

The Impact of Risk Perception on Tourists' Behavior Intention under the Background of Big Data: Based on TPB Expansion Model

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Abstract. Sudden crisis events will affect tourists' risk perception, risk perception further affects tourists' travel intentions, and the advent of the era of big data has further improved tourists' perception of risks. Starting from the background of big data, this paper selects tourists from tourist places in Guizhou, collects data by questionnaire, combines risk perception theory, and introduces emotional evaluation and situational factors into the TPB model to study tourists' behavior intentions from the perspective of risk perception. The results show that: (1) four factors, namely attitude, perceived behavioural control, emotional evaluation and situational factors, have a direct influence on tourists' behavioural intention ($p < 0.05$), among which tourists' behavioural intention is most influenced by emotional evaluation ($\beta = 0.186$); (2) cognitive degree does not have a direct influence on tourists' behavioural intention ($p > 0.05$); (3) risk perception directly influenced cognitive level, situational factors and perceived behavioural control (all $p < 0.05$), with situational factors and perceived behavioural control playing a mediating role.

Keywords: big data, risk perception, tourism destination, behavioural intention, TPB extension model

1. INTRODUCTION

With the advent of the big data era, the travel industry can use the functions of big data search, analysis and deep mining to analyze the behavioral intentions of travelers and achieve feed-forward control especially in the face of unexpected crisis events. When experiencing an unexpected crisis event before, using big data can obtain timely and accurate information, real-time news can be quickly disseminated in off-site, and the results that have occurred can be measured, compared and analyzed to detect deviations and prevent reoccurrence in future events. The World Health Organization (WHO) states that the crisis events have triggered great public fear and mental health stress [1]. According to its survey, approximately 30% to 50% of people will experience moderate to severe psychological disorders after a disaster, and 20% of people will suffer from severe mental illness within a year of the crisis events [2] This in turn affects the behaviour of the public. [3] The tourism industry is a sensitive and environmentally sensitive industry. The tourism industry, which is sensitive to the external environment and subject to high levels of volatility, has faced enormous challenges in the aftermath of the epidemic and has been virtually "shut down" in the short term. Therefore, it is important to study the impact of risk

perception on the behavioural intentions of tourists in the context of the new epidemic in order to recover the tourism industry. By analysing and collating the relevant literature in the Web of Science core database from 2020-2021, Carry out tourism impact research based on the background of big data, the current research on the impact of tourism in the context of the New Coronation epidemic has been conducted from five perspectives: economics, tourism industry, social psychology, crisis management and new changes in tourism research. The concept of risk perception comes from psychology and was first introduced into consumer behaviour research by P.A. Bauer, referring to individuals' feelings and perceptions of objective risk in external environments, emphasising the impact of experience gained from individuals' subjective feelings and direct judgments [4]. However, the dynamic nature of risk and the sensitivity of the tourism industry to fluctuations in the external environment make the study of risk perception in tourism more difficult.

In current research in the academic field, scholars have focused on three main areas of research on tourists' behavioural intentions in tourism destinations: firstly, research on tourism motivation and tourism decision-making. Motivation activates, directs, maintains and adjusts behaviour. Tourism motivation governs tourism behaviour, which in turn can trigger tourism activities. The second is the study of tourism behaviour of different segments of the population. Jigang Bao et al. argue that gender affects the type and manner in which tourists gather tourism information, and that there are differences in the degree of preference for the same tourism activity between female and male tourists. The third is the analysis of factors influencing behavioural intentions. Research in this area is mainly based on an extension of the Theory of Planned Behaviour. Due to the openness and simplicity of the Theory of Planned Behaviour - scholars have argued that Theory of Planned Behaviour models that incorporate other predictor variables can still predict individual behavioural intentions. For example, Hsieh incorporates risk perception variables into the TPB model to explore the influence of tourists' risk perception on behavioural intention to travel in Japan.

The Theory of Planned Behaviour (TPB) was an early theory for studying people's behavioural choices, developed by Fishbein and Ajzen [5]. The Theory of Rational Behaviour (TRA) was developed in 1975. The theory asserts that people are fully rational and in control of their own behaviour. However, some scholars have pointed out that the study of individual behavioural intentions should take into account situational variables, which somehow reduces the explanatory value of individual behaviour. To better address the limitations of imperfect volitional control of behaviour, Ajzen points out that behavioural attitudes and subjective norms are only some of the constraints that influence individual behaviour, which is also conditioned by resources and opportunities; having positive attitudes and subjective norms alone cannot trigger an individual's intention to perform a particular behaviour. Therefore, Ajzen introduced a new predictor variable: perceived behavioural control, and proposed the TPB model. Numerous studies have shown that the TPB model is more widely applicable than the TRA model and that it substantially increases the degree of explanation of behaviour. Due to the openness and simplicity of the Theory of Planned Behaviour, scholars have argued that a Theory of Planned Behaviour model that incorporates other predictor variables can still predict individuals' behavioural intentions, such as Hsieh's study of Japanese tourists' behavioural intentions when he considered the risk perception variable.

A synthesis of existing research has been collated to produce the research model shown in Figure 1.

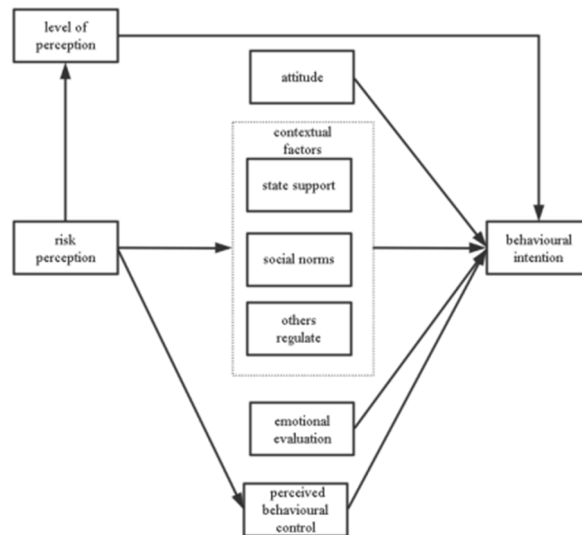


Fig. 1. Research model

2. THEORETICAL ASSUMPTIONS

2.1. The influence of cognitive level on tourists' behavioural intentions.

The information and knowledge that an individual receives from the outside world can be transformed into cognition by way of perception, memory and communication. A necessary part of cognition to influence behaviour is intention, and negative perceptions of tourism can negatively influence intention to travel[6]. This is the case in the China Integrated Social Survey Environment Module 2003. Data from 2003 and 2010 from the environmental module of the China Integrated Social Survey reflect to some extent the influence of urban residents' perceptions of environmental risks on the level of participation in environmental behaviour, but the environmental risk perception hypothesis has only been partially tested. Therefore, the relationship between the degree of tourists' perception of risk and their behavioural intentions is worth exploring. Based on the above analysis, this study proposes the following hypotheses.

H1: The extent to which tourists perceive risk directly influences behavioural intentions.

2.2 The influence of situational factors and affective evaluations on tourists' behavioural intentions.

Bagozzi's self-regulation theory emphasises that emotions are triggered by an individual's evaluation of the environment and that individual behavioural intentions vary, i.e. "evaluation - emotion - behavioural intention". -Murry (1992) points out that consumer behaviour is directly influenced by their emotions. Not only do emotions influence consumer behaviour, but also the emotions of leaders in companies directly influence the effectiveness of leadership behaviour. In

the field of tourism research, Wang Meng and Li Junyi used structural equation modeling to explore the visual factors of landscape that affect tourists' emotions and found that tourists' emotions directly affect tourists' behavioural intentions[7] . Based on the above analysis, this study proposes the following hypothesis.

H2: Contextual factors directly influence visitors' behavioural intentions.

H3: Affective evaluations directly influence visitors' behavioural intentions.

2.3 Attitudes and perceived behavioural control on tourists' behavioural intentions Strobl and Grail argue that attitudes are one of the factors that influence individual behaviour and that their influence on behaviour is intrinsic, persistent and consistent.

Ding Liying's study shows that attitudes and perceived behavioural control have a direct effect on the behavioural intention of Fuzhou residents to visit Taiwan, while attitudes have a weaker effect on behavioural intention compared to perceived behavioural control. Xie Dengming and He Biao et al. considered risk perception and tourism context variables in an extended model of planned behaviour theory, and the results showed that behavioural intention changed significantly under the effect of attitude and perceived behavioural control of potential forest recreation tourists[8]. Based on the above analysis, the following hypotheses are proposed in this study.

H4: Visitors' attitudes directly influence behavioural intentions.

H5: The perceived behavioural control of visitors directly influences behavioural intentions.

2.4 Influence of risk perception on tourists' behavioral intentions.

Risk perception is a key factor that influences tourists' behavioural intention to travel. Biu et al.(2022) argues that risk perception can be one of the factors that predict the social distance that individuals should keep from others under the crisis events[9] . Individual risk perception and social risk perception together form the overall public risk perception of the crisis events, and the overall public risk perception is associated with people's level of awareness and actions in relation to the crisis events[10]. The overall risk perception of the public is linked to the level of awareness and action. There is a lack of research on the direct pathway from risk perception to situational factors. Zhang Bingchao et al. used PLS-SEM to empirically examine the factors influencing local residents' willingness to participate in the construction of a special town and found that risk perception directly influenced local residents' perceived behavioural control. Based on the above analysis, this study proposes the following hypotheses.

H6: The perceived risk of visitors directly influences the level of perception.

H7: The perceived risk of tourists directly influences situational factors.

H8: Visitor perceptions of risk directly influence perceived behavioural control.

2.5 The mediating role of cognitive level, situational factors, and perceived behavioural control.

Based on the social amplification framework of risk, emotion and cognition are then amplification stations for individual risk perceptions. sjoever argues that risk perceptions are weak predictors of behavioural intentions, i.e. behavioural intentions are influenced by multiple

factors. Sjöver argues that risk perception is a weak predictor of behavioural intentions, i.e. behavioural intentions are influenced by multiple factors. Hu Xianan et al. proposed a "risk perception-cognitive evaluation-coping behaviour" pathway. Chen Hongling found that the greater the intensity of risk perception, the more negative the perceived behavioural control, and the weaker the perceived behavioural control, the stronger the behavioural intention of the tourists. Compared to the traditional health risks, the crisis events present new characteristics and the specificity of the context may trigger changes in people's behaviour, so the general social context theory may not be applicable. Based on the above analysis, this study proposes the following hypotheses.

H9: The degree of perception mediates between tourists' risk perceptions and behavioural intentions.

H10: Contextual factors mediate the relationship between tourists' risk perceptions and behavioural intentions.

H11: Perceived behavioural control mediates between tourists' risk perceptions and behavioural intentions.

3. STUDY CASE

In this study, SPSS 26.0 was used to analyse the reliability of the sample data: the KMO value for the overall scale was 0.747 ($p=0.000$) and the Bartlett's spherical test was significant, indicating that the questionnaire was well suited for factor analysis. In general, alpha coefficients between 0.7 and 0.8 indicate that the scale has reasonable reliability, and alpha coefficients between 0.6 and 0.7 indicate that the scale has acceptable reliability. Therefore, items with factor loadings below 0.5 were removed. The Cronbach's alpha values for the 24 retained items were found to be between 0.602 and 0.805, with good internal consistency across the dimensions measured and good reliability of the scale. Inter-variate validity tests include convergent validity tests and discriminant validity tests.

The AVE values for all variables were greater than 0.5, except for perceived behavioural control and behavioural intention, which were slightly below 0.5, in line with the academically agreed range where AVE values greater than 0.36 are acceptable and above 0.5 are ideal. The factor loadings for all variables were greater than 0.5 and the combined reliabilities for all variables were greater than 0.6, all greater than the minimum acceptable value. Therefore, this sample data has good convergent validity.

3.1 Study case sites

This paper selects Xijiang Qiandu Miaozhai and Zhaoxing Dongzhai in Guizhou Province as case sites, aiming to provide theoretical guidance for the rapid recovery of the tourism industry under the crisis events. Tourism accounts for a large proportion of Guizhou's tourism industry, which is in urgent need of revitalisation in the wake of the crisis events. In addition, Guizhou province represents one of the less affected regions in China, and the conclusions drawn as a case study are typical. Studying the mechanisms underlying the perception of risk in the region on the behavioural intentions of tourists will be beneficial for the future emergency management of major public health crisis events.

3.2 Questionnaire design

The questionnaire consists of three parts: the first part is a survey on tourists' pre-trip risk perceptions, which mainly investigates the extent of tourists' awareness and risk perceptions of the risks of travelling. The second part is a survey on tourists' behavioural patterns and evaluation of this trip, which mainly investigates tourists' attitudes, perceived behavioural control, situational factors and post-trip feedback evaluation of Guizhou tourist destinations. In order to ensure the validity and credibility of the sample data, the study used a mature scale. The above measures were assessed using a five-point Likert scale: strongly disagree, less agree, neutral, more agree and strongly agree. The question design of behavioural intention as the explanatory variable was borrowed from the scale design of Li Huamin and Zhu Xuan et al. The design of the three questions of attitude was referred to the scale design of Ajzen, Liu Jia et al. and Hausteine et al. The design of the four questions of perceived behavioural control was referred to the scale design of Ajzen and Goh et al. The design of the questions of risk perception and degree of perception was referred to the scale developed by Dai Yajun et al. and used three. The design of the risk perception and perceived level of risk items was based on the scale developed by Yajun Dai et al. For the measurement of situational factors, reference is made to the scale questions designed by Yu, Zhao, Li and others. The third part was a survey of basic information of tourists who completed the questionnaire, which focused on gender, age, education, occupation, monthly personal income after tax, marital status and frequency of travel before the crisis events.

3.3 Basic overview of data collection and sample

The questionnaire for this study was distributed in the field, and the survey period was from August 13, 2020 to August 24, 2020. The questionnaires were completed by tourists who took Xijiang Qiandu Miaozhai and Zhao Xing Dongzhai in Guizhou Province as their tourist destinations. A total of 493 questionnaires were distributed, and excluding incomplete questionnaires, 483 valid questionnaires were finally obtained, with a valid questionnaire return rate of 97.97%.

According to the valid survey sample, the gender distribution of visitors was more balanced, with 243 males and 240 females; the majority of respondents were aged between 19 and 35, and most of them were company employees; in terms of education, respondents were concentrated in the undergraduate level, accounting for 57.1%; in terms of average monthly income, the largest number of respondents (31.9%) was RMB 5001-8000, followed by RMB 3001-5000, accounting for 30.0%. In terms of average monthly income, RMB 5001-8000 was the most common, accounting for 31.9%, followed by RMB 3001-5000 (30.0%).

4. RESULTS AND ANALYSIS

4.1 Model fit test

The fit of the structural equation model was checked by using MPLUS 8.0, and the results are shown in Table 1.

TABLE 1. Structural equation model fit indices

Fitted indicators	χ^2/df	SRMR	RMSEA	CFI	TLI	Test results
Reference values	<3	<0.080	<0.080	>0.90 0	>0.90 0	Ideal
Actual value	1.745	0.043	0.039	0.944	0.932	Better

According to the χ^2/df test for model fit, the model fit is good as shown in Table 4 $\chi^2/df=1.745$ which is in the range of 1-3. 0.9, the better the model fit. The model design is reasonable.

4.2 Direct effects test

The path coefficients for the direct effects are shown in Table 2.

TABLE 2. Results of the path relationship test

Research Hypothesis	Paths	β -value	Standard error	t-value	Significance	Hypothetical results
H1	Level of perception → attitude	0.106	0.060	1.766	0.077	Support
H2	Degree of cognition → subjective norms	0.302	0.047	6.419	0.000	Support
H3	Degree of cognition → Perceived behavioural control	0.231	0.056	4.141	0.000	Support
H4	Contextual factors → Risk perception	-0.124	0.059	-2.103	0.035	Support
H5	Emotional evaluation → Risk perception	-0.079	0.053	-1.469	0.142	Not supported
H6	Risk perception → Attitude	0.129	0.058	2.208	0.027	Support
H7	Risk perception → Behavioural intention	0.106	0.053	2.004	0.043	Support
H8	Attitude → Behavioural intention	0.213	0.059	3.592	0.000	Support
H9	Subjective norms → Behavioural intentions	0.072	0.051	1.397	0.162	Not supported
H10	Perceived behavioural control → Behavioural intention	0.181	0.058	3.125	0.002	Support

Note: "****" in the table indicates $p < 0.001$

The standardized coefficients were 0.058, 0.089, 0.038, 0.186 and 0.042, respectively. The hypotheses of the studies were as follows: (1) Hypotheses H2, H4, H5, H6 and H8 held: at the $p < 0.001$ level, affective evaluation (1) Hypotheses H2, H4, H5, H6 and H8 hold: at the $p < 0.001$ level, affective evaluation, attitude and perceived behavioural control all have a significant positive effect on behavioural intention, risk perception has a significant positive effect on cognitive degree, and risk perception has a significant positive effect on perceived behavioural control; (2) Hypotheses H3 and H7 hold: at the $p < 0.05$ level, situational factors have a significant positive effect on behavioural intention, and risk perception has a significant negative effect on situational factors. Of these, the effect of perception level on behavioural intention was not significant, i.e. hypothesis H1 did not hold. The greatest effect of perceived behavioural control was 0.089, while the smallest effect of contextual factor was 0.042. It can be seen that perceived behavioural control, i.e. tourists' understanding of the risks after the epidemic and before the trip, has the greatest effect on behavioural intention to travel to Guizhou. At the same time, perceived behavioural control, i.e. tourists' judgement of their ability to travel and resources, also has an important influence on their behavioural intention to travel to Guizhou; while the direct influence of situational factors on behavioural intention is less than the other two factors, but the role as a mediating variable cannot be ignored.

4.3 Intermediary effects test

The intermediate effect test was conducted using the Bootstrapping method commonly used in academia to produce results in the case of 1000 replicate samples. This can be seen in Table 3.

TABLE 3. Analysis of mediating effects

Research hypothesis	Paths	β -value	Standard error	Significance
H11	Level of perception → attitude → behavioural intention	0.028	0.032	0.382

At the 95% confidence interval, the pathway Risk Perception → Perceived Degree → Behavioural Intention does not hold, i.e. hypothesis H9 does not hold. The paths of risk perception → situational factors → behavioural intention and risk perception → perceived behavioural control → behavioural intention both pass, i.e. hypotheses H10 and H11 are valid.

5. CONCLUSIONS

This paper combines risk perception theory with the extension of the traditional TPB model in an attempt to reveal the mechanisms underlying the influence of risk perception on tourism behavioural intentions and the important influencing factors of tourism behavioural intentions, the results of the study show that.

The government's support and policies on the crisis events prevention in scenic areas under the New Crown epidemic will indirectly influence tourists' behavioural intentions to travel through risk perception. Therefore, local governments and tourism-related departments should provide staff with epidemic prevention training in order to better reduce the degree of tourists' risk

perception. Risk perception has a significant negative effect on contextual factors, and contextual factors play a mediating role between risk perception and travel behavioural intentions, indicating that some of the negative effects of risk perception are transmitted to travel behavioural intentions through contextual factors.

Emotional evaluation can significantly influence tourists' behavioural intention, but the degree of cognition does not have a direct impact on tourists' behavioural intention. Both situational factors and emotional evaluation have an indirect effect on tourists' behavioural intention to visit, indicating that tourists' satisfaction evaluation after a visit will influence their behavioural intention to visit next time.

Attitude and perceived behavioural control can significantly influence tourists' behavioural intention, which indicates that the more positive tourists' attitude towards travelling, the more inclined they are to make a travel decision; the more negative tourists' attitude towards travelling, the less likely they are to make a travel behavioural intention. The degree of cognition cannot influence tourists' behavioural intentions through attitudes, subjective norms and perceived behavioural control, indicating that the direct effect of attitudes and perceived behavioural control on tourists' behavioural intentions is significant, suggesting that when tourists' attitudes towards travelling are more positive, tourists are more likely to make travel decisions.

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