Can the COVID-19 risk perception affect tourists' responsible behavior intention: an application of the structural equation model

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Abstract

Responsible tourism has received great attention as a recovery strategy post COVID-19 in the tourism industry. The originality of this study is the integration of knowledge-attitude-practice theory and theory of planned behavior to disclose how knowledge influences responsible tourism behavior intention and the development of a new scale of responsible tourism behavior in the post COVID-19 era. By using a mixed-methods approach with quota sampling, a propensity score weighting structure equation model is adopted to examine the behavior developed scales and proposed framework. From a methodological perspective, the propensity score weighting structural equation model was adopted to address the sampling bias in the non-probability sampling, which is a supplement and deepening of the research methods in tourism economics. This study finds that the responsible behavioral intention is partially mediated by the knowledge in travel risk. Behavioral attitude and subjective norm are the mediators and their indirect effects are causally moderated by tourists' past travel experience. Finally, the theoretical and practical implications of the findings are discussed.

Keywords

COVID-19, KAP model, theory of planned behavior, responsible tourism behavior, propensity score weighting, PLS-SEM

1. Introduction

Responsible tourism has drawn increasing attention in the literature in recent years (Mihalic, 2016). From the demand side, responsible tourism is a product which is 'consumed by an ethically oriented segment' (Goodwin, 2014, 22); whereas from the supply side, it is the process which promotes the community involvement and the sustainable development, including resource management and distribution (ibid). In the post-COVID-19 era, both the ethics from the demand side and the sustainability from the supply side need to be redefined (Im, Fu, Kim & Zhang, 2021) to achieve a safe and healthy recovery of the tourism industry. In addition to studies investigating responsible tourism from the companies' perspective, a few studies have shed light on the tourists' perspective (Stanford, 2008). For example, Grimwood, Yudina, Muldoon and Qiu (2015) discussed the definition of the phenomenon, Caruana, Glozer, Crane and McCabe (2014) explored the typology of responsible tourists, Mody, Day, Sydnor, Jaffe and Lehto (2014) studied their motivations and Bonn, Reid and Kim (2017) revealed the decision-making process of responsible tourism intention, and specifically from the ethical judgmental perspective.

At the time of writing, COVID-19 is still spreading in many countries globally. As the vaccine campaign has started in countries such as China, Russia, the UK and the USA, tourism scholars have predicted that the international tourism market will start to recover in 2021 (Liu, Vici, Ramos, Giannoni & Blake, 2021; Qiu et al., 2021). However, it is no doubt that the pandemic has changed tourists' behavior at least in the short-run (Kock, Nørfelt, Josiassen, Assaf, & Tsionas, 2020). Miao, Im et al. (2021) revealed that the behavioral change post COVID-19 is motivated by the avoidance of the disease. For example, tourists are more likely to choose auto-service (Seyitoğlu & Ivanov, 2020) and maintain social distance (Im, Kim & Choeh, 2021) in travel activities post COVID-19. Thus, the responsible tourism behavior in the post COVID-19 era will also be shifted from the pre-COVID performance. However, little light has been shed on the disclosure of responsible tourism behavior in the post COVID-19 era.

According to the protection motivation theory (Roger, 1975), the efficacy of the recommended preventive behavior and perceived self-efficacy influence people's behavior change. In the COVID-19 context, these two determinants are associated with the experience and knowledge they gained from the pandemic. In the tourism context, the knowledge on travel risks learnt from the pandemic can change tourists' future travel behavior (Foroudi, Tabaghdehi & Marvi, 2021) as people do not want to be infected in travels. Thus, the perceived risk during the pandemic and the new knowledge of travel risk people learn from the pandemic are associated with tourist' responsible tourism behavioral decisions post-COVID-19. Thus, given the important role of responsible tourism in the recovery process, the understanding of how travel risk knowledge changes responsible tourism behaviors is critical to reopen the tourism market in a safe and sustainable way. However, the discussion on knowledge in travel risk and responsible travel behavior remains rare in the tourism literature.

To fill in the research gap, this study integrates the knowledge-attitude-practice (KAP) theory, which has been widely used in the medicine literature (Piyaphanee et al., 2009), with the theory of planned behavior (TPB) to examine the determinants of the

responsible tourism behavior post-COVID-19 for the first time in the tourism field. Furthermore, this is also the first attempt to investigate the decision-making determinants of responsible tourism using the scales developed from the tourists' perspective. From the methodological perspective, this is the first attempt to adopt the propensity score weighting structure equation model (PSW-SEM) in tourism studies, which can address the sampling bias in the non-probability sampling and identify the causality in the model.

The remainder of the paper is organized as follows. Section 2 briefly reviews the literature associated with responsible tourism, the TPB and KAP theory. Section 3 introduces the methodology and data adopted by the study. Section 4 presents the main findings, followed by Section 5, which summarizes the findings and concludes the study.

2. Literature Review

2.1 Responsible tourism and responsible behavior (RSB)

Responsible tourism is proposed by Krippendorf in 1982 (Krippendorf & Andrassy, 1987) who believes it represents the direction of tourism development and aims to promote a new type of tourism that does not cause intolerable damage to the environment and society. Goodwin (2001) introduced responsible tourism as an overarching concept, meaning that in responsible tourism, tourists would consider minimizing the negative economic, social and environmental impacts of tourism. From the industry perspective, responsible tourism is defined as a win-win development for individuals, local places and communities (Responsible Travel, 2020), whereas the Responsible Tourism of Cape Town Declaration (2002) emphasized responsible tourism for better places for people to live in and better places for people to visit.

When investigating the impact of responsible tourism, Jenkins and Schröder (2013) believe that responsible tourism implies that all stakeholders in tourism activities, including tourism businesses, local authorities and communities, destination marketing organizations, investors and consumers are responsible for the consequences of their behaviors. Goodwin (2016) suggested the impact of responsible tourism should be coherent with sustainable tourism, which includes three pillars, namely, economic, social and environmental aspects. UNWTO (2020) released the report, Global Code of Ethics for Tourism which added the cultural dimension into Goodwin (2016)'s version. In the industry practice, Frey and George (2010) pointed out that the resource constraint negatively influenced businesses' responsible tourism management practices. Su, Huang and Pearce (2018) found that residents' perception of positive tourism impacts can encourage them to adopt environmental responsible behavior.

When researchers studied responsible tourism from tourists' perspective, most scholars are keen to investigate the environmental responsible behavior (Lee & Jan, 2015; Lin & Lee, 2018; Han, Lee & Hwang, 2016). However, in addition to the environmental responsible behavior domain, there is no scale yet measuring other domains developed by Goodwin (2016) and UNWTO (2020) from tourists' perspective.COVID-19 has co-existed with us for more than one year at the time of writing, which has changed the way we work and live (Park, Ju, Ohs & Hinsley 2020). For example, the presence of social distancing and adoption of more robotics have become a new trend in the tourism industry (Shin & Kang, 2020). However, to our best knowledge, the measurement of corresponding responsible behavior changes has been overlooked in the tourism literature. Thus, a development of responsible travel behavior measurement is needed, particularly in the post COVID-19 era.

2.2 TPB and tourists' responsible behaviour

TPB has been widely used in the tourism and hospitality field across various research domains. For example, Liu, Wu and Che (2019) uncovered that perceived environmental quality significantly affects tourists' environmentally responsible behavior through broken windows theory and the TPB model. Han, Hsu and Sheu (2010) revealed that attitude, subjective norm and perceived behavioral control positively affected intention to stay in a green hotel. Some studies have already started using TPB

model to investigate public preventive behaviors post-COVID-19 pandemic. For example, Si, Shen, Liu and Wu (2021) examined the driving factors of the people's mask-saving intentions in the post-epidemic scenario. Prasetyo, Castillo, Salonga, Sia and Seneta (2020) extended TPB model with protection motivation theory to evaluate the perceived effectiveness of the against-COVID-19 measures in behavioral intention, actual behavior and adapted behavior.

Behavioral attitude is one of the determinants of the intention in TPB (Ajzen & Fishbein, 1980). Behavioral attitude has a mediating and a significant direct effect on tourists' responsible behavioral intention (Lee & Jan, 2015; Lin & Lee, 2018). In this study, behavioral attitude means that tourists form a positive and favorable evaluation of the responsible behavior (Ajzen, 1991). Thus, Hypothesis 1 is proposed as

H1: Behavioral attitude positively influences tourists' responsible behavioral intention in the post-COVID-19 era.

Subjective norms are influenced by normative beliefs and motivations for compliance (Ajzen, 1991). Any individual or group organization is likely to have a key influence on an individual's beliefs, attitudes and choices, as the individual may observe the opinions of family members, friends or government departments (Moutinho, 1987). In this study, subjective norm implies that the social pressure perceived by tourists when they consider whether to implement responsible behavior. On this basis, Hypothesis 2 is proposed as

H2: Subjective norm positively influences tourists' responsible behavioral intention in the post-COVID-19 era.

Perceived behavioral control, as a non-volitional determinant of behavioral intention, refers to the perceived ease or difficulty of performing the behavior (Ajzen, 1991). According to TPB, if people perceive little control on their behaviors, they will have low intentions even if their behavioral attitude and subjective norm are positively related to the behavioral intention (Madden, Ellen & Ajzen, 1992). TPB suggests that behavioral attitude and subjective norm may not be sufficient to explain behavioral intention (Fishbein & Ajzen, 2011). Ajzen (1991) found that high levels of perceived behavioral control leads to stronger behavioral intentions. On this basis, Hypothesis 3 is proposed as

H3: Perceived behavioral control positively influences tourists' responsible behavioral intention in the post-COVID-19 era.

2.3 Risk and KAP theory

Risk and tourism are intertwined, as the purchase of tourism experience carries its own risks (Zheng, Luo & Ritchie 2021). Many scholars concentrated on assessing the relationship between risk perception and decision-making behavior of tourists. The higher the level of risk perception, the lower the likelihood of potential travelers to travel (Sönmez & Graefe, 1998). Some studies have attempted to examine the relationship between the travel risk perception and travel intention in different infectious disease contexts, such as Malaria (Piyaphanee et al., 2009), Avian influenza (Aro, Vartti, Schreck, Turtiainen & Uutela, 2009), H1N1 (Lee et al., 2012) and mosquito-borne viruses (Cherry et al., 2016), and most of them are grounded by the

KAP model (Sridhar, Regner, Brouqui & Gautret, 2016). Lee et al. (2012) pointed out that the 2009 H1N1 perception does not affect tourists' intention to travel internationally but indirectly affects travel intention when it is mediated by personal non-pharmaceutical interventions which extended the dependent variable in KAP from practice to intention. However, none of the above pandemics has hit the global economy and the tourism industry as strongly as COVID-19 did, which even changed the way people work and live (Park et al., 2020). Thus, the perception of COVID-19 must be different with perceptions of previous pandemics when travelers make travel decisions because the perceived health risk is situation-specific (Seabra, Dolnicar, Abrantes & Kastenholz, 2013). This indicates the essence to develop a new scale to measure the perception of COVID-19 more accurately.

One of the challenges of TPB is the weak explanation power to the behavioral intention (McEachan et al., 2016). Thus, Fishben and Ajzen (2010) proposed a Reasoned Action Approach (RAA) which endogenizes attitudes, social norm and perceived behavioral control by introducing other variables as their determinants including perceived risk and personal background (Fishben, 2008). In other words, risk or knowledge on the risk as the personal background can also influence consumer behaviors. KAP has been defined as theory of behavioral intervention, which has three components: travelers' actual knowledge of a given disease (e.g. symptoms, transmission, preventive measures and so on.), their attitudes (negative, positive or neutral) towards preventive measures, intended risk-taking or avoidance behaviors and their practices (e.g. the protection rate) (Sridhar et al., 2016). In the medical literature, the perceived risk of the disease is a key determinant of the knowledge on the disease (Wilcox & Stefanik, 1999). Thus, after COVID-19, tourists would have accumulated relevant knowledge on the pandemic. However, the scale which covers the new gains from the pandemic in knowledge of travel risk has been overlooked by tourism and medical scholars.

Grounded on RAA, the integration of KAP and TPB has solid theoretical foundation and could improve the expletory power of the model. Hu, Zhang, Chu, Yang and Yu (2018) found that environmental theory knowledge and environmental practice knowledge had significantly positive influences on attitude toward the behavior, and attitude toward the behavior had a significantly positive influence on the behavioral intention. According to KAP, H4–H6 are therefore proposed as

H4: The COVID-19 perception positively influences the knowledge in travel risk.

H5a: The COVID-19 perception positively influences tourists' behavioral attitude.

H5b: The knowledge in travel risk positively influences tourists' behavioral attitude.

H6a: The COVID-19 perception positively influences tourists' responsible behavioral intention in the post-COVID-19 era.

H6b: The knowledge in travel risk positively influences tourists' responsible behavioral intention in the post-COVID-19 era.

The relationship between cognitive and affective determinants in the consumer behavior literature has been well established (Kowalczuk, Siepmann & Adler, 2020).

The perception of COIVD-19 and the knowledge of travel risk are also cognitive variables. Han and Hyun (2016) examined the influence of environmental knowledge on positive and negative emotions in the context of pro-environmental behavior in museum visiting. Bamberg and Möser (2007) revealed that the environmental knowledge is associated with respondents' feeling of guilty, which is a core dimension of social norm. Denton, Chi and Gursoy (2020) found that subjective knowledge and objective knowledge were positively associated with subjective norm. Following previous research, Hypothesis 7 is proposed as follows

H7a: The COVID-19 perception positively influences tourists' subjective norm.

H7b: The knowledge in travel risk positively influences tourists' subjective norm.

According to KAP, knowledge on a disease could affect tourists' travel decision. The perceived risk is a key determinant of the behavioral intention (Sönmez & Graefe, 1998). All rational tourists will intend to decrease the exposure in the risk during travel, thus the knowledge they have should have a positive relationship with the behavioral control to protect themselves from infection. Wang, Wang, Yang, Li and Zhou (2020) pointed out that waste sorting knowledge was positively and significantly related to perceived behavioral control. The relationship between subjective knowledge/objective knowledge and perceived behavioral control were confirmed as well (Denton et al., 2020). Thus, Hypothesis 8 is proposed as

H8a: The COVID-19 perception positively influences tourists' perceived behavioral control.

H8b: The knowledge in travel risk positively influences tourists' perceived behavioral control.

As indicated by Lee and Jan (2015), Lin and Lee (2018) and Han et al. (2016), travel experiences also influence the intention. Thus, the mediating effects in the above hypotheses may also be moderated by the travel experience. Thus, Hypothesis 9 is proposed as follows:

H9a: Travel experience moderates the mediating effects between COVID-19 perception and responsible behavioral intentions.

H9b: Travel experience moderates the mediating effects between knowledge in travel risk and responsible behavioral intentions.

According to the literature review and discussion above, a hypothetical model investigating the responsible travel behavioral intention in the post-COVID-19 era is proposed in Figure 1. The originality of the research is as follows. Firstly, this is the first attempt to integrate the KAP model and TPB to investigate the role of knowledge in travel risk in the determination of the responsible behavioral intention. Secondly, the key construct in the narrative framework, responsible behavioral intention, will be measured by a newly developed scale from tourists' perspective. Given that COVID-19 just surfaced in 2020, no specific measurement exists on the perception of the pandemic and the travel risk knowledge in the COVID-19 context, thus, the measurement of those two constructs will also be developed by this study. Thirdly, from

the methodological perspective, a PSW-SEM is used in this study to address the potential sampling bias issue in non-probability sampling data.

China is one of the countries which has almost controlled the spread of the pandemic in the world. Residents in China have a more complete perception of the COVID-19 risk from the emergence in December 2019 to the elimination of domestic cases in March 2020. Given its dominant position in the global outbound market, it would be valuable and informative to investigate the relationship of knowledge in travel risk and responsible tourism in the recovery of the tourism industry using China as an example.

[Insert Figure 1 here]

3. Methodology and Data

A mixed-methods approach is adopted to this study in two stages. Following the scale development guidance suggested by Churchill (1979), in the first stage, in-depth interviews, panel discussions and desk research were used to generate the initial scales, which will be purified by the explorative factor analysis (EFA) and composite confirmatory analysis (CCA) (Hair, Matt, Howard & Christian, 2020). In the second stage, the PSW-SEM was used to examine the proposed framework with the developed scales.

3.1 Scale development

COVID-19 perception, knowledge in travel risk and responsible behavioral intention are three scales that must be develop in this study. The initial scales were composed of existing measurements in the literature and the new items identified in interviews. After a comprehensive literature review, 22 semi-structured in-depth interviews were conducted to collect information from Chinese residents who traveled domestically since May 2020 when domestic travel was reopened in China. The perception of COVID-19 and their experiences or challenges during the post-COVID-19 travel were collected. Convenient sampling method was adopted to conduct the interviews from May 6th to May 13th. To balance the influence of industry knowledge on the understanding of the interview questions, 13 interviewees had the tourism and hospitality background and nine did not. The interviews lasted for 15–30 minutes. Nvivo 11 was used for the coding and content analysis. From the 18th interviewee onward, no new themes were identified which shows that the data saturation was achieved. Eight items were adapted from existing scale which made up the construct of COVID-19 perception. Specifically, in addition to severity, infection, controllability and spread possibility developed by Dai, Hao and Wu (2020) in the public health emergency risk, the duration of the pandemic crisis and the recognition of COVID-19 as a new epidemic, were identified from the interviews as measurements for COVID-19 perception. Studies by Roehl and Fesenmaier (1992) and Lepp and Gibson (2003) summarized eight types of risk in travel activities, including equipment, financial, physical, psychological, satisfaction, social, time and political risks. Except the political risk, the other seven were mentioned in the understanding of the overall travel risks and customized with COVID-19 related-content in interviews and thus they were adopted as the measurements for the knowledge in travel risk (eight items).

For tourists' responsible behavioral intention construct, respondents were asked to recall their responsible tourism behaviors before the COVID-19 outbreak and share their understanding of the responsible behavior in the post-COVID-19 era. The items developed from interviews were matched with the four dimensions proposed by Goodwin (2016), including financial (seven items), social (eight items), cultural (four items) and environmental responsibilities (six items). The subconstructs were also highlighted in the Global Code of Ethics for Tourism for tourists by UNWTO (November, 2020). This means the structure of the developed scales was in line with the existed theory but with narrative measurements specifying the context of COVID-

19. In general, tourists define the responsible tourist behavior in the post COVID-19 era as more online and self-service activities with certain social distance such as the preference of online check-in, online shopping and self-service dining which supports findings of previous literature such as Shin and Kang (2020).

An expert panel discussion was conducted to evaluate the validity of scales in the initial pool. The panel was consisted of five members including two associate professors who are specialized in consumer behaviors, one expert from Beijing Tourism Group, one expert from Ministry of Culture and Tourism, and one expert form World Tourism Cities Federation. In total, 41 items were developed to measure COVID-19 perception and knowledge in travel risk and responsible behavioral intention, respectively. The expert panel reviewed all of the initial items. The applicability and representativeness of the measurement items were assessed by choosing an appropriate value on a scale of 1 = highly inapplicable to 5 = highly applicable. If two experts give a score lower than three points at the same time, the item will be deleted (Li, Su & Du, 2020). As a result, six out of 41 items were removed accordingly, and 35 items were left and measured by Likert scales that ranged from 1 = strongly disagree to 5 = strongly agree for the quantitative data collection and analysis. Limited by the space, details of the initial scales are included in the supplementary online material.

3.2 Questionnaire and data collection

In addition to the three developed constructs, the measurements of TPB constructs, including subjective norm, behavioral attitude and perceived behavioral control were obtained from previous literature (Ajzen, 1991, 2006; Han, Hsu & Sheu, 2010). Data were collected using a professional online survey company, Wenjuanxing, in China. The first wave was collected from June 15, 2020 to June 22, 2020 with the sample size of 100 for EFA analysis, meanwhile 339 responses were collected in the second wave in July 18, 2020 to August 1, 2020 for the measurement and path model estimations. Quota sampling was used in the data collection to represent the severity of COVID-19 across provinces in China, as the severity may cause different perception of the pandemic and residents in various provinces represent the demand of the domestic travel market. Specifically, one third of the respondents were from Hubei Province, which is the only province with the total confirmed cases beyond 10,000; one third from provinces with confirmed cases 1,000–9,999 and one third from provinces less than 1,000. In total, 49 items were used to measure the proposed framework. As a rule of thumb, in an adequate sample, one item responds to five to 10 valid questionnaires. Consequently, the sample size of the study is large enough to generate reliable and valid results (Hair, Hult, Ringe & Sarstedt, 2014).

3.3 Propensity score weighting structure equation model

The newly developed items were examined with EFA and confirmed by CCA in the complete framework using data collected from two waves of online panel surveys.

CCA is a process to confirm measurement models in partial least square SEM (PLS-SEM), which is similar to the function of confirmative factor analysis (CFA) in covariance-based SEM (CB-SEM). The difference between CCA and CFA in the model estimation process is that CCA maximizes total variances extracted from indicators which is consistent with the path model of PLS-SEM, whereas CFA maximizes the common variance which is in line with the path model of CB-SEM. CCA also needs to pass a series of diagnostic tests including composite reliability, convergent and discriminant validities for reflective measurements (Hair et al., 2020). After confirming the newly developed scales and testing the measurement model, the developed framework was examined with PLS-SEM.

To examine H9, the sample was split into two groups by the cluster analysis, taking the travel frequency and expenses as clustering conditions. In a random sampling study, demographics will be statistically the same across groups, thus the difference can only be caused by the treatment variable, which is the travel experience in this study. However, in a non-probability sampling data set, the difference may cause other demographical variables due to the sampling bias. The propensity score in PSW-SEM is the likelihood an observation to be assigned to the treatment group given a series of covariates (Rosenbaum & Rubin, 1983). The propensity score is usually obtained by the logistic regression between the treatment variable and covariates (ibid) and the weight is the inverse of the score. Thus, after weighting by the inverse of the propensity score, observations with higher score will have lower weights and vice versa. This means observations will be statistically much similar on demographics after weighting and is any difference exists across groups, the difference can only be caused by the travel experience which confirms the moderating effect. Given that most constructs are newly developed, and a second-order construct is involved, instead of the CB-SEM, the PLS-SEM was used due to its robustness in explorative studies and the unbiased estimation for formative constructs (Chang, Busser & Liu, 2020; Stienmetz, Liu & Tussyadiah, 2020).

4. Findings

4.1 Demographics

The demographics of respondents in the two waves survey are presented in Table 1. In the first wave, female accounted for 58% and respondents aged 26–50 accounted for 66%. In total, 90% participants were well educated with a college education or above and 63% of them earned the average monthly income between CNY2,000 to CNY10,000. Half of the respondents spent less than CNY4,000 per year for travel and 60% of them travelled over three times per year. In the COVID-19 pandemic context, 58% respondents had very good understanding of the pandemic development and almost all respondents (97%) prefer to check relevant tourism destination information before travelling.

In the second wave of data collection, female accounted for 48% and male accounted for 52%. The age ranges 19–25 accounted for 41%, whereas 26–40 for 51%. 87% respondents had a college education or above and 60% had an average monthly income between CNY2,000−CNY10,000. Similar to the first wave survey, over half of the respondents spent less than CNY4,000 and 65% of them travelled for over three times per year. Around 70% respondents understood the pandemic very well and 96% of them would take the initiative to obtain the relevant information of the destination before arrival.

[Insert Table 1 here]

4.2 EFA results

EFA was conducted to purify the initial items. The Kaiser–Meyer–Olkin value is 0.748 which is larger than 0.7 and the Bartlett's sphericity test is significant at 1% significance level, indicating, these items are suitable for factor analysis (Field, 2013). The principal axis factoring method and orthogonal rotation were used to estimate the factor loadings. Cumulative variance contribution rate of each construct is over 50%, whereas financial responsibility is slightly less than 50%. Items whose factor loading were lower than 0.5 were removed and the purified items are presented in Table 2. The Cronbach's α for the nine extracted factors were all higher than 0.60, demonstrating adequate reliabilities (Field, 2013). Specifically, two items were removed from COVID-19 perception, three from the knowledge in travel risk, two from financial responsibility, three from social responsibility and one from environmental responsibility. The purified items will be used to conduct CCA and SEM with the three constructs in TPB using the second wave data collection.

4.3 Composite confirmatory analysis of latent structure

In total, 339 responses were collected for CCA and the path model analysis. Given that the responsible behavioral intention is a second-order composite formative construct, a hybrid second-order SEM was adapted to estimate the model. As suggested by Chang et al. (2021), in the hybrid approach has two stages. In the first stage, all first layer constructs were used to implement the regular CCA and in the second stage, factor scores of the first layer constructs were extracted for the second-order CCA and path

model analysis. In the first layer CCA, three items (BA3, PBC2, and ER3) were removed due to the low loadings and the remaining 35 items' loading range from 0.652–0.835 (see Table 2). The goodness of fit is 0.452 and the Harman's single factor test is 0.252. The two indices meant the data fit the model well and no common variance bias exists in the model (Hair et al., 2014). As shown in Table 2, the composite reliability was between 0.771 and 0.836, indicating satisfied reliability of the constructs. The average variance extracted (AVE) values for all constructs were above 0.5 and the heterotrait-monotrait (HTMT) values were all smaller than 0.9 (see supplementary online material), suggesting great convergent and discriminant validities (Hair et al., 2014) respectively. According to the results above, the assessment of measurement model confirmed the reliability and validity of the first-layer latent constructs. The weights of the four first-layer constructs in the second-order CCA were all significant at 1% significance level, indicating that the higher order construct was also confirmed. In addition, the weights of financial, cultural, social and environmental responsible dimensions were 0.325, 0.408, 0.243 and 0.314, respectively. This means that the cultural dimension contributes to the responsible tourism intention the most, followed by financial, environmental and social dimensions.

[Insert Table 2 here]

4.4 Path Models

The estimation result of the path model with the full sample is presented in Table 3. For the direct effect, COVID-19 perception significantly and positively impact knowledge in travel risk (β=0.593), behavioral attitude (β=0.297) and subjective norm (β=0.137) but does not significantly impact perceived behavioral control (β=0.108) and responsible behavioral intention (β=0.071) at 10% significance level. Knowledge in travel risk perception significantly and positively influences behavioral attitude (β=0.291), subjective norm (β=0.333), perceived behavioral control (β=0.285) and responsible behavioral intention (β=0.263) at least at 10% significance level. The behavioral attitude shows a larger significant and positive impact on responsible behavioral intention (β=0.365) compared with subjective norm (β=0.184) and perceived behavioral control (β=0.234). The difference is significant at 10% significance level with the *z*-statistics of 2.57 and 1.87, respectively. Therefore, H1, H2a, H2b, H3b, H4, H5, H6, H7a, H7b and H8b were supported, whereas H3b and H8b were not supported.

The mediators between the relationship of COVID-19 perception and knowledge in travel risk towards responsible behavioral intention were further assessed. As presented in Table 3, behavioral attitude (β=0.108) and subjective norm (β=0.025) significantly mediated the relationship between COVID-19 perception and responsible behavioral intention at 10% significance level. Similar mediating effects were observed from knowledge in travel risk perception to the behavioral intention with the indirect effect of 0.106 and 0.061, respectively, which are significant at 10% significance level. The influence of knowledge in travel risk perception was also significantly mediated

by perceived behavioral control (β=0.067) at 1% significance level, which was not identified from the COVID-19 perception.

4.5 Multi group analysis—the moderating effect of travel experience

Lee and Jan (2015), Han et al. (2016) and Lin and Lee (2018) argued that travel experience can influence the responsible tourism behavioral intention. Thus, the sample has been split by the annual travel expenses and travel frequency. K-means cluster analysis suggested the optimal cluster number is two. Thus, the sample has been split into one group with higher expenses and travel frequency, named high group and the other one with lower expenses and travel frequency, named lower group. *t*-statistics indicate that the annual travel expenses (t=8.13) and travel frequency (t=33.25) in the high group were significantly higher than the low group, which supports the reasonability of the cluster analysis results. Gender, age, education, income, origin region, respondents' understanding of the pandemic and travel information search behavior are input as covariates in the estimation of propensity scores. Figure 2 presents the standardized mean differences of covariates before and after weighting. Cohen (2013) suggested that a smaller than 0.2 effective size of mean difference is marginal for binominal treatment. As presented in Figure 2, mean difference of most covariates was less than 0.2 after weighting. This means that if any difference exists in the multi-group analysis, the difference can only be caused by the travel experience, which can be used to examine H9.

[Insert Figure 2 here]

The PSW-SEM results for the two groups are presented in Table 3. Generally, the estimation results of the two groups were consistent with the full sample. This means the findings obtained by the full sample are robust. The direct effects of knowledge in travel risk on behavioral attitude and perceived behavioral control have significant differences at 10% significance level. In H2b, the path coefficient between knowledge in travel risk and attitude in the high group (0.431) is larger than the low group (0.128) (comparison: Z=−1.742) at 10% significance level. In H8b, the influence of knowledge in travel risk to perceived behavioral control in the high group (0.438) is also larger than the low group (0.131) (comparison: Z=−1.946) at 10% significance level. Meanwhile, two out of the three indirect effects show significant differences between the two groups. The mediating effect of behavioral attitude (comparison: Z=−1.864) and perceived behavioral control (comparison: Z=−1.744) between the relationship of knowledge in travel risk and tourists' responsible behavioral intention in the high group were smaller than the low group at 10% significance level. No significant difference associated with the COVID-19 perception has been identified across the two groups. Thus, H9a is not supported and H9b is confirmed.

[Insert Table 3 here]

5. Discussion and Conclusions

The results above confirm the significant and positive direct effect of knowledge in travel risk, behavioral attitude, subjective norm and perceived behavioral control on tourists' responsible behavioral intention in the context of COVID-19 pandemic, whereas the impact of COVID-19 perception on behavioral intention was insignificant. Ultimately, the findings discloses the impact of knowledge in travel risk on the responsible tourism behavior post COVID-19 which confirms the KAP theory in the tourism context for the first time. Although COVID-19 perception does not influence the responsible behavioral travel intention in this study, the COVID-19 experience has contributed new knowledge to the understanding of travel risk. The end of the massive spread of COVID-19 in China could be the underlying reason behind the insignificant relationship between COVID-19 perception and the behavioral intention. This finding also reveals that the direct determinant of responsible tourism behavior is the updated knowledge of travel risk, not the perception of the pandemic. Previous pandemic such as H1N1 and SARS were neither as severe as COVID-19 nor lasted as long as COVID-19, thus, they did not significantly contribute to tourists' travel risk knowledge and thus did not widely change tourists' behaviors afterwards.

The mediations of behavioral attitude and subjective norm on the paths from knowledge in travel risk and COVID-19 perception to tourists' responsible behavioral intention are confirmed. Meanwhile, the mediating effect of perceived behavioral control in the relationship between knowledge in travel risk and tourists' responsible behavioral control was also found significant. As presented in Table 3, a few COVID-19 related measurements in responsible tourism behavior constructs have been identified such as the preference to use online and auto services and the selection of self-service dining. Such preferences are still the practice of social distancing measures. This reveals that the knowledge or travel risk tourists learnt in the pandemic influences their responsible behavior by the practice of social distancing which is the perceived behavioral control. The behavioral attitude plays a crucial role in determining tourists' responsible behavioral intention evidenced by the significant direct and indirect effects (Zhou, Lin & Zhu, 2014; Qiu, 2017). This means in the post COVID-19 era, not only the KAP but also the TPB theories can be confirmed in the tourism context. More importantly, KAP further complements TPB by introducing knowledge as the determinant of attitude, subjective norm and perceived behavioral control.

The moderating effect of tourists' travel experience on the framework of KAP was tested. Tourists with more travel experience intended to have stronger commitment to responsible behavioral intention in future tourism activities. The knowledge they accumulated in their travel experiences could generate higher indirect effect on the behavior intention through subjective norm and perceived behavioral control. Due to the use of PSW-PLS, all other demographics are statistically the same between groups of tourists with different travel experience, thus the only reason can cause the significant difference between groups is travel experience itself. The adoption of PSW-PLS cannot only address the sampling bias issue in the online survey, but also identify the causal

moderating effect in the multigroup analysis. The multigroup analysis examined the role of knowledge in determining the responsible tourism behaviors when tourists have different travel experience. It deepened the analysis of KAP into segments, and also further confirmed the robustness of the finding obtained by the full sample model.

This study makes several theoretical contributions. Firstly, this study reveals the role of knowledge in travel risk in determining responsible tourism behavior post COVID-19, which generates a new angle to investigate the consumer decision-making process post crises. Secondly, in addition to assessing the widely discussed social and environmental aspects in responsible performance (Goodwin, 2016), financial and cultural responsibility were also explored and verified. This generates novel knowledge in understanding responsible tourism behavior in post COVID-19 era. Thirdly, it examined the influencing mechanisms of tourists' responsible behavior in the context of COVID-19 pandemic, which deepens the understanding of consumer behaviors post-COVID-19. Finally, from a methodological perspective, the PSW-SEM was adopted to address the sampling bias in the non-probability sampling, which is a supplement and deepening of the research methods in the responsible tourism.

As suggested by UNWTO (August, 2020), responsible tourism is the key to the industry's recovery post-COVID-19. The proposed conceptual model of responsible behavioral intention and its measurement scale have significant practical implications for tourists' responsible behavior management. The empirical results from China have revealed that tourists intend to deliver responsible behavior in future travels post-COVID-19, but the travel experience partially moderates the impact of knowledge of travel risk in the framework. This suggests that further promotion of the responsible travel behavior could facilitate the responsible tourism in China. A promotion campaign of travel risk knowledge to people with less travel experience would be more effective to stimulate the responsible behaviors. This study has developed the responsible tourism behavior scale which include financial, social, cultural and environmental aspects. Thus, governments or destination marketing organizations can follow the framework and establish the guidance of responsible tourism behaviors. Trainings and education should be well planned and delivered to tourism businesses and tourists in advance. Destinations should provide further incentives and enhance the quality of tourism products and services, thereby motivating tourists' actual responsible behavior.

This study has certain limitations which should be further addressed in the future research. Firstly, the scale was developed and tested in China only. With the wide global spread of COVID-19 pandemic, it would be useful to test the model in more diverse contexts to compare the differences in knowledge and responsible behavioral intention. Secondly, tourists' responsible behavioral intention was investigated instead of the actual behavior. Previous studies have suggested that the environmental behavior intention can be used to predict environmental behavior (Lee & Jan, 2015; Han & Yoon, 2015). However, discrepancy between actual responsible behavior and responsible behavioral intention is likely to exist. Therefore, this should be addressed in further

research to gain more insights into the intention-behavior gap regarding responsible tourism. Thirdly, although findings of this study are insightful in the recovering stage of destinations, the validity of the findings should be further examined when the tourism industry returns to pre-pandemic normal or transitions to a new normal.

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Figures and Tables

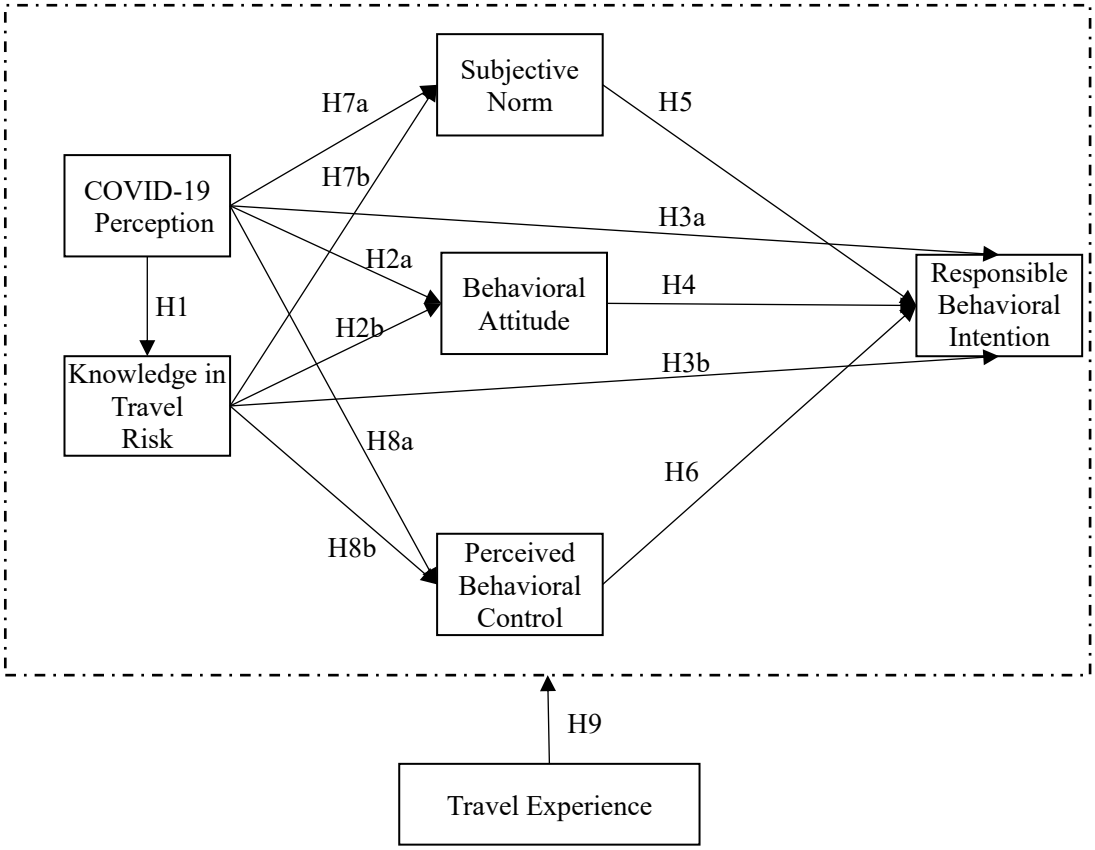

Figure 1. Conceptual Framework

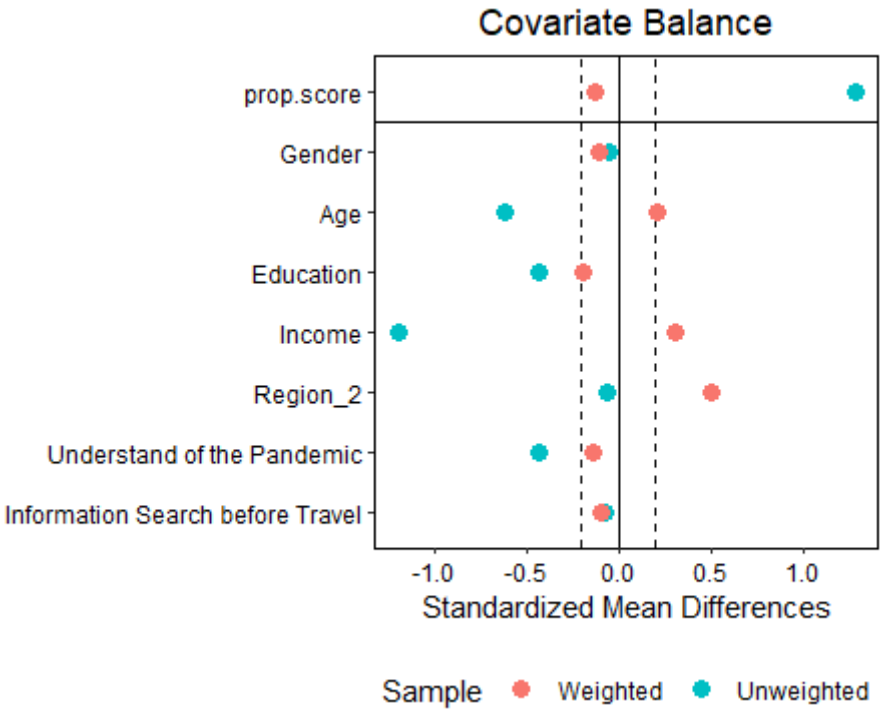

Figure 2. Propensity Score Weighting Results

Table 1. Demographics of Respondents

Demographic variable		1st Wave N=100		2nd Wave N=339	
		n	%	n	%
Gender	Male	42	42	162	47.79
	Female	58	58	177	52.21
Age	19–25	32	32	138	40.71
	26–30	27	27	85	25.07
	31–40	32	32	88	25.96
	41–50	7	7	16	4.72
	51–60	2	2	12	3.54
	> 60	0	0	0	0.00
Education	Junior high school and below	0	0	4	1.18
	High school or technical secondary school	9	9	39	11.50
	College or vocational high school	27	27	66	19.47
	Undergraduate	52	52	207	61.06
	Postgraduate	8	8	17	5.01
	PhD and above	4	4	6	1.77
Average monthly income	⩽ ¥2000	17	17	61	17.99
	¥2001– ¥5000	29	29	73	21.53
	¥5001–¥10000	34	34	132	38.94
	¥10001– ¥15000	13	13	42	12.39
	¥15001– ¥20000	6	6	17	5.01
	> ¥20000	1	1	14	4.13
Average annual travel expenses	⩽ ¥1000	11	11	37	10.91
	¥100–¥4000	39	39	142	41.89
	¥4001–¥8000	33	33	104	30.68
	> ¥8000	17	17	56	16.52
Average annual trips	0–2	41	41	147	43.36
	3–5	48	48	173	51.03
	> 5	11	11	19	5.60
Understanding the pandemic development	Have no idea about it	2	1.96	0	0.00
	Do not know much about it	0	0	5	1.47
	Hard to explain	20	20	51	15.04
	Know it	20	20	78	23.01
	Know it quite well	58	58	201	59.29
Destination information search before travelling	No	1	1	9	2.65
	Uncertain	2	2	20	5.90
	Yes	97	97	324	95.58

Note: ¥ denotes CNY (Chinese Yuan; 1 US Dollar was approximately 6.6 CNY in 2020).

Table 2. Factor Analysis Results

Construct	Item	EFA (N=100)		CFA(N=339)			
		Factor loading	Cronbach's alpha	Factor loading	CR	AVE	Weight
COVID-19 Perception (CP)			0.725		0.838	0.633	
	CP 1 - I think COVID-19 is easy to spread	0.812		0.752			
	CP 2 - I think COVID-19 is more serious than previous infectious diseases	0.772		0.798			
	CP 3 - I think COVID-19 is more infectious than previous infectious diseases	0.767		0.835			
	CP 6 - I think COVID-19 is a new infectious disease	0.621					
Knowledge in Travel Risk (KTR)			0.693		0.801	0.503	
	KTR 1 - Long-haul travel during the pandemic increases the possibility to infect COVID-19 and endanger my health	0.784		0.693			
	KTR 3 - I am worried when travelling during the pandemic due to the spatial mobility of infected people	0.805		0.763			
	KTR 4 - I have to maintain a certain social distance during the pandemic, which reduces the interactive experience whilst	0.678		0.707			

	traveling				
	KTR 5 - My travel time and destination have been restricted during the pandemic	0.610	0.670		
Behavioral Attitude (BA)				0.831	0.511
	BA1 - It is wise for individual travelers to practice responsible tourism	-	0.761		
	BA 2 - It is individual travelers' responsibility to practice responsible tourism	-	0.730		
	BA 4 - Responsible tourism is enjoyable	-	0.721		
	BA 5 - Responsible tourism is valuable	-	0.758		
Subjective Norm (SN)				0.808	0.584
	SN1 - Since the outbreak of the pandemic, people who are important to me and around me want me to travel responsibly in the future	-	0.728		
	SN2 - The guidance and supervision of the media since the outbreak of the pandemic will affect my future responsible tourism behaviors	-	0.778		
	SN3 - The government's civilized tourism initiative since the outbreak of the pandemic will affect my future responsible behaviors	-	0.784		

Perceived Behavioral Control (PBC)					0.828	0.546	
	PBC 1 - I understand the responsible tourism well	-		0.714			
	PBC 3 - I have the resources, time and opportunity to practice responsible tourism behavior	-		0.731			
	PBC 4 - I can make my own decisions on the responsible tourism behavior	-		0.763			
	PBC 5 - I can obtain rich information to practice the responsible tourism behavior	-		0.747			
Financial Responsibility (FR)			0.612		0.771	0.530	0.325***
	FR 1 - I am willing to use the voucher in the destination for consumption	0.646		0.798			
	FR 2 - I will buy the travel insurance to reduce the economic or time loss caused by the pandemic when I travel in the future	0.632					
	FR5 - I am more willing to purchase travel products, such as catering and accommodation services online than offline	0.793		0.683			
	FR6 - I am willing to buy local stuff during travel	0.644		0.697			
Social			0.668		0.816	0.526	0.408***

Responsibility (SR)							
	SR1 - I am willing to accept self-services, such as ordering and ticket checking when I travel in the future	0.806		0.757			
	SR2 - I prefer to make an online ticket reservation in advance instead of offline	0.702		0.675			
	SR4 - I am willing to follow the government regulation and accept the COVID-19 test when I travel in the future	0.771		0.71			
	SR5 - I am willing to accept measures to limit visitor crowding when I travel in the future	0.755		0.755			
Cultural Responsibility (CR)			0.701		0.801	0.504	0.243***
	CR1 - I am more willing to learn the destination cultural online than offline	0.766		0.747			
	CR2 - I am willing to show the destination cuisine and customs through social media	0.800		0.777			
	CR3 - I prefer to visit famous historical and cultural attractions	0.660		0.652			
	CR4 - I would like to practice individual dining when I travel in the future	0.670		0.653			
Environmental Responsibility			0.687		0.827	0.588	0.314***

(ER)			
	ER1 - I am willing to practice waste sorting, such as responsible disposal of masks	0.735	0.822
	ER2 - I am willing to stop the uncivilized behavior of other tourists	0.685	
	ER4 - I am willing to practice a healthy way to travel	0.800	0.814
	ER5 - I think the use of central air conditioning can be reduced in public places	0.671	0.652

Note: 1. CR: Composite reliability; AVE: Average variance extracted. 2. *** represents significance at 1% level.

Table 3. Estimated Relationships and Multi-group Analysis

	Full Sample (n=339)		Low (n=179)		High (n=160)		Group difference
	β	Z-statistic	β	Z-statistic	β	Z-statistic	Z-statistic
Direct effect							
KTR							
CP	0.593	(8.67)***	0.542	(6.67) ***	0.645	(5.19) ***	−0.70
BA							
CP	0.297	(3.61)***	0.366	(3.57) ***	0.206	(1.89) *	1.07
KTR	0.291	(3.30)***	0.128	(1.34)	0.431	(2.98) ***	−1.74*
SN							
CP	0.137	(1.80)*	0.100	(0.99)	0.219	(2.31) **	−0.85
KTR	0.333	(4.22)***	0.256	(2.65) ***	0.405	(3.14) ***	−0.92
PBC							
CP	0.108	(1.50)	0.141	(1.68) *	0.097	(1.09)	0.36
KTR	0.285	(3.55)***	0.131	(1.31)	0.438	(3.59) ***	−1.95*
RBI							
CP	0.071	(1.19)	0.040	(0.55)	0.109	(1.21)	−0.60
KTR	0.263	(4.15)***	0.310	(4.77) ***	0.175	(1.74) *	1.12
BA	0.365	(6.90)***	0.360	(5.67) ***	0.387	(4.92) ***	−0.27
SN	0.184	(3.94)***	0.148	(2.48) **	0.220	(3.323) ***	−0.81
PBC	0.234	(5.089)***	0.203	(3.77) ***	0.275	(3.82) ***	−0.80
Indirect Effect							
CP-BA	0.108	(3.53)***	0.132	(3.74) ***	0.08	(1.77) *	0.91
KTR-BA	0.106	(3.21)***	0.046	(1.29)	0.167	(3.06) ***	−1.86*
CP-SN	0.025	(1.79)*	0.015	(0.98)	0.048	(2.08) **	−1.20
KTR-SN	0.061	(2.73)***	0.038	(1.77) *	0.089	(2.16) **	−1.11
CP-PBC	0.025	(1.58)	0.029	(1.51)	0.027	(1.08)	0.06
KTR-PBC	0.067	(2.74)***	0.027	(1.24)	0.120	(2.48) **	−1.74*

Note: 1. CP: COVID-19 Perception; KTR: Knowledge in Travel Risk; BA: Behavioral Attitude SN: Subjective Norm; PBC: Perceived Behavioral Control; CR: Cultural Responsibility; ER: Environmental Responsibility; SR: Social Responsibility; FR: Financial Responsibility; RBI: Responsible behavioral intention. 2. *, ** and *** represent significant at 10%, 5% and 1% significance level, respectively.