Visiting natural disaster sites as transformational experiences

Purpose – The purpose of this research was to investigate the perceived benefits arising from tourist activities at natural disaster sites, to analyze the influence of perceived benefits on satisfaction and behavioral intentions, and to identify the moderating role of origin region.

Design/methodology/approach – A research model containing dark tourism motivations, perceived benefits, satisfaction, protection and loyalty intentions was developed, and visitor origin was introduced as a moderating variable. Taking the 5.12 Wenchuan Earthquake Memorial Museum as the case site, data were obtained by distributing questionnaires on-site, and the model was tested using PLS-SEM.

Findings – Dark tourism motivations had a significant effect on cognitive and affective benefits, and perceived benefits significantly affected satisfaction, protection and loyalty intentions, with satisfaction playing a partial mediating role. The origins of tourists showed a moderating role in part of the influence relationship of perceived benefits.

Originality/value – This research adopted a new perspective of the decision-making behavior of dark tourists, analyzed perceived benefits of dark tourism from natural disaster sites, and examined the relationship between perceived benefits and motivation, satisfaction, protection and loyalty intentions. Considering the specificity of dark tourism emotions, the research also analyzed the similarities and differences in the psychology and behavior of locals and non-locals in dark tourism. The research results enrich and deepen the theoretical study of dark tourism.

Keywords: Dark tourism; motivations; perceived benefits; protection intentions; loyalty intentions; local and non-local tourists; 5.12 Wenchuan earthquake

1. Introduction

Dark tourism involves visits to places where death, disaster, or terrorist events occurred, and is a somewhat controversial part of the broad spectrum of leisure tourism (Seaton & Lennon, 2004; Stone, 2012). Its experience core lies in ways of portraying memories of death, disaster, tragedy, fear, and suffering, in which visitors immerse themselves in historical reality for commemoration, warning, and education (Thompson, 2021). Many natural disaster sites have been preserved and developed into dark tourism sites, such as the ruins of Pompeii in Italy, the Tsunami Museum in Indonesia, and the site of the 2011 earthquake on the Pacific coast of Tōhoku in Japan.

These sites attract large numbers of people every year and have become popular tourism destinations. The development of dark tourism has also injected vitality into local societies and economies. Especially in places where natural disasters have just occurred, dark tourism plays a role in local recovery and reconstruction, which not only helps to attract large amounts of reconstruction funds and supplies, but also makes more people pay attention to the revitalization and development of local society and culture (Qian *et al.*, 2020). Dark tourism is such an important part of not only the tourism sector, but also a major force in the socio-economic development of many natural disaster areas. It also provides an opportunity for tourists to acquire life, disaster prevention and mitigation education, as well gaining in self-reflection (Light and Ivanova, 2022).

Some think dark tourism provides venues for visitors to have contact with death (Potts, 2012; Chen and Xu, 2021); however, this may cause greater suffering for local residents (Kim and Butler, 2015; Jordan and Prayag, 2022). Others believe that dark heritage sites contribute

to the recovery of local economies and society, and have practical educational value for visitors (Jang *et al.*, 2021). This creates several questions, e.g., does the development of dark tourism bring benefits to destinations and tourists and, if so, what are the benefits perceived by tourists? Answers to these questions need to be explored in greater depth through empirical research.

Tourist perceived benefits (TPBs) are the benefits that people perceive from activity participation and are the result of 'people–place' interactions between tourists and destinations (Feng, 2017). Studies have found that perceived benefits shape satisfaction and behavioral intentions towards destinations (Pai *et al.*, 2021). In general, the greater the perceived benefits, the more positive evaluations of destinations and vice versa (Rahman, 2019). Research on perceived benefits not only contributes to a greater understanding of the psychological and behavioral characteristics of tourists (Tang, 2014), but it is also crucial for destinations to focus on visitors' perceived benefits and take appropriate measures to improve them.

Previous scholars have analyzed TPBs in dark tourism. Kang *et al.* (2012) used a benefit–based approach and found that benefits were related to motivations and experiences. Tang (2014) confirmed that dark tourism experiences positively affect benefits. Oren *et al.* (2021) found that perceived benefits influenced the quality of the tourism experience and Wu *et al.* (2016) determined that disaster prevention and mitigation education increased revisit willingness. Therefore, it is expected that dark tourism benefits have significant impacts on post–visit evaluations and behavioral intentions. Perceived benefits may play an important role in dark tourism as there is a complex relationship between motivations, benefits,

satisfaction, protection and loyalty intentions. A better understanding of the perceived participation benefits and their influences may enhance the management and marketing of dark tourism destinations. However, the existing research on dark tourism has a focus on how motivation affects satisfaction and behavioral intentions. There are relatively few studies on perceived benefits, especially systematic, multivariate analyses of chain–effect relationships among perceived benefits and motivation, satisfaction, and behavioral intentions. As an activity with strong emotional attributes (Pimentel and Marques, 2022), what are the benefits perceived by dark tourism participants? What are the relationships between motivations, perceived benefits, satisfaction, and post–visit behaviors? These questions need to be further investigated.

Scholars have found that factors such as connection to incidents (e.g., disasters), visitor origins, and other factors can influence perceptions and attitudes toward dark tourism (Chang, 2017; Sarkar *et al.*, 2021). Studying these factors not only provides further insight into the behavioral characteristics of tourists and deepens theoretical research on dark tourism, but is also useful for managers for developing destination management and marketing strategies based on precise market segmentation. Abraham *et al.* (2022) found that tourists from different origins show different perceptions and attitudes when engaging in activities at sites where a disaster (war) has occurred, especially for local people who have experienced or are directly related to the disaster, who behave significantly differently than out-of-town visitors who are not directly connected with the war. Then, when visiting natural disaster sites, are the perceived benefits of local and non-local tourists consistent and, if not, what are the differences and influential factors? What is the influence of visitor origin on the relationship

between motivations, perceived benefits, satisfaction, and behavioral intentions? All these questions still need further research. To address these questions and fill the literature gaps, a theoretical model was constructed of the perceived benefits of dark tourism and their influences and tested through an empirical study of the 5.12 Wenchuan Earthquake Memorial Museum in Sichuan Province, China.

2. Literature review and hypothesis development

2.1 Dark tourism

Foley and Lennon (1996) first proposed the concept of dark tourism, defining dark tourism as tourism activities in places where death or disaster had occurred. These two authors later provided a detailed explanation and deeper analysis of the contents of dark tourism in the book, *Dark tourism: The attraction of death and disaster* (Lennon and Foley, 2000). Since then, scholars have advanced related concepts including battlefield tourism (Dunkley *et al.*, 2011), prison tourism (Isaac and Çakmak, 2016), criminal tourism (Welch, 2013), and disaster tourism (Antick, 2013). Nevertheless, among these concepts, dark tourism remains the most widely applied. Dark tourism is receiving growing attention from academia, and the scope of this research has been expanding. As of June 2022, there were 616 items on dark tourism in the Scopus database and 51.1% of these were published from 2018 to 2022.

In its initial stages, dark tourism research focused more on supply and descriptive discussions of dark tourism definitions (Sharpley, 2006; Ashworth, 2016), and types (Antick, 2013; Liyanage *et al.*, 2015). Thereafter, the scope of research is expanding as scholars are paying greater attention to the consumption and behaviors in dark tourism from the demand perspective. Research on dark tourists has branched out from exploring dark tourism

motivations (Bhati *et al.*, 2021) to dark tourism experiences (Khaydarova and Isheryakova, 2022), perceptions (Sarkar *et al.*, 2021), satisfaction (Aprilia *et al.*, 2022), and revisit intentions (Zheng *et al.*, 2020), and research topics have covered various perspectives such as influence of visual expression on experience (Lv *et al.*, 2022), the narration of dark events (Lischer, 2019) and dark tourism digitization (Addeo *et al.*, 2021). However, less attention has been paid to the perceived benefits, and more empirical studies are needed to deepen the research of dark tourism demand (Isaac and Çakmak, 2014). Based on previous behavioral studies of dark tourists, this research explored the perceived benefits in natural disaster sites and systematically analyzed the relationships among motivation, benefits, satisfaction, and post-tour behaviors, which contributes to a better understanding of dark tourist decision-making and behavioral intentions and provides theoretical support for dark tourism destination management and marketing.

2.2 Benefit segmentation and perceived benefits

The concept of 'benefit' originally originated from economic research. In marketing, Haley (1968) proposed that benefits are the fundamental reason for consumer demand for products, and considered them an important tool for market segmentation. Since the 1980s, the rapid development of tourism has stimulated people's interest in benefits, and the psychological attributes of benefits have gradually received greater attention. Perceived benefit are considered to be the psychological outcome of the tourism experience (Frochot, 2005), which is reflected in tourist consumption and post–trip behaviors (McCool and Reilly, 1993).

Benefit segmentation is primarily a segmentation of benefits based on destination attributes (Sangpikul, 2008), which can be classified as attribute–based segmentation.

Scholars have treated tourist motivation as a decision–making variable and benefits are a combination of sensory, rational and emotional motives (Lewis, 1981), resulting in a psychology–based benefit segmentation method. There are studies that mix the two approaches or rely solely on the segmentation of tangible benefits (Ryan and Glendon, 1998). Among them, the combination of attributes and psychology is considered to be the best combination for product design (Frochot and Morrison, 2000). Benefit research has been explored for different types of tourism activities, including rural tourism (Frochot, 2005), health tourism (Dryglas and Salamaga, 2017), nature–based tourism (Nduna and van Zyl, 2020), and cruise tourism (Benevolo and Spinelli, 2021). Zhou *et al.* (2019) explored the benefits of visiting heritage museums, and identified five dimensions of benefits, including family bonding, community attachment, cultural awareness, restoration and personal growth, based on the perspective of parents. Thus, the benefits from tourism participation are manifold, and benefit segmentation assists with destination product development as well as in realizing competitive advantages.

The perceived benefits in this research are intellectual, emotional, physical, and psychological gains that people derive from visiting natural disaster sites. Among the dark tourism benefits, there is a high proportion of emotional and educational benefits (Chang, 2014; Oren *et al.*, 2021). Jang (2021) and Zheng (2020) found that educational and learning benefits were the most pronounced, followed by strengthening family relationships and promoting positive moral values (Kang *et al.*, 2012; Jamin *et al.*, 2020). This investigation contends that perceived benefits can be divided into cognitive ones related to earthquake or related heritage information and knowledge, as well as affective benefits related to self,

family, society, and life perceptions. In addition, pre-tour motivations, in-tour benefits, post-tour attitudes and behaviors are a complete customer journey, and each stage affects and connects with the others (Rajasekaram *et al.*, 2022). Thus, dark tourism benefits are influenced by multiple factors. Although a large amount of research exists on the benefits of dark tourism, there is still a need for further exploration of what influences the perceived benefits of tourists and how these benefits affect the decision-making process. These gaps in research were the focus of this research.

2.3 Dark tourism motivation and perceived benefits

Motivation is one of the crucial aspects of dark tourism demand research. Researchers have suggested that the main motivations for participating in dark tourism are directly related to the deaths and disasters inherent in these destinations, which are manifested in commemoration, memory, and reflection (Biran *et al.*, 2014; MacCarthy, 2021). Meanwhile, dark tourism still retains social functions such as leisure and recreation, social interaction, and physical exercise (Kang *et al.*, 2012; Yan *et al.*, 2016; Iliev, 2021), and thus dark tourism motivations often include the general needs for education and recreation (Foley and Lennon, 1997). Dark tourism motives also include unconventional needs such as voyeurism, curiosity about death, and schadenfreude (Seaton and Lennon, 2004; Isaac and Cakmak, 2014; Mehta *et al.*, 2022). In general, dark tourism has remembrance and witnessing motives directly related to dark events, recreation and self–development motives involving people's development needs and special demands, and public contribution and education motives for the relief and educational functions of dark tourism destinations. Tang (2014) found an interrelationship between motivation, experience, and benefits in a study of the Wenchuan earthquake site. Whereas

when Chang (2014) broke down the benefits of the dark tourism experience, it was found that motivation directly influenced the psychological benefits and the impact on learning and social benefits was not significant. The diversity of dark tourism sites and the complexity of people's expectations and emotions affect dark tourism motivations. To further identify the effect of motivation on benefit, the following hypothesis was formulated.

H_1: Dark tourism motivations positively influence perceived benefits.

2.4 Dark tourism motivation, perceived benefits and satisfaction

Tourist satisfaction is the evaluation of tourism activities and is an important factor in the success of a destination (Chen and Chen, 2010). Research has shown that motivation for dark tourism has an impact on satisfaction ratings. Piao and Li (2019) in their study of the United Nations Peace Memorial Park in Busan ascertained that motivation influences satisfaction ratings and that there are differences in the types of motivation leading to different levels of satisfaction. Su *et al.* (2020) indicated that there may be other indirect effects of factors such as engagement, experience, and destination image in this relationship. Moreover, benefits can have an impact on the quality of the experience by affecting emotions (Oren *et al.*, 2021). Therefore, in this research, while exploring the relationship between dark tourism motivation and satisfaction, the relationship between perceived benefits and satisfaction and its mediating role were taken into consideration, and the hypotheses H_{2a} - H_3 were proposed.

H_{2a}: Dark tourism motivations positively influence satisfaction.

H_{2b}: Perceived benefits positively influence satisfaction.

H_3: Perceived benefits mediate the relationship between motivation and satisfaction.

2.5 Perceived benefits and behavioral intentions

Dark tourism studies on behavioral intentions cover various dimensions such as loyalty (Kurnaz and Kiliç,2016; Sharma and Nayak, 2019), protection (Qian *et al.*,2020; Qian *et al.*, 2017), and support intentions (Leong *et al.*, 2014; Wu and Cheng, 2018). Tourist protect intentions represent the tendencies to protect ecological and resource–vulnerable areas formed by personal, psychological, and social factors (Cheng, 2020). Qian *et al.* (2020) postulated that benefits lead to different degrees of behavioral intentions, and exploring perceived benefits is of great importance in explaining the behavior of tourists and the connotation of dark tourism. There are few studies on the conservation intentions of dark tourism, and further exploration of the factors influencing willingness to conserve is necessary (Qian *et al.*, 2017). Dark tourism loyalty intentions guide the development of dark tourism destinations (Qian *et al.*, 2021; Dandotiya and Aggarwal, 2022), and loyalty is influenced by multiple factors (Shen *et al.*, 2012). Ponnapureddy *et al.* (2020) suggested that the perceived benefits from sustainable hotel booking intention have a partial mediating role. In a study on the Wenchuan earthquake, it was shown that disaster prevention and mitigation education increased revisit intention (Wu *et al.*, 2016). Thus, there appears to be a relationship between perceived benefits and behavioral intentions. Hypotheses H_{4a} and H_{4b} were proposed as follows:

H_{4a}: Perceived benefits positively influence protection intention.

H_{4b}: Perceived benefits positively influence loyalty intentions.

2.6 Satisfaction and behavioral intentions

The understanding of satisfaction not only provides insight into tourist evaluations but also

predicts post-visit behavioral intentions (Ozdemir *et al.*, 2012). Sharma and Nayak (2019) showed a positive relationship between satisfaction and loyalty in a survey study of tourists visiting dark tourism destinations in India, while Qian *et al.* (2017) explored the positive impact of satisfaction on conservation and revisit intentions. Furthermore, the mediating role of satisfaction has been widely confirmed (Shi *et al.*, 2022), with Sharma and Nayak (2019) finding that dark tourist values indirectly influenced loyalty through satisfaction, and Zhou *et al.* (2022) found that satisfaction had a partial mediating role in positively influencing the effects of functional and affective values on destination loyalty.

H_{5a}: Satisfaction positively influences protection intention.

H_{5b}: Satisfaction positively influences loyalty intentions.

H_{6a}: Satisfaction mediates the relationship between perceived benefits and loyalty intentions.

H_{6b}: Satisfaction mediates the relationship between perceived benefits and protection intention.

H_7: Protection intentions positively influence loyalty intentions.

2.7 Tourist origin as a moderator

Origin as a demographic characteristic has been shown in many studies to contribute in part to differences in the psychological and behavioral characteristics. Chang (2017) found demographic backgrounds had a moderating effect on some causal relationships, tourists from different origins (locals, other Taiwan, and Mainland China) had dissimilar experiences of Kinmen. Regarding the development of dark tourism, there are also large differences in the views of local and foreign tourists (Jordan and Prayag, 2022). This difference in the source

background of tourists requires differential analysis when studying perceived benefits. Both Zhang *et al.* (2016) and Shen *et al.* (2021) have found that inner constraints and past experiences can affect willingness to revisit. This study investigated the perceived benefits of tourists in natural disasters, and some tourists may have experienced the disasters. So, does origin also have an influence on the interpretation of perceived benefits at a natural disaster site? To answer this question, research hypotheses H8a–H8e were proposed:

H_{8a}: Origin positively moderates the relationship between motivation and perceived benefits.

H_{8b}: Origin positively moderates the relationship between motivation and satisfaction.

H_{8c}: Origin positively moderates the relationship between perceived benefits and satisfaction.

H_{8d}: Origin positively moderates the relationship between perceived benefits and protection intentions.

H_{8e}: Origin positively moderates the relationship between dark motivation and loyalty intentions.

A research model was constructed based on these relationships (Fig.1) consisting of six variables and 16 research hypotheses including motivation, perceived benefits, satisfaction, protection intention, loyalty intentions, and origins.

[Insert Fig.1 about here]

3. Methodology

3.1 Study area

The 5.12 Wenchuan Earthquake Memorial Museum was selected as the case study site for survey questionnaire administration. The 5.12 Wenchuan Earthquake Memorial Museum was built to commemorate the Wenchuan earthquake of 2008. It was an 8.0 magnitude earthquake that occurred in Yingxiu Town, Wenchuan County, and was the most destructive, widest–range, heaviest–damage, and most difficult earthquake to respond to since the founding of the People's Republic of China.

The 5.12 Wenchuan Earthquake Memorial Museum was built in Qushan Town, Beichuan County, Sichuan, covering a total area of 142,300 m^2, with an exhibition area of 10,748 m^2. It is one of the largest national–level Earthquake–themed memorial halls in China, and the scale and completeness of its earthquake site complex rank among the biggest in the world. The Museum is an important place for interpreting the historical memory of the disaster, as well as an important site for disaster prevention and mitigation education. Since its opening in 2013, the memorial has attracted large numbers of visitors and has played an important role in promoting the recovery and development of the local economy and social activities. The Museum has thus become one of the most representative dark tourist destinations in China.

[Insert Fig.2 about here]

[Insert Fig.3 about here]

3.2 Questionnaire design

The questionnaire was designed drawing upon mature and validated scales, adjusted according to the actual situation (Table 1). Since the questionnaire reference scale was in English and the final questionnaire language was Chinese, two back-translations from Chinese to English were used to adjust the questionnaire content, and two bilingual experts in tourism

were invited to revise the question items to avoid semantic differences.

The questionnaire included four sections. In the first, the investigation mainly focused on the antecedents (dark tourism motivation and perceived benefits) that influence satisfaction and behaviors. Dark tourism motivation (DTM) items were based on the studies of Yuill (2004), Tang (2014), Kang *et al.* (2012), Biran *et al.* (2011), and Isaac *et al.* (2014). It consisted of 15 items in three dimensions: remembrance and witnessing, public contributions and education, and recreation and self–development. According to the questionnaires of Tang (2014), Kang *et al.* (2012), and Biran *et al.* (2011), perceived benefits (TPB) had 16 items in the two dimensions of cognitive and affective. In the second section, satisfaction (TS) referred to the research of Chen and Tsai (2007) and had one item. In the third section on behavioral intentions, one item was designed for protection intention (PI) and two items for loyalty intentions (LI) according to the scale of Nawijn and Fricke (2015). The items of the above variables were assigned scores of 1 to 5 using Likert 5–point scales (1 = strongly disagree, 5 = strongly agree). The last section gathered data on gender, age, education, occupation, and origin.

As the Wenchuan earthquake affected the entire Sichuan province, it became the ultimate disaster area. To distinguish local from non–local tourists, the question of origin determined by whether respondents were Sichuan Province residents or not.

[Insert Table 1 about here]

3.3 Data collection

This study used a quantitative method of self-administered questionnaires to collect data from tourists visiting the 5.12 Wenchuan Earthquake Memorial Museum. Convenience sampling is

a widely used data collection method in quantitative research (Khan *et al.*, 2019); it is easy to implement and thus a more sufficient data set can be obtained to ensure the validity of the research. Thus, the survey was carried out using the convenience sampling method.

In December 2015, the research team first went to the site for a visit and conducted a pilot survey through convenience sampling. A total of 60 questionnaires were distributed in the pre-investigation, and 53 valid questionnaires were recovered. According to the results of the SPSS and Smart PLS, Cronbach' α and AVE were greater than 0.7 and 0.5, respectively, and the factor loadings of each question item were >0 .6, indicating that the questionnaire had good reliability. The formal questionnaire survey was conducted in October 2016 at the Museum. To ensure the integrity of the survey population and reduce common method bias, the research group was divided into four to conduct one-to-one surveys with tourists at the exit of the venue, the exits of the two memorial halls and the entrance of the parking lot. A total of 500 questionnaires were distributed. After excluding incomplete answers and invalid questionnaires, 438 valid responses were obtained, an effective rate of 87.6%.

The demographic characteristics of the respondents (Table 2) show that the gender ratio of respondents was relatively evenly distributed, with 51.6% of males and 48.4% females. The respondents were generally younger, mostly aged 20 to 40 years old, accounting for 56.17% in total, with 33.11% aged 20 to 29 and 23.06% aged 30 to 39. The largest proportion of respondents had earned Bachelor's degree or above at 32.65%. The highest portion of respondents were students, accounting for 30.82%. The majority were provincial residents with 72.15% from Sichuan Province and 27.85% from other regions.

[Insert Table 2 about here]

3.4 Data analysis

Since a multivariate complex model was developed for an exploratory study of dark tourism theory, PLS-SEM was chosen to carry out the data analysis. PLS-SEM is not required that the data strictly conform to the normal distribution and the sample size requirements are lower, under the same circumstances has looser data requirements (Bontis *et al.*, 2007; Rahman, 2019), is relatively more advantageous in dealing with complex relationships (Ringle *et al.*, 2012), and is more suitable for model exploration and theory development. These features aligned with the research requirements, and Partial least squares–structural equation modeling (PLS–SEM) was selected to examine and analyze the research model. Using the SmartPLS (version 3.3.2), the reliability and validity of the measurement model were tested. Then, through the repeated sampling method (bootstrapping), the path relationships in the structural model were tested and the influence relationships among motivations, perceived benefits, satisfaction, and behavioral intentions were verified, and mediating effects were analyzed. Finally, the moderating effects were examined through multiple group analysis (PLS–MGA) to explore the moderating role of origin in the relationships between motivations, perceived benefits, satisfaction, and behavioral intentions.

4. Results

4.1 Assessment of common method bias

Considering that the questionnaire measurement method was used, there was a need to ensure that there was no serious common method bias. Harman's single–factor test and the PLS common method variation test were used to assess the common method bias. The results of Harman's single–factor test showed that there was a total of nine factors whose eigenvalues

were greater than one, and the variance explained by the first factor is 25.595%, less than the standard of 50% (Qiu, 2017), so there was no significant common method bias due to one factor explaining most of the variation. To further identify the existence of single–factor variance, the common method variance (CMV) test was performed by SmartPLS (Liang *et al.*, 2007), and the results showed that the ratio of the average substantive factor loadings to the average method factor loadings of common method variance was 29:1, and the average method variance loadings were much smaller than the average substantive factor loadings, so it was concluded that there was not a serious problem with common method bias.

4.2 Assessment of the measurement model

The reliability, validity, and discriminant validity of the measurement model were analyzed by SmartPLS, and the relationship between items and latent variables and between latent variables was tested. According to the results (Table 3), the standard factor loading of the questionnaire items ranged from 0.609 to 1.000, greater than 0.6, and all were significant at the $p < 0.01$ level, so the items were within the acceptable range (Bagozzi and Yi, 1988). The composite reliability (*CR*) ranged from 0.838 to 1.000, and Cronbach's α ranged from 0.759 to 1.000, all of which were greater than 0.7, indicating that the latent variables of the model had good internal consistency (Bagozzi and Yi, 1988). AVEs ranged from 0.510 to 1.000 which exceeded the threshold criterion of 0.5, indicating that the latent variables had good convergent validity (Fornell and Larcker, 1981).

The discriminant validity of the measurement model was estimated by three methods: cross–loadings, Fornell and Larcker criterion, and HTMT Heterotrait–Monotrait Ratio (Henseler, 2010). The cross–loading results showed that the factor loadings of the items

contained in the latent variables were significantly greater than their factor loadings on other variables, and the model could be judged to have adequate discriminant validity. According to the Fornell and Larcker criterion (1981), if the AVEs of each variable were greater than the square of the Pearson correlation coefficient between variables (Table 4), this indicates that the model has discriminant validity. But Henseler (2015) pointed out that PLS–SEM will overestimate factor loadings and underestimate the correlation between variables, so the ratio between the internal correlation of variables and the correlation between variables was calculated by the HTMT estimation method (Table 5), and the results showed that the discriminant validity values were all less than 0.85, which confirmed that the model had discriminant validity (Hair *et al.*, 2021).

[Insert Table 3 about here]

[Insert Table 4 about here]

[Insert Table 5 about here]

4.3 Assessment of the structural model

After running the PLS Algorithm, samples were drawn 5,000 times by bootstrapping, and then the blindfolding algorithm was used to test the path significance of the structural model and the degree of model fit. The results showed that the explained degree R^2 of the endogenous variables in the model was between 0.155 and 0.371, which was acceptable (Jaafar *et al.*, 2015); and the prediction correlation (Q2) between 0.142 and 0.478 was greater than 0, indicating that the model has good prediction correlation. By calculating the square root of the product of AVE mean and R^2 mean, the goodness of fit (GoF) of the model was 0.467, greater than the standard of a good fit of 0.36, indicating that the model has a high degree of fit

(Wetzels *et al.*, 2015).

[Insert Fig.4 about here]

4.4 Path analysis and hypothesis testing

From the results of the research model (Fig.4), motivation significantly and positively influenced perceived benefits ($\beta = 0.501$, $t = 11.391$, $p < 0.01$), supporting hypothesis H_1; while motivation had no significant effect on satisfaction ($\beta = 0.066$, $t = 1.253$, $p > 0.1$), rejecting hypotheses H_{2a}. Perceived benefits significantly and positively affected satisfaction ($\beta = 0.356$, $t = 6.003$, $p < 0.01$), protection intentions ($\beta = 0.312$, $t = 4.742$, $p < 0.01$), and loyalty intentions ($\beta = 0.249$, t = 4.385, $p < 0.01$), supporting hypotheses H_{2b}, H_{4a}, and H_{4b}. Satisfaction significantly and positively influenced protection intentions ($\beta = 0.256$, $t = 4.603$ $p < 0.01$) and loyalty intentions ($\beta = 0.359$, $t = 6.570$, $p < 0.01$), supporting hypotheses H_{5a} and H_{5b}; protection intentions significantly and positively affected loyalty intentions ($\beta = 0.143$, $t = 2.284$, $p < 0.05$), supporting hypothesis H_7.

[Insert Table 6 about here]

The results of the mediating effect test of the model are shown in Table 7. According to the results of SmartPLS, the direct and indirect effects of the paths and their significance are first obtained. The direct effect of the path of DTM → TPB → TS was 0.066 ($p > 0.1$), and the indirect effect was 0.178. Since the influence of DTM on TS was not significant, so the hypothesis H_3 that TPB mediates between DTM and TS did not hold. In the path of TPB → TS → PI, the direct effect $\beta = 0.312$ ($p < 0.01$), the indirect effect was 0.091, the total effect was 0.403. For the path of TPB → TS → LI, the direct effect was 0.249 ($p < 0.01$), the indirect effect was 0.129, the total effect was 0.434. To assess the degree of mediation of a

variable, it was chosen to determine whether a variable was partially mediated (VAF > 20%) or fully mediated (VAF > 80%) by calculating the VAF (the ratio of indirect effects to total effects) (Hair *et al.*, 2021). In TPB → TS → PI, the VAF value of TS was 22.58%, which is between 20% to 80%, indicating that TS plays a partial mediating role in the influence of TPB on PI, and hypothesis H_{6a} was supported. Likewise, in TPB → TS → LI its VAF value is 29.72%, which means that TS also plays a partially mediating role in the effect of TPB on LI, and hypothesis H_{6b} was supported.

[Insert Table 7 about here]

Through multiple group analysis (PLS–MGA), the differences of the moderator variable TO in the influence paths of DTM, TPB on TS, PI, and LI were explored, and hypotheses H_{8a}–H_{8e} were tested. The results showed (Table 8) that the motivations of tourists from other places had a greater effect on perceived benefits than the local tourists and had a certain level of significance. This difference was contrary to the hypothesis, and H_{8a} was rejected. While the local tourists' TPB has a greater influence on PI, the influence of the moderator variables on the path has a significant level of difference, supporting H_{8d}. In addition, TO did not show a significant effect in other moderating path tests, so H_{8b}, H_{8c}, and H_{8e} were not supported.

[Insert Table 8 about here]

5. Conclusion and implications

5.1 Conclusions

To deepen the research related to dark tourists and promote better management and development of dark tourism destinations, this research constructed a model including motivation, perceived benefits, satisfaction, protection and loyalty intentions around perceived

benefits. By means of a questionnaire survey, the perceived benefits of tourists visiting natural disaster sites were identified, the influential paths of dark tourist behavior were clarified, and visitor origin as a moderating variable was used to identify differences in local and non-local decision-making behavior.

The PLS-SEM results validated that dark tourism motives can be classified into three types: remembrance and witnessing, recreation and self-development, and public contribution and education motives. The structure of the cognitive and affective divisions of perceived benefits was also supported. Dark tourism motivation significantly influenced perceived benefits and motivation was an antecedent of perceived benefits, which was consistent with the findings of other empirical studies exploring the relationship between dark tourism motivation and benefits (Tang, 2014; Kang *et al.*, 2012). In contrast to studies that analyze the role of motivation through influencing destination image (Su *et al.*, 202), emotions, and attitudes (Abraham *et al.*, 2022), experiences (Iliev, 2021), this study examined the role of perceived benefits in the relationship between motivation and satisfaction. In terms of the impact on satisfaction, perceived benefits had a greater proportion compared to that of motivation. The results showed that the presence of perceived benefits leads to a lower influence effect of motivation on satisfaction, thus calling for more empirical studies on the analysis of the influence of perceived benefits on satisfaction and behaviors.

This research verifies that there is a two-by-two influence relationship between perceived benefits, satisfaction and protection and loyalty intentions, and that these combinations form a chain relationship model. Perceived benefits significantly and positively influence satisfaction, protection and loyalty intentions (including revisit and recommendation

intentions), suggesting that higher perceived benefits not only increase the quality of the travel experience and the intention to revisit (Oren *et al.*, 2021; Wu *et al.*, 2016), but also lead to higher satisfaction and stronger protection and loyalty intentions. Similar to the results of most consumer behavior studies (Padrón-Ávila *et al.*, 2022; Rasoolimanesh *et al.*, 2022), satisfaction in the context of dark tourism also significantly and positively affects loyalty intention and with a mediating effect. Furthermore, this research yielded the result that satisfaction had a positive effect on protection intention. High levels of satisfaction enhance protection intentions for destinations and support the sustainable development of dark tourism destinations. In addition, the study found a positive effect of protection intention on loyalty intention, which complements the research on dark tourist behaviors.

Origin had a moderating effect on the influence of motivations on perceived benefits and perceived benefits on protection intentions. Tourists with different origins showed dissimilarities in the effect of motivation on perceived benefits, and locals presented lower effects of motivation on benefits than non-local tourists. This is similar to the findings of other dark tourist studies that distinguish local tourists from out-of-town tourists (Chang, 2017; Kang *et al.*, 2012). The possible reason could be that, when compared to local tourists who experienced this dark event, the external tourists who were not connected to the event would be more deeply shocked after witnessing the dark event in the field, thus resulting in higher perceived benefits. Furthermore, a new finding of this study is that origin had a moderating effect on the relationship between perceived benefits and protection intentions, and local tourists' perceived benefits had a stronger impact on protection intentions. This may be due to local tourists with a closer connection to the earthquake having stronger subjective

experiences (e.g., having personally experienced the earthquake disaster themselves or their family members, having lost family or property in the disaster) and having a more profound sense of value perceptions. This closer connection produced a stronger desire to preserve and protect earthquake disaster sites than non–local tourists who did not experience the event.

5.2 Theoretical implications

The theoretical contributions of this research are three–fold. First, in the existing research literature, there are still relatively few studies on the perceived benefits of dark tourism. This research interpreted the perceived benefits from the perspective of tourists and gives a more profound explanation of its influence on behavioral intentions. By proposing a systematic chain relationship research model of dark tourist motivation, perceived benefits, satisfaction, and behavioral intentions, and examined the relationship among variables through empirical research, this helps scholars to systematically comprehend the psychological and behavioral characteristics of dark tourists and enriches the studies related to dark tourists. Second, there is less research on conservation intention in dark tourist behavior studies (Qian *et al.*, 2017), and protection intentions are an important support for the sustainable development of dark tourism destinations. Therefore, research on the protection intentions of dark tourists is equally important. This research explores the ability of perceived benefits to promote protection intention, which provides a new perspective on the study of dark tourist behaviors. Third, many dark tourism sites are facing ethical controversies (Chen and Xu, 2022), one of the most critical ones being whether disaster sites should be preserved and developed as tourism destinations (Thompson, 2021). However, there appears to be a lack of academic consensus on this issue, along with a paucity of research from the tourist perspective. The

influence of demographic and social backgrounds in dark tourism was considered, introducing origin as a moderator, and similarities and differences between local and non-local tourists were analyzed in perceived benefits and psychological and behavioral characteristics. The findings not only enrich the research related to the conservation and development of dark tourism destinations but also provide an academic context for understanding tourist behavioral intentions and attitudes.

5.3 Practical implications

This study explored the perceived benefits among dark tourists and built a research model of their influence on tourist satisfaction and behavior. This not only provides suggestions for managers related to dark tourism development in natural disaster areas, but also offers the possibility of enhancing tourist dark tourism experiences by interpreting the psychology and behavior of dark tourists. For destination managers, market segmentation of dark tourists with different motivations is required because of the wide variation in motivations to travel and the fact that motivation affects perceived benefits. According to unique consumption needs, targeted marketing strategies are adopted. It is important to note that considering the emotional specificity of dark tourism destinations, recreational tourism motives should be avoided (Qian *et al.*, 2022) and excessive commercialization of destination development should not be followed. Equally critical, this study indicates that perceived benefits have a strong influence on satisfaction and behavioral intentions, so it is necessary to pay attention to the interaction among tourists and with attractions. By creating an appropriate environment, such as enhancing venue environment (Lv *et al.*, 2022), the quality of interpretation (Lischer, 2019), and organizing some memorial events (Qian *et al.*, 2022), perceived benefits will

increase as well as improving evaluations and post-visit intentions. Considering the similarities and differences between local and non–local tourists, there is a need to focus on the dissimilar priorities and concerns of tourists with different backgrounds. It is essential to avoid the trivialization of dark tourism sites in disaster areas, and rather to protect and accurately recount the history of disaster sites, providing locals with historically authentic places to remember. Environments should be created for non–local tourists to accurately understand dark historical events while delivering educational values which enhance perceived benefits and expand the positive impacts of dark tourism destinations.

6. Limitations and further research needs

This research has certain limitations, and future research should be considered to develop the study in the following three aspects. First, the case site selected was an earthquake site, which belongs to the natural disaster dark tourism destinations, and the research findings apply to the same type of dark tourism destinations. However, natural disaster dark tourism sites also include other types of disaster sites (e.g., volcanoes, tsunamis, hurricanes, avalanches), and the perceived benefits and influence of other types of natural disasters on tourists may vary, so future research should be carried out on other types of natural disaster tourism sites. Second, this research was based on cross–sectional data at a specific time, which may lead to limitations in the conclusions. Considering the changes in the longitudinal comparison of tourist data in different periods, future research can collect historical data for comparative research, so as to deepen the research conclusions. Finally, this analysis used a questionnaire–based method, and a mixed research method combining questionnaires and in–depth interviews should be considered for future research to deepen the interpretation of the

psychological and behavioral characteristics of dark tourists.

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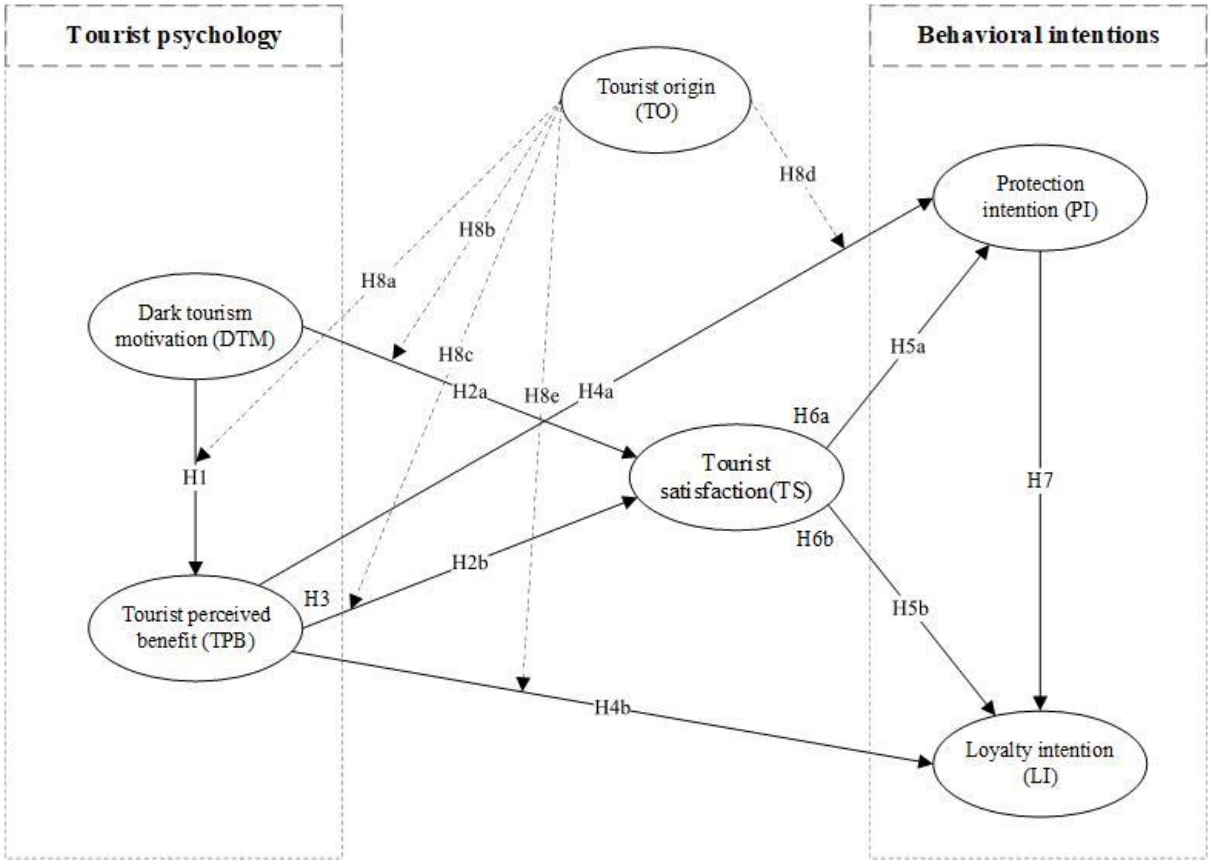

Figure 1 Conceptual research model.

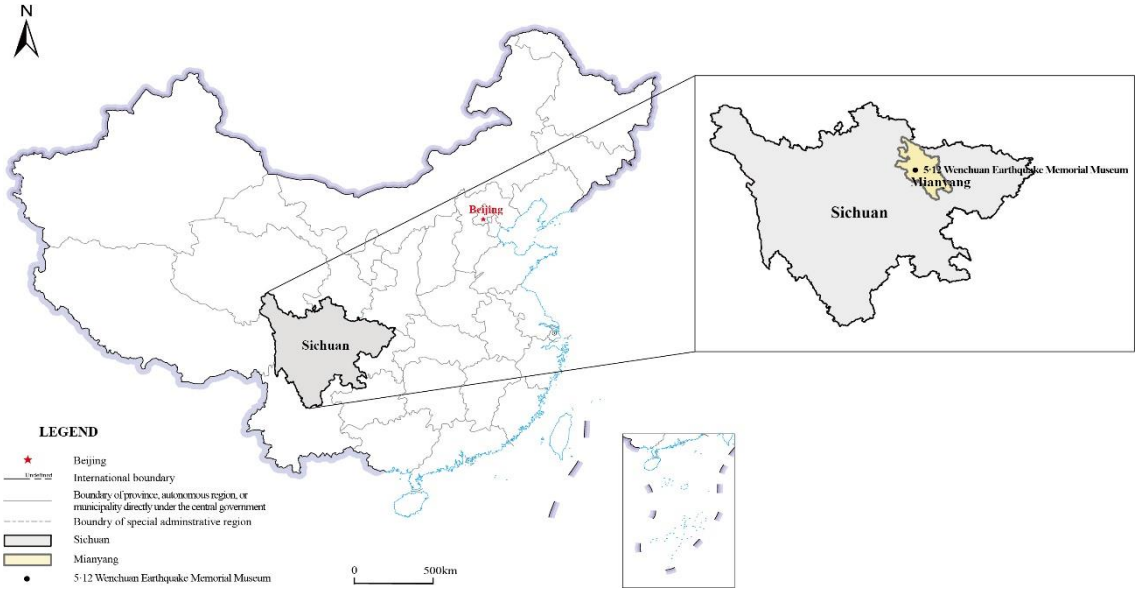

Figure 2 Location of the 5.12 Wenchuan Earthquake Memorial Museum in Sichuan Province, China

Figure 3 The landscape of the 5.12 Wenchuan Earthquake Memorial Museum

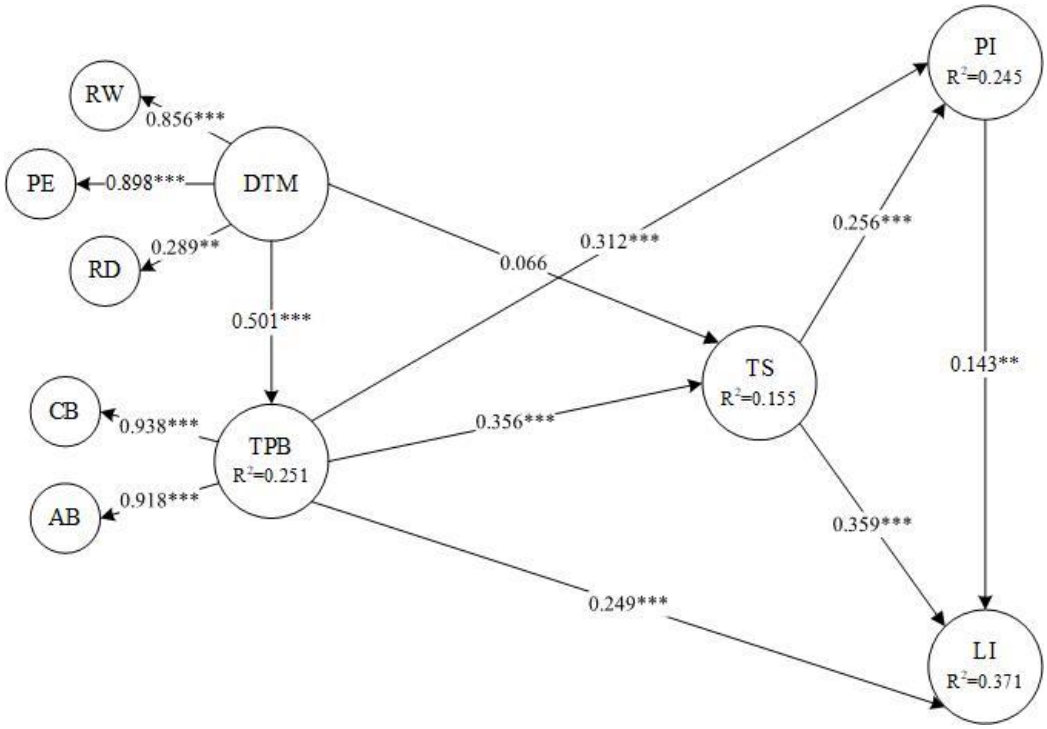

Figure 4 Results for the research model.

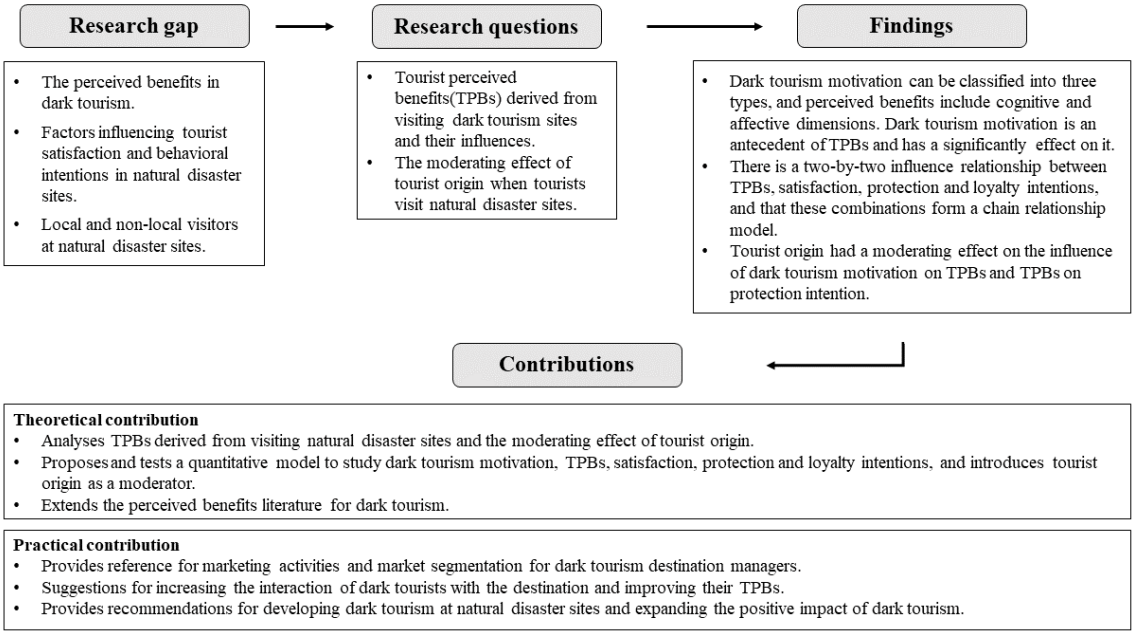

Figure 5 Findings and main contributions.

Table 1 Variables and item sources.

Variables	Items	Sources
Motivations	***Remembrance and witnessing (RW)***	Yuill, 2004
(DTM)	RW1 Enjoy the natural landscape.	Kang et al., 2012
	RW2 Feel the force of nature.	Biran et al., 2011
	RW3 Feel the impact of the earthquake disaster.	Isaac and Çakmak, 2014
	RW4 Take a look at the situation in the disaster area reported in the media.	
	RW5 Witness the rebuilt New Beichuan.	
	Public contributions and education (PE)	
	PE1 Learn about disaster prevention and reduction.	
	PE2 Carry out life education and enlighten life.	
	PE3 Take part in volunteer activities.	
	PE4 Donate or support disaster-affected people.	
	PE5 To receive patriotic education.	
	Recreation and self-development (RD)	
	RD1 Relieve stress and relax.	
	RD2 Physical exercise.	
	RD3 Social interactions.	
	RD4 Increase sense of accomplishment.	
	RD5 Satisfaction of self-superiority.	
Perceived benefits	***Cognitive benefits (CB)***	Kang et al., 2012
(TPB)	CB1 Learned about the principle of the 5.12 Wenchuan earthquake.	Tang, 2014 Biran et al., 2011
	CB2 Learned about the scope of the 5.12 Wenchuan Earthquake.	
	CB3 Learned about the casualties of the 5.12 Wenchuan Earthquake.	
	CB4 Learned about the property and economic losses of the 5.12 Wenchuan Earthquake.	
	CB5 Learned about the rescue and recovery process of the 5.12 Wenchuan Earthquake.	
	CB6 Recognized the value of earthquake sites.	
	CB7 Enhanced conservation awareness of earthquake sites.	
	CB8 Learned about the purpose of conservation and management of earthquake sites.	
	Affective benefits (AB)	
	AB1 Promote mutual understanding between self and staff.	
	AB2 Mourning and memorializing the victims of the earthquake.	
	AB3 Developed a sense of compassion for earthquake survivors.	
	AB4 Promoted mutual understanding between self and local residents.	
	AB5 Develop a sense of reverence for nature.	
	AB6 Received disaster prevention and mitigation education, and know how to prevent and avoid disasters.	

	AB7 After receiving life education and reflection on life, I will cherish life more. AB8 After receiving patriotic education, I will love the party and the country more.	
Protection intentions (PI)	PI1: I will support the protection of earthquake sites or earthquake cultural relics.	Nawijn and Fricke, 2013
Satisfaction (TS)	TS1: Generally speaking, I am satisfied with the whole tour.	Chen and Tsai, 2007
Loyalty intentions (LI)	LI1: I will revisit the earthquake site. LI2: I am willing to recommend this museum to others.	Nawijn and Fricke, 2013

Table 2 Demographic characteristics of respondents.

Attributes	Levels	Frequencies	%
Gender	Male	226	51.60
	Female	212	48.40
Age	Less than 20	96	21.92
	20-29	145	33.11
	30-39	101	23.06
	40-49	73	16.67
	50-59	19	4.34
	60 and above	4	0.91
Education	Junior high school and below	101	23.06
	Senior high school	69	15.75
	Technical secondary school degree	41	9.36
	Junior college degree	84	19.18
	Bachelor degree	129	29.45
	Postgraduate and above	14	3.20
Occupation	Student	135	30.82
	Civil servant	34	7.26
	Staff	58	13.24
	Teachers and technical personnel	27	6.16
	Individual industrial and commercial operators	29	6.62
	Peasant	20	4.57
	Freelancer	51	11.64
	Emeritus and retired	7	1.60
	Waiting for employment	13	2.97
	Professions not specified above	64	14.61
Origin	Sichuan province (China)	316	72.15
	Other places	122	27.85

Table 3 Measurement model evaluation.

Variable	First-order	Items	Standardized factor loadings	Cronbach's α	CR	AVE
DTM	RW	RW1	0.687***	0.759	0.838	0.510
		RW2	0.744***			
		RW3	0.697***			
		RW4	0.783***			
		RW5	0.651***			
	PE	PE1	0.658***	0.790	0.857	0.546
		PE2	0.683***			
		PE3	0.751***			
		PE4	0.833***			
		PE5	0.758***			
	RD	RD1	0.701***	0.881	0.912	0.677
		RD2	0.863***			
		RD3	0.897***			
		RD4	0.858***			
		RD5	0.779***			
TPB	CB	CB1	0.794***	0.907	0.925	0.605
		CB2	0.811***			
		CB3	0.806***			
		CB4	0.788***			
		CB5	0.808***			
		CB6	0.730***			
		CB7	0.737***			
		CB8	0.745***			
	AB	AB1	0.628***	0.865	0.895	0.517
		AB2	0.762***			
		AB3	0.746***			
		AB4	0.729***			
		AB5	0.609***			
		AB6	0.771***			
		AB7	0.783***			
		AB8	0.704***			
TS	TS	TS1	1.000***	1.000	1.000	1.000
PI	PI	PI1	1.000***	1.000	1.000	1.000
LI	LI	LI1	0.902***	0.781	0.901	0.820
		LI2	0.910***			

Note: $^{***}p < 0.01$

Table 4 Fornell & Larcker criterion discriminant validity.

Variable	RW	PE	RD	CB	AB	TS	PI	LI
RW	**0.714**							
PE	0.593	**0.739**						
RD	0.074	0.122	**0.823**					
CB	0.351	0.456	0.081	**0.778**				
AB	0.380	0.469	0.053	0.724	**0.719**			
TS	0.195	0.244	0.022	0.339	0.387	**1.000**		
PI	0.219	0.272	-0.051	0.402	0.400	0.387	**1.000**	
LI	0.191	0.313	0.044	0.424	0.447	0.520	0.399	**0.906**

Note: All boldfaced diagonal elements indicate the square roots of AVEs.

Table 5 Heterotrait-Monotrait Ratio discriminant validity.

Variable	RW	PE	RD	CB	AB	TS	PI	LI
RW	—							
PE	0.754	—						
RD	0.129	0.141	—					
CB	0.420	0.540	0.096	—				
AB	0.468	0.567	0.123	0.819	—			
TS	0.223	0.275	0.044	0.356	0.416	—		
PI	0.251	0.306	0.059	0.421	0.429	0.387	—	
LI	0.241	0.399	0.083	0.503	0.539	0.589	0.450	—

Table 6 Structural model evaluation.

Hypothesis	Path	Path coefficient	*P*	Test result
H1	DTM→TPB	0.501***	0.000	Supported
H2a	DTM→TS	0.066	0.215	Not supported
H2b	TPB→TS	0.356***	0.000	Supported
H4a	TPB→PI	0.312***	0.000	Supported
H4b	TPB→LI	0.249***	0.000	Supported
H5a	TS→PI	0.256***	0.000	Supported
H5b	TS→LI	0.359**	0.000	Supported
H7	PI→LI	0.143**	0.022	Supported

Note: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

Table 7 Mediating effect

Hypothesis	Path	Direct effect	Indirect effect	Total effect	Test result
H3	DTM→TPB→TS	0.066	0.178	0.244	Not supported
H6a	TPB→TS→PI	0.312	0.091	0.403	Supported
H6b	TPB→TS→LI	0.249	0.129	0.434	Supported

Table 8 Multi-group analysis (local tourist vs non-local tourist).

Hypothesis	Path	Local tourist	Non-local tourist	Difference	*P*	Test result
H8a	DTM→TPB	0.467	0.597	-0.130	0.097*	Not supported
H8b	DTM→TS	0.109	0.177	-0.068	0.354	Not supported
H8c	TPB→TS	0.329	0.430	-0.101	0.387	Not supported
H8d	TPB→PI	0.385	0.109	0.276	0.042**	Supported
H8e	TPB→LI	0.233	0.233	0.000	0.983	Not supported

Note: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$