's container deposit law: an ecological perspective, Journal of Marketing, vol. 46, pp. 47–60, 1982.
65) Fornell, C., Johnson, M. D., Anderson, E. W., Cha, J., and Bryant, B. E.: The American customer satisfaction index: nature, purpose, and findings. Journal of Marketing, vol. 60, pp. 7–18, 1996.
66) Herberlein, T. A., Linz, D., and Ortiz, B. P.: Satisfaction, commitment and knowledge of customers on a mandatory participation time-of-day electricity pricing experiment, Journal of Consumer Research, vol. 9, pp. 106–114, 1982.
67) Tse, D. K. and Wilton, P. C.: Models of consumer satisfaction formation: An extension. Journal of Marketing Research, vol. 25, pp. 204–212, 1988.
68) Bigné, J. E., Sánchez, M. I., and Sánchez, J.: Tourism image, evaluation variables and after purchase behaviour: Inter-relationship, Tourism Management, vol. 22, pp. 607-616, 2001.
69) Reisinger, Y. and Mavondo, F.: Travel anxiety and intentions to travel internationally: Implications of travel risk perception, Journal of Travel Research, vol. 43, pp. 212-225, 2005.
70) Chon, K. S.: Understanding recreational traveler's motivation, attitude and satisfaction, Tourism Review, vol. 44, pp. 3-7, 1989.
71) Um, S. and Crompton, J. L.: Attitude determinants in tourism destination choice, Annals of tourism research, vol. 17, pp. 432-448, 1990.
72) Quintal, V. A., Lee, J. A. and Soutar, G. N.: Risk, uncertainty and the theory of planned behavior: A tourism example, Tourism Management, vol. 31, pp. 797-805, 2010.
73) Fielding, K. A., Pearce, P. L., and Hughes, K.: Climbing Ayers Rock: relating visitor motivation, time perception and enjoyment, Journal of Tourism Studies, vol. 3, pp. 49-57, 1992.
74) Churchill, Jr. G. A.and Surprenant, C.: An investigation into the determinants of customer satisfaction, Journal of Marketing Research (JMR), vol. 19, pp. 491-504, 1982.
75) Alegre, J. and Cladera, M.: Analysing the effect of satisfaction and previous visits on tourist intentions to return, European Journal of Marketing, vol. 43, pp. 670-685, 2009.
76) Official website of Sichuan provincial tourism administration, 2013.08
http://www.scta.gov.cn/sclyj/lydzzwdt/lyjq/
77) Law, R.: The perceived impact of risks on travel decisions, International Journal of Tourism Research, vol. 8, pp. 289-300, 2006.
78) Kozak, M., Crotts, J. C. and Law, R.: The impact of the perception of risk on international travelers, International Journal of Tourism Research, vol. 9, pp. 233-242, 2007.
79) Gan, L., Liu, Y. and Lu, T.: Study on the motives of tourists coming to Sichuan after Wenchuan Earthquake and their perceptions about the impact of the earthquake on local tourism, Tourism Tribune, vol.25, pp.59-64, 2010.
80) Li, M., Zhang, J. and Zhong, S. E., et al.: The changes of domestic tourist motivations in tourism site of disaster area before and after earthquake: Case of Jiuzhaigou before and after" 5.12" Wenchuan Earthquake, Scientia Geographica Sinica, vol. 31, pp. 1533-1540, 2011.
81) Byrne, B. M.: Structural equation modeling with AMOS: Basic concepts, applications, and programming, Routledge, 2013.
82) Lei, P. W. and Wu, Q.: Introduction to structural equation modeling: Issues and practical considerations, Educational Measurement: Issues and Practice, vol. 26, pp. 33-43, 2007.
83) Reisinger, Y. and Turner, L.: Structural equation modeling with Lisrel: Application in tourism, Tourism Management, vol. 20, pp. 71-88, 1999.
84) Cronbach, L. J.: Coefficient alpha and the internal structure of tests,Psychometrika, vol.16, pp. 297-334, 1951.
85) Nunnally, J.: Psychometric Theory. McGraw-Hill: New York, 1978.
86)http://www.ats.ucla.edu/stat/mplus/faq/two_group_measurement_model.htm
87) Milfont, T. L. and Fischer, R.: Testing measurement invariance across groups: Applications in cross-cultural research, International Journal of Psychological Research, vol. 3, pp. 111-130, 2010.
88) http://davidakenny.net/cm/identify_formal.htm
89) Schermelleh-Engel, K., Moosbrugger, H., and Müller, H.: Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures, Methods of Psychological Research Online, vol. 8, pp. 23-74, 2003.
90) Hu, L. and Bentler, P. M.: Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives, Structural Equation Modeling: A Multidisciplinary Journal, vol. 6, pp. 1-55, 1999.
91) Ritchie, B. W.: Chaos, crises and disasters: a strategic approach to crisis management in the tourism industry, Tourism Management, vol. 25, pp. 669-683, 2004.
92) Pottorff. S. M. and Neal, D. D. M.: Marketing implications for post-disaster tourism destinations, Journal of Travel & Tourism Marketing, vol. 3, pp. 115-122, 1994.
93) Sichuan Tour Agency, 2006.07.17,
http://www.scta.gov.cn/sclyj/lytj/sclytjbl/system/2006/07/17/000160604.html

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