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A Novel Travel Substitution Model Based on the Theory of Planned Behavior in COVID-19 Era

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KEYWORDS

Travel substitution behaviors, Perceived risk, Theory of Planned Behavior (TPB), Pandemic travel intentions, Tourism industry impact

ABSTRACT

The coronavirus disease 2019 outbreak has severely impacted the global economy, particularly the tourism industry. Lockdowns and epidemic prevention measures imposed in many countries have restricted the range and methods of travel. However, since many people still need to travel, they may change their initial plans through substitution. This study examined the travel substitution behaviors of Taiwanese citizens during the pandemic based on the theory of planned behavior. By including an additional perceived risk variable, we expanded the theory of planned behavior model to analyze the association between the perceived risk level and changes in travel behaviors during the pandemic and the possible travel substitutes adopted by visitors for dining, accommodation, transportation, sightseeing, shopping, and entertainment. We used a mixed-method approach, conducting in-depth qualitative interviews to examine the interviewees' potential travel substitution behaviors during the pandemic and then developing and administering a pre-test questionnaire based on the interview results. Then, we used convenience sampling to administer 580 online questionnaires to financially capable Taiwanese citizens aged ≥18 years. This study successfully developed an extended TPB model to examine the travel intentions of Taiwanese citizens during the pandemic. The results indicate that visitors have more intentions to travel when they have substitutes in the post-pandemic era. Moreover, the explanatory power of perceived behavioral control on travel-related behavioral intentions was stronger than attitudes and subjective norms. Our results are expected to provide a reference for tourism operators to suitably adjust their business models during an uncertain time.

1. INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic originated as a cluster of infections in Wuhan, Hubei Province, China, in December 2019. It then rapidly spread to other cities in China and worldwide. Its high variability and the frequent movements of people worldwide due to globalization have facilitated its far-reaching transmission. To effectively curb the spread of the pandemic, many counties imposed border restrictions, forcing the cancellation of many international flights.

The global economy has suffered tremendously due to the pandemic. Many industries became sluggish or stopped, with tourism being the worst affected (Škare et al., 2021). Based on the United Nations World Tourism Organization's (UNWTO) tourism data, the pandemic and worldwide travel restrictions caused international tourist arrivals between January and October 2020 to decrease by 72% compared to the same period in 2019, a decline of 900 million international tourists and a revenue loss of US$935 billion. This loss is ten times higher than during the global financial crisis in 2009 (UNWTO, 2020). The Taiwanese Ministry of Tourism estimated that only 1.37 million international tourists visited Taiwan in 2020,

representing only 11% of the 10.5 million visitors in 2019. The tourism industry's revenue also plummeted by over NT$37 billion (Chen, 2020). The profound impacts of the pandemic were evident in job cuts and business closures. There was also a reduction in visitors' confidence in spending on international tourism (Taiwan Visitors Association, 2021).

To stimulate domestic tourism and its related markets, the Taiwanese Government rolled out various subsidy measures for domestic travel in the second half of 2020, hoping to boost travel-related activities, revitalize the local tourism industry, and mitigate the impacts of decreased international tourism. The varying lockdown measures imposed in various countries have restricted people' travel range (Feng, 2020). Their inability to travel overseas has prompted them to turn to domestic travel as a substitute.

Substitution is settling on other options when the primary option becomes unavailable (Xuereb et al., 2020). In tourism, substitution can be defined as replacing specific products or services with equivalent products or services (van der Veen, 2015). For example, when travelers choose their destination, they may substitute domestic (international) travel with international (domestic) travel (Forsyth et al., 2014). Huybers (2003) proposed that geopolitical instability and significant events, such as the severe acute respiratory syndrome (SARS) outbreak in 2003, could promote substitution between domestic and international tourism.

Previous reviews have widely discussed travel-related behavioral intentions, such as tourism type, destination, willingness to pay, and accommodation choices (Chiang, 2014; Lam & Hsu, 2006; Park et al., 2017). However, there is a dearth of research on the behavioral model of travel substitution during the pandemic, especially local studies. Therefore, this study expanded the theory of planned behavior (TPB) by incorporating the concept of perceived risk. We designed a questionnaire to survey the travel-related behavioral intentions of people during the pandemic and changes in their dining, accommodation, transportation, sightseeing, shopping, and entertainment behaviors. Our results are a valuable reference for the tourism industry to quickly reshape and adjust its business models during crises.

To summarize, this study examines four main research questions:

(1) To understand visitors' perceived risk during the COVID-19 pandemic.

(2) To examine the relationships between perceived risk and the various latent variables in our planned behavior-based theoretical model and their effects on visitors' travel-related behavioral intentions.

(3) To analyze visitors' travel substitution behaviors relating to dining, accommodation, transportation, sightseeing, shopping, and entertainment during the pandemic.

(4) To provide a future reference for tourism-related industries based on the analyzed study results.

1.1 Perceived risk

The concept of perceived risk was first proposed by Bauer (1960), who suggested that when making a purchase, consumers subjectively perceive some form of uncertainty that affects their shopping behaviors because they cannot anticipate the outcomes of using a product. There are many sources of consumer-perceived risk. Cox (1967) elaborated on the implications of perceived risk by proposing that consumers may generate it when they cannot meet their shopping goals. A person's perception of risk is a key determinant of whether or not they would adopt a specific behavior. Therefore, many studies have focused on perceived instead of actual risks (Dillard et al., 2012).

Previous studies on perceived risk have mainly focused on actual products (Tsaur & Wang, 2001). Sirakaya et al. (1997) examined the association between perceived safety and travel destination choice, finding that consumers are less likely to visit a destination if they perceive it has a higher safety risk. In the tourism industry, risk is an important consideration among international travelers (Kozak et al., 2007). According to Maslow's (1943) hierarchy of needs, humans have an innate need to pursue safety. Therefore, safety and crisis are considered when a person makes their travel decision in the context of uncertain risks (Beirman, 2002). Perceived travel risk can be conceptualized as a consumer whose traveling decisions may be affected when they feel that the perceived risk of a specific travel behavior exceeds their acceptance level (Chew & Jahari, 2014). Therefore, a visitor may change their destination or travel method when they view their travel as dangerous or unpleasant due to perceived risks (Korstanje, 2007). These travel risk perceptions may arise from natural disasters, infectious diseases, terrorism, and political turmoil.

The impacts of infectious diseases on tourism, including economic impacts and changes in travel intentions, have been widely discussed, especially during the SARS outbreak in 2003 and the H1N1 influenza pandemic in 2009 (Karabuluta et al., 2020; Page et al., 2012; Zeng et al., 2005). However, few studies have explored how the COVID-19 pandemic has changed how Taiwanese citizens travel locally. Based on the studies of Bae and Chang (2020) and Dryhurst et al. (2020) on perceived risks during the COVID-19 pandemic, this study developed a global perceived risk scale that encompasses the affective and cognitive dimensions and is suitable for Taiwanese travelers.

1.2 Theory of planned behavior

Ajzen (1985) proposed the TPB to predict why a person performs specific behaviors. He advocated that behaviors are generated mainly due to the influence of behavioral intentions, while intentions comprise the three behavior variables:

attitudes, subjective norms, and perceived behavioral control. The TPB serves as the basis for the theory of reasoned action (TRA) proposed by Ajzen and Fishbein (1975). The TRA assumes that self-will controls behavior and that attitudes and subjective norms influence behavioral intentions. In contrast, individual behaviors generally do not arise from self-willingness and may be influenced by other objective factors under certain conditions. Therefore, Ajzen revised the TRA by adding perceived behavioral control to the other variables of attitudes and subjective norms, creating a more complete model of behavioral intentions.

When a person holds a positive and negative self-appraisal of certain behaviors. An individual's behavioral intentions strengthen when they show a more positive attitude toward a specific behavior. In contrast, their behavioral intentions weaken when they show a more negative attitude toward a specific behavior (Ajzen & Fishbein, 1980). When a person perceived social stress when adopting a specific behavior. These stressors range from personal perceptions to important reference groups (e.g., parents, spouses, friends, and colleagues) who have expectations about whether the person would execute the behavior in question (Ajzen & Fishbein, 1980). In addition to incorporating their subjective consciousness when performing a specific behavior, a person would also consider social norms; therefore, the extrinsic society influences their subjective norms (Chen, 2015). When society is more inclined toward supporting a specific behavior, people become more motivated to compromise, and their subjective norms also become stronger. Ultimately, a person develops the behavioral intentions to execute the said behavior (Hsing, 2002).

When an individual is taking a certain behavior, the difficulty a person perceives when adopting a specific behavior. He would also predict the difficulties they could encounter when performing the behavior based on their previous experiences. When he has more control over the resources (e.g., time, money, and skills) and opportunities required to perform the behavior, they would have a stronger perceived control toward the behavior and a higher intention to adopt the behavior. However, when he lacks control over the resources, or they feel that it is difficult to perform the behavior based on their similar past experiences, his perceived behavioral control decreases to the point where they may not be able to perform the behavior (Ajzen, 1985; Yan, 2018).When the person intends to adopt a specific behavior, which can be measured based on the effort they are willing to invest to achieve that behavior (Ajzen & Fishbein, 1980). Ajzen (1991) suggested that behavioral intentions correlate strongly with behavior; the stronger the behavioral intentions, the higher the likelihood of performing the behavior. Therefore, behavioral intentions are the best approach for predicting the feasibility of a behavior.

To date, the TPB has been extensively applied in various research fields at home and abroad, including psychology, healthcare, information technology, and tourism. Many studies have attempted to include new variables in the TPB model to enhance its explanatory power and ability to accurately predict how individual behaviors are generated (Bae & Chang, 2020). Regarding tourism, Lam and Hsu (2006) added previous experiences as a new variable to the TPB to predict tourists' behavioral intentions in choosing Hong Kong as a tourist destination. Their results showed that attitudes, perceived behavioral control, and previous experiences significantly influenced the behavioral intention of choosing a tourism destination. Park et al. (2017) added destination image and travel constraints to the original TPB to accurately predict Chinese college students' behavioral intentions to visit Japan. Their results showed that attitudes had the greatest influence on students' behavioral intentions, while travel constraints negatively influenced their behavioral intentions. Quintal et al. (2010) based their study on the TPB and the perceived risk and perceived uncertainty variables. Their objective was to examine how risk-related variables affect the behavioral intentions of South Korean, Chinese, and Japanese tourists to visit Australia. Their results showed that perceived risk significantly influenced Japanese attitudes, and perceived uncertainty significantly influenced Chinese attitudes and Chinese and Japanese perceived behavioral control.

The COVID-19 pandemic has caused widespread and significant impacts globally, with the tourism industry experiencing severe setbacks. It has also created a demand for predicting tourists' future travel-related behavioral intentions. There is extensive research on using the TPB to predict the specific behaviors a person adopts during their travels, such as their mode of travel, destination choice, willingness to cover the costs, and accommodation choice (Chiang, 2014). However, there is a dearth of research on changes in tourists' behavioral intentions during the pandemic. Therefore, this study aimed to expand the TPB model by adding perceived risk as a variable and to use it to explore the associations between Taiwanese citizens' perceived risk level and changes in their travel behavior during the COVID-19 pandemic.

1.3 Travel substitution behavior

In tourism, substitution is defined as substituting specific products or services with equivalent products or services (van der Veen, 2015). Substitution may arise for two reasons: (1) visitors are unreceptive to the destination's environmental changes, and (2) the environment of another destination offers substitutive conditions (Shelby et al., 1988). Manning (1999) highlighted that visitors might adopt temporal or spatial substitution strategies when they adapt to negative recreational experiences. Wang (2008) explored the coping behaviors of stressed-out visitors during the Yangmingshan flower festival. The author found that the higher the stress level experienced by visitors, the more likely they were to adopt spatial substitution, deviating from the spaces or routes of their original recreation activities and engaging in identical or similar activities in other locations.

Human interactions are unavoidable in tourism; therefore, compared with other industries, tourism is more susceptible to the impacts of COVID-19 (Feyisa, 2020). While the severity of the pandemic has limited the range and methods of travel, some

people still need to travel and may choose alternative modes that they perceive to pose a smaller infection risk. Kourgiantakis et al. (2020) investigated the travel intentions of 1281 Crete residents during the pandemic, finding that some residents still intended to travel during or after the summer but may adjust their original travel plans. Most interviewees chose to substitute overseas travel with domestic travel in Greece or Crete. Regarding accommodation, some participants were more inclined toward living in private holiday residences (e.g., cottages and homes of friends or relatives), four- or five-star luxury hotels, or Airbnb apartments, suggesting that visitors had safety and hygiene considerations. Sarkady et al. (2021) found that during the pandemic, visitors could substitute physical travel with virtual reality-simulated travel experiences.

Taiwanese citizens' travel behavior decisions undoubtedly center on the six dimensions of dining, accommodation, transportation, sightseeing, shopping, and entertainment (Chien, 2019). This study defines the potential substitutive travel behaviors based on Chang's (2017) and Kuo's (2012) definitions of these six dimensions (Table 1).

Table 1. Travel substitution behaviors in times of crisis.

Substitution behavior	Definition and classification	References
Dining	Classification of dining types and methods, such as self-preparing meals, taking out, online food ordering, and dining in (e.g., restaurants, hawker stalls, and fast food restaurants).	Kao & Lin (2004)
Accommodation	Classification of accommodation types, such as high-class luxury hotels, homes of friends and relatives, and campsites.	Tourism Bureau (2003) and Wu (2007)
Transportation	Refers to transportation modes, facilities, and services and the classification of transportation modes at the destination, including driving or taking a bus, taxi, or high-speed rail.	Lin et al. (2019)
Sightseeing	Classification of sightseeing locations (e.g., overseas destinations and local and offshore destinations in Taiwan) and types (e.g., natural landscapes, historical sites, and religious tourism destinations).	Lin et al. (2019)
Shopping	Classification of shopping types (e.g., souvenirs, handicrafts, and local products) and payment methods (e.g., credit card, cash, and mobile payment).	Yang (2005)
Entertainment	Classification of entertainment activity types, such as viewing sceneries or participating in art events or local celebrations.	Lin et al. (2019)

2. METHODS

This mixed-methods study conducted qualitative interviews with several participants for in-depth exploration and observation. Next, qualitative questionnaire items were developed and revised based on the interview results. Then, the relationships among variables were determined in a quantitative study using a large sample to overcome the shortcomings of a single research method.

2.1 Qualitative research

2.1.1 Participants and procedure

Purposive sampling was used to recruit the interviewees for the qualitative interviews. Between August 7 and October 22, 2021, when Taiwan was on a Level 2 nationwide epidemic alert, semi-structured qualitative interviews were conducted online or in-person with 20 financially capable people aged ≥18 years who had good decision-making skills and had gone on ≥3 domestic or international trips within the last five years. The interviews aimed to highlight the differences and similarities in the interviewees' travel intentions and modes before and after the pandemic. Each interview lasted 30–60 minutes. The interviewees consented to the interviews being audio recorded and transcribed; the interviewees clarified any unclear information in the transcripts.

2.1.2 Data analysis methods

Template analysis was used to analyze the qualitative interview data. First, the researcher constructed a template (a pre-built classification system) and then classified the text data semi-openly, adjusting the original classification system when necessary. The associations between the text data were described through non-statistical methods afterward (Chang, 2010). The qualitative interviews aimed to elucidate the possible travel substitution behaviors adopted by Taiwanese citizens during

the pandemic. Therefore, the classification system comprised the six dimensions of dining, accommodation, transportation, sightseeing, shopping, and entertainment. Different concepts were identified from the interviewees' responses and then classified. If the interviewees mentioned similar concepts, they were added to the same principal axis for analysis.

2.2 Quantitative research

Based on the literature reviewed, this study developed the following method and procedure to examine associations between visitors' perceived risks and travel attitudes, subjective norms, perceived behavioral control, and travel-related behavioral intentions during the pandemic and how substitutive travel choices affected their travel-related behavioral intentions.

2.2.1 Study framework and hypotheses

This study proposed the following hypotheses based on the study by Bae and Chang (2020) (Figure 1):

H1: Visitors' perceived risk during the pandemic influences their travel attitudes.

H2: Visitors' perceived risk during the pandemic influences their subjective travel norms.

H3: Visitors' perceived risk during the pandemic influences their perceived behavioral control over travel.

H4: Visitors' perceived risk during the pandemic influences their travel-related behavioral intentions.

H5: Visitors' perceived risk during the pandemic influences their travel substitution behavior.

H6: Visitors' attitudes influence their travel-related behavioral intentions.

H7: Visitors' subjective norms influence their travel-related behavioral intentions.

H8: Visitors perceived behavioral control influences their travel-related behavioral intentions.

H9: Travel substitution behavior influences visitors' travel-related behavioral intentions.

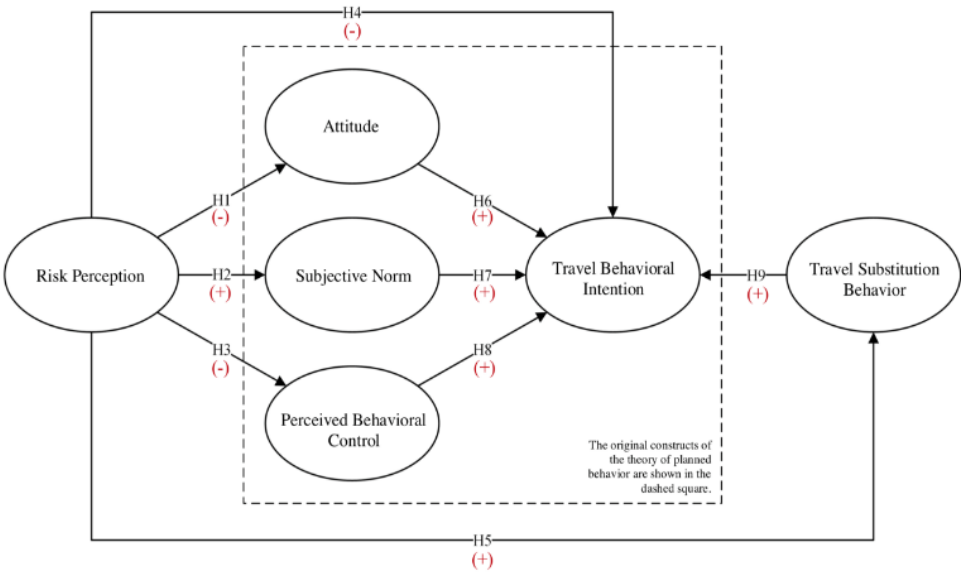

Figure 1 Caption: The study framework.

Figure 1 Alt Text: A model for incorporating Risk Perception and Travel Substitution Behavior to revise the Theory of Planned Behavior Model. The study hypothesizes that Risk Perception has various effects on Attitude, Subjective Norm, Perceived Behavioral Control, Travel Behavior Intention, and Travel Substitution Behavior. These effects are specified as follows: H1 (negative impact), H2 (positive impact), H3 (negative impact), H4 (negative impact), and H5 (positive impact). Furthermore, Attitude, Subjective Norm, and Perceived Behavioral Control have positive impacts, specified as H6 (positive impact), H7 (positive impact), and H8 (positive impact), respectively. Lastly, Travel Substitution Behavior positively influences Travel Behavior Intention, denoted as H9.

2.2.2 Participants and procedure

This study used convenience sampling to recruit financially capable participants aged ≥18 years with good decision-making skills who had gone on ≥3 domestic or international trips within the last five years. They completed the questionnaire, which was provided as an online Google form. The qualitative study comprised two stages:

1. Questionnaire pretesting

First, the qualitative interview results were consolidated, and the questionnaire items were preliminarily developed based on the published literature. The questionnaire was administered over nine days (November 5 and 13, 2021). From the 79 questionnaires administered, 50 valid responses were received, giving an effective response rate of 62.39%. Unsuitable items were removed or revised following item analysis, exploratory factor analysis, and reliability analysis to improve the questionnaire's accuracy and reliability.

2. Questionnaire testing

Huang (2000) developed a formula for determining sample size. Assuming the population is approximately infinite, the minimum sample size should be 384 at a 95% confidence level and a sampling margin of error of ±5 percentage points. The formal questionnaire was administered between November 11 and December 13, 2021. From the 669 questionnaires administered, 580 valid responses were received, giving an effective response rate of 86.82%.

2.2.3 Study instrument

This study's instrument was a self-reported online questionnaire based on Ajzen's (1991) TPB. It was designed based on Bae and Chang's (2020) study, which focused on the influence of South Koreans' perceived risk of contactless travel on their travel-related behavioral intentions. We also referred to Dryhurst et al.'s (2020) study on worldwide perceived risk during the COVID-19 pandemic; Prati and Pietrantoni's (2016) study on how knowledge, perceived risk, and xenophobic attitudes influenced Italians during the Ebola outbreak; Liu et al.'s (2021) study that used the TPB to investigate Chinese students' intentions to visit green urban spaces during lockdowns; Liu et al.'s (2021) study that used the TPB to investigate the factors influencing Chinese citizens' willingness to travel overseas post-pandemic; Seong and Hong's (2021) study that used the TPB to assess whether risk awareness influenced visitors' decisions to visit national parks during the pandemic; and Yang's (2012) study that used the TPB to explore associations between factors influencing elementary schoolteachers' decisions to engage in ecotourism, willingness to travel, and environmental behaviors. To develop our questionnaire, we revised the items in each factor related to perceived risk and the TPB in these studies. Our questionnaire comprised four main sections: participants' basic data; perceived risk; attitudes, subjective norms, perceived behavioral control, and travel-related behavioral intentions; and travel substitution behavior. The questionnaire contained 126 items that were measured on a five-point Likert scale. The operational definitions of all variables are provided in Table 2.

Table 2. Operational definitions of the variables

Variable	Operational definition	Measurement	Item	References
Perceived risk (R)	The person's perceived risk level toward the COVID-19 pandemic	Five-point Likert scale (1 = strongly disagree; 5 = strongly agree)	R1: I am worried about the progress of the COVID-19 pandemic.	Bae & Chang (2020); Dryhurst et al. (2020); Prati & Pietrantoni (2016)
			R2: I am worried about getting infected with COVID-19.	
			R3: I am worried that friends and family living in Taiwan will get infected with COVID-19.	
			R4: In general, I believe that I am very likely to get infected with COVID-19.	
			R5: Compared to others, I believe that I am more likely to get infected with COVID-19.	
			R6: I believe that I am very likely to die of COVID-19.	
Attitudes (A)	The person's positive or negative appraisal of traveling during the COVID-19 pandemic		A1: To me, traveling during the pandemic is enjoyable.	Bae & Chang (2020); Liu, J. et al. (2021); Liu, Y. et al. (2021); Seong & Hong (2021); Yang
			A2:To me, traveling during the pandemic allows me to relax and de-stress.	
			A3: To me, traveling during the pandemic gives me more opportunities to connect with the world outside and socialize.	
			A4: To me, traveling during the pandemic benefits me.	

				(2012)
Subjective norms (S)	The person's perception of social stress when traveling during the COVID-19 pandemic		S1: My family's opinions influence my travel choices during the pandemic.	Bae & Chang (2020); Seong & Hong (2021); Liu, Y. et al. (2021); Yang (2012)
			S2: The opinions of my friends, classmates, and colleagues influence my travel choices during the pandemic.	
			S3: Media information influences my travel choices during the pandemic.	
			S4: Government policies and measures influence my travel choices during the pandemic.	
Perceived behavioral control (P)	The person's perception of difficulty when traveling during the COVID-19 pandemic		P1: I am confident I can travel during the pandemic as long as I am willing.	Bae & Chang (2020); Liu, J. et al. (2021); Liu, Y. et al. (2021); Seong & Hong (2021); Yang (2012)
			P2: Nothing can stop me from traveling during the pandemic as long as I am willing.	
			P3: I can travel during the pandemic, provided I have sufficient resources (funds), opportunities, and time.	
			P4: I would still travel during the pandemic even if some attractions remain closed or require advanced booking.	
Travel-related behavioral intentions (TB)	The person's self-measured propensity to travel in the future during the COVID-19 pandemic		TB1: I want to travel within the next year.	Liu, Y. et al. (2021); Seong & Hong (2021); Yang (2012)
			TB2: I plan to travel within the next year.	
			TB3: I will try my best to travel within the next year.	
			TB4: I will invest my time and money in traveling within the next year.	
Travel substitution behavior (TS)	The person's self-measured willingness to travel in the future during the COVID-19 pandemic		TS1: In my travels within the next year, I plan to visit open instead of closed spaces.	Liu, Y. et al. (2021); Seong & Hong (2021)
			TS2: In my travels within the next year, I plan to visit less crowded instead of crowded places.	
			TS3: In my travels within the next year, I plan to visit places where disinfection work is carried out instead of places that lack such operations.	
			TS4: In my travels within the next year, I plan to adopt modes of travel that pose a smaller infection risk instead of my previous pre-pandemic modes.	

2.2.4 Data analysis

The quantitative questionnaire data were coded using a computer and then analyzed using IBM SPSS (version 22.0) and Amos software. The analytical method was as follows. First, the questionnaire was coded and quantified, and the descriptive statistics were visualized to present the data distribution directly and to calculate the mean and standard error between each item. Next, we used confirmatory factor analysis (CFA) to examine the relationships between items. Then, we tested the causality level between variables through structural equation modeling (SEM).

3. RESULT

3-1 Qualitative data analysis

3.1.1 Interview data

The semi-structured qualitative interview items were designed and revised in July 2021. Between August 7 and October 22,

2021, financially capable people aged ≥18 years with good decision-making skills who had gone on ≥3 domestic or international trips within the last five years participated in the interviews. They described the changes in their modes of travel after the pandemic; their dining, accommodation, transportation, sightseeing, shopping, and entertainment habits; and their substitution behaviors when traveling in the future.

1. Dining: Before the pandemic, most interviewees chose to dine in at restaurants, hawker stalls, and diners. Most expressed that they may dine in less and opt for take-out instead after the pandemic. Some older interviewees even said they were only willing to travel once there were no more confirmed cases in Taiwan. Older people are recognized to be most at risk of getting infected, while younger people are perceived to be more risk-taking. Therefore, it is important to examine the age differences in response to the current state of the pandemic (Wolfe et al., 2021). We also found that interviewees aged ≤30 years expressed that they would continue their pre-pandemic eating habits at stalls and diners. In contrast, those aged ≥40 years expressed that they would dine in less at diners after the pandemic due to sanitary concerns or family factors.

2. Accommodation: The tourism and hotel industries have been hit hardest since the pandemic began. Hoteliers are worried that they may suffer losses due to changes in customer demands, such as the uncertain outcomes of hotel stays, booking cancelations, and travel restrictions (Rowell, 2021; Schürhoff, 2021). The interviewees aged ≥40 years emphasized comfort and sanitary conditions in their accommodation and chose to stay in luxury hotels and guesthouses before the pandemic. Those aged 18–40 years considered the pricing, cleanliness, and ambiance of their accommodation and chose to stay in hotels, guesthouses, youth hostels, and Airbnb properties before the pandemic. Regarding post-pandemic traveling, those aged ≥40 years said that they would not change their accommodation preferences. In contrast, those aged 18–40 years said they would try to avoid accommodations with shared spaces and bathrooms. As the local epidemic wanes in Taiwan and the government relaxes its epidemic prevention policies, more people are willing to travel again and have been booking accommodations. In the post-pandemic era, hostels' sanitary, safety, and flexibility policies will become key considerations for travelers (Skyscanner, 2020).

3. Transportation: Before the pandemic, most interviewees traveled to their destination by driving or taking a train, high-speed rail, or bus. Post-pandemic, several interviewees stated that they are less likely to take public transportation and would drive instead or shorten the travel distance to minimize the time spent inside the vehicle. Numerous recent studies have shown that the pandemic has increased the likelihood of visitors self-driving during their travels. In addition, Milman (2022) found an increased frequency of car accidents and a sharp decline in public transport use in the US as businesses closed down, more people began to work from home, and the fear of getting infected increased. While there are no direct associations between these trends, the pandemic has indeed hampered road safety improvement measures in the US, restricted measures to improve the livability of cities, and impeded efforts to reduce air pollution and greenhouse gas emissions.

4. Sightseeing: Most interviewees were inclined to visit natural scenic areas, museums, heritage sites, and temples during the pandemic. They would choose to reduce the likelihood of staying indoors after the pandemic and head to vast and open outskirts in their travels.

5. Shopping: Before and after the pandemic, most interviewees completed payments using cash and credit cards because of personal habits and their widespread and convenient use. Some would even swap cash for their most frequently used credit card to reduce contact with cash. While some interviewees considered using mobile payments, they gave up because the procedure was complex and cumbersome. When purchasing travel products, most interviewees tended to buy local products or unique souvenirs before the pandemic. Post-pandemic, some said they would buy local products less often because they were uncertain whether health and safety guidelines were followed during manufacturing. Moreover, some worried that gifting would cause fear among the recipients.

6. Entertainment: Before the pandemic, some interviewees would go sightseeing, window-shopping, taking a hot spring dip, participating in art events, or mountaineering. After the pandemic, most interviewees said they would avoid crowded, confined, and indoor activities and instead go mountaineering, hiking, or sightseeing.

This study consolidated the factors influencing the travel-related decisions of the 20 interviewees. When traveling during the pandemic, they considered whether they should be masked at all times or whether other tourists were masked and were more inclined to visit open outdoor spaces instead of crowded indoor spaces. Sanitary conditions, government policies, and prices also influenced their travel decisions. Sanitary conditions were the top priority since most interviewees wished to stay in or eat at places that are cleaner, tidier, and disinfected when traveling after the pandemic and would avoid places with high risks of virus transmission. Furthermore, some interviewees had different post-pandemic travel choices based on their vaccination status.

3.2 Quantitative data analysis

3.2.1 Validity and reliability analysis

We performed CFA using Amos statistical software to measure each dimension's goodness of fit and ensure the validity and reliability of the results. First, based on Fornell and Larcker's (1981) criteria for evaluating convergent validity, all the estimated standardized factor loadings (λ) must exceed 0.5, and the t-statistic must be statistically significant when using multiple indices to measure the structure of a particular model.

Next, reliability analysis was used to check the consistency and stability of each dimension's measurement results. Nunnally (1978) suggested that good reliability is indicated by a Cronbach's α of >0.7. However, Cronbach's α is often underestimated in SEM analysis. Therefore, studies prefer to use composite reliability (CR) and average variance extracted (AVE) to examine the internal consistency of a dimension (Yeh, 2013). Fornell and Larcker (1981) suggested that reliability is acceptable when the CR is between 0.6 and 0.7, while it is excellent with a CR of >0.7. An AVE of >0.5 indicates that the factors can significantly explain all measurement variables.

In this study, the λ of all variables exceeded 0.5, indicating somewhat strong associations between the indices and specific latent variables. In addition, each dimension's Cronbach's α and CR exceeded 0.7, indicating that the latent variable could explain a large proportion of the total variance of each observed index, and the internal consistency was good. Moreover, each dimension's AVE was >0.5. Therefore, this study's goodness of fit tests had a certain level of reliability and validity.

Discriminant validity mainly examines the discrimination level between the observed variables in different dimensions. It reflects the extent to which different dimensions differentiate from other latent variables and checks whether the square root of each dimension's AVE exceeds the correlation coefficient between two dimensions (Chin, 1998; Hair et al., 1998). The discriminant validity analysis results are shown in Table 3, with the square root of each construct's AVE shown on the diagonal and the correlation coefficients between dimensions shown below the diagonal. Since the square root of each construct's AVE exceeded the correlation coefficients between any two dimensions, this study had sufficient discriminant validity.

Table 3. Discriminant validity.

Factor	(1)	(2)	(3)	(4)	(5)	(6)
(1) Travel-related behavioral intentions	0.908					
(2) Attitudes	0.450	0.876				
(3) Perceived risk	−0.099	−0.107	0.707			
(4) Subjective norms	0.183	0.044	0.245	0.711		
(5) Perceived behavioral control	0.548	0.757	−0.087	0.047	0.760	
(6) Travel substitution behavior	0.066	−0.209	0.183	0.182	−0.172	0.738

3.2.2 The goodness of fit in the model

We used AMOS statistical software to perform SEM on the interrelations between the observed variables and analyze and validate the hypotheses. Before model construction, the study model's goodness of fit must be validated through various indices, including the Chi-square test and its degrees of freedom (df), the goodness of fit index (GFI), the adjusted GFI (AGFI), and the root-mean-square error of approximation (RMSEA). Table 4 shows the reference standards and test results of our model's goodness of fit.

Table 4. The SEM model's goodness of fit.

Fit index	Standard	Test results	Model fit
Chi-square	Preferably smaller	1015.082	
Chi-square/df	1–5	4.177	Yes
GFI	>0.8	0.880	Yes
AGFI	>0.8	0.852	Yes
RMSEA	Excellent when <0.05, and good when 0.05–0.08	0.074	Yes

Source: Doll et al. (1994) and Huang (2007)

To validate this study's nine proposed hypotheses, we developed a structural model pathway diagram (Figure 2). The figure shows that perceived risk significantly and negatively influenced attitudes, perceived behavioral control, and travel-related behavioral intentions. In contrast, perceived risk significantly and positively influenced subjective norms and travel substitution behaviors. Attitudes, subjective norms, perceived behavioral control, and travel substitution behaviors significantly and negatively influenced travel-related behavioral intentions. Therefore, all hypotheses are supported, and the first eight were consistent with the results of previous studies. Interestingly, the ninth hypothesis has yet to be proposed in local and foreign studies. Therefore, this study demonstrated that visitors have more intentions to travel when they have substitutes in the post-pandemic era.

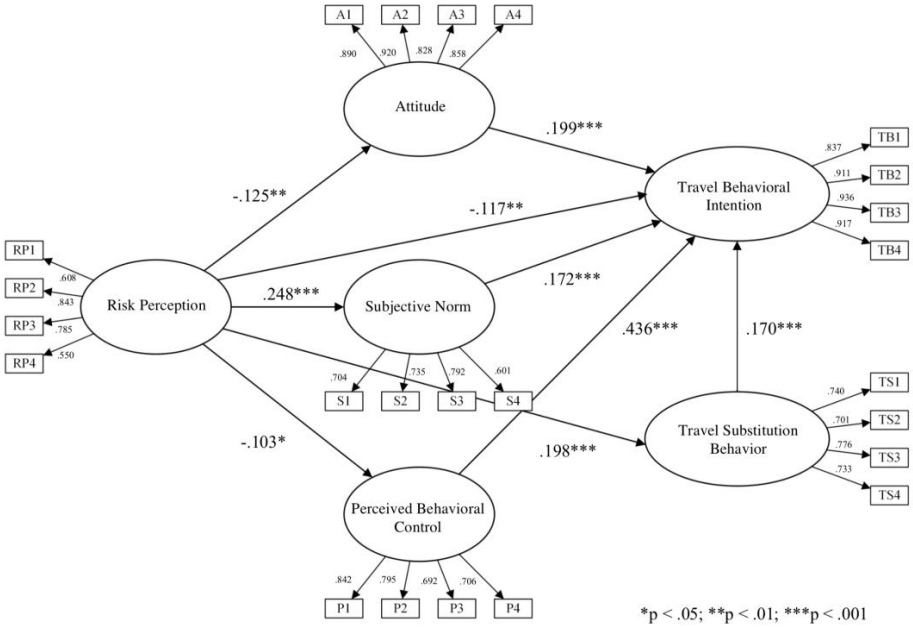

Figure 2 Caption: The structural model.

Figure 2 Alt Text: The path coefficient of Risk Perception to Attitude is -0.125, indicating a significant negative effect (H1); the path coefficient of Risk Perception to Subjective Norm is 0.248, indicating a significant positive effect (H2); the path coefficient of Risk Perception on Perceived Behavioral Control is -0.103, indicating a significant negative effect (H3); the effect of Risk Perception towards Travel Behavioral Intention is -0.117, which is also significant (H4); the path coefficient of Risk Perception to Travel Substitution Behavior is 0.198, indicating a significant positive effect (H5); the path coefficient of Attitude on Travel Behavioral Intention is 0.199, demonstrating a significant positive effect (H6); the path coefficient of Subjective Norm on Travel Behavioral Intention is 0.172, indicating a significant positive effect (H7); the path coefficient of Perceived Behavioral Control on Travel Behavioral Intention is 0.436, signifying a significant positive effect (H8); and the path coefficient of Travel Substitution Behavior on Travel Behavioral Intention is 0.170, indicating a significant positive effect (H9). It can be observed that all research hypotheses are supported.

4. DISCUSSION

4.1 Qualitative and quantitative results and recommendations

Based on the in-depth interviews, several interviewees aged ≥40 years were only willing to engage in travel activities that entail overnight stays (≥2 days and ≥1 night) when the local epidemic is more stable or has ended. In contrast, those aged 18–40 years expressed that they may travel when the nationwide epidemic alert level is ≤2 provided they have the time, opportunity, and funds. Therefore, the older interviewees presumably had a higher risk awareness. Regarding the six dimensions of substitution behaviors (dining, accommodation, transportation, sightseeing, shopping, and entertainment), most interviewees had no significant differences in their pre- and post-pandemic travel modes due to their travel habits and preferences. However, those who previously preferred overseas travel would turn to domestic travel after the pandemic due to policy restrictions and risk concerns. Those who previously preferred to stay at youth hostels would also avoid accommodations with shared living spaces and bathrooms after the pandemic. Regarding dining, most interviewees expressed that they would still dine in when there are no policy restrictions but may go for take-out more often. Some interviewees stated they would avoid crowded and congregated attractions or entertainment outlets after the pandemic and switch to broad and open outdoor spaces with fresh air to get closer to nature. Regarding payment, most interviewees would

continue to use cash and credit cards. While several were interested in using mobile payment, they gave up because most merchants did not accept it or felt that the application process was too complicated and troublesome.

We propose the following recommendations based on these results. In response to the digital age, mobile payment has become increasingly ubiquitous worldwide. While many forms of mobile payment are available in Taiwan, most merchants, aside from supermarkets, convenience stores, and some restaurants, do not accept mobile payment, explaining why many Taiwanese citizens still prefer to use cash and credit cards. We suggest that, in addition to cooperating with more merchants who accept mobile payments, tourism operators should intensify their payment-related advertising and introductions and offer suitable promotions (e.g., airline lucky draws and discounts) to attract more consumers, increasing their willingness to use and penetration rate of mobile payment, enabling it to become part of their daily life. Restaurant and hotel operators should establish cleaning and housekeeping standard operating procedures and strengthen their disinfection, masking, and ventilation measures to boost consumer confidence in purchasing their services. They can also set up outdoor dining or seating areas to prevent indoor crowding, reducing the probability of virus transmission.

4.2 Theory contribution

This study successfully developed an extended TPB model to examine the travel intentions of Taiwanese citizens during the pandemic. Its main findings are as follows:

Taiwanese citizens are generally somewhat willing to travel or adopt substitutive travel behaviors within one year after the post-pandemic era. This finding disagrees with Liu et al. (2021), who found that Chinese citizens were generally unwilling to travel after the pandemic wanes. Based on the qualitative interview data, we surmise that Taiwan's effective handling of the pandemic has boosted Taiwanese citizens' positivity toward traveling and may even endorse revenge travel.

Interestingly, the explanatory power of perceived behavioral control on travel-related behavioral intentions was stronger than attitudes and subjective norms. This finding is at odds with Liu et al. (2021) and Bae and Chang (2020), who found that attitudes had the strongest influence on behavioral intentions. However, this finding agrees with Sparks and Pan (2009), Juschten et al. (2019), Huang (2021), Liang (2013), and Huang (2012), indicating that perceived behavioral control may have different effects based on the research setting. Future research can focus on whether Taiwanese citizens' travel intentions are influenced most by perceived behavioral control. Additionally, the independent samples t-tests showed that the perceived behavioral control was significantly lower for women than men. This finding differs from Sparks and Pan (2009), who found that women's subjective norms differed significantly. Nevertheless, both results imply that under the influence of traditional Asian culture, women have lower autonomous behavioral control than men.

Taiwanese citizens' perceptions of COVID-19 risk directly and negatively impact their travel-related behavioral intentions. Similar results were reported by Zhu and Deng (2020) and Wang et al. (2020). Next, travel substitution behaviors positively influence travel-related behavioral intentions. Therefore, we propose that even under perceived risk when traveling during the pandemic, Taiwanese citizens are more willing to travel if substitutes are available.

The quantitative analysis showed that Taiwanese citizens were more inclined to travel to open, less-crowded, and well-sanitized settings in their post-pandemic travels. However, the qualitative analysis showed that personal habits significantly influenced the interviewees. According to international studies, even when behaviors are adopted in unstable environments, the frequency of past behaviors also indirectly influences behaviors through intentions. Therefore, people will likely develop good intentions based on past behaviors (Lam & Hsu, 2006). Regarding mobile payments, our quantitative analysis showed that Taiwanese citizens had a higher preference for using mobile payments after the pandemic. However, the qualitative interviews showed that most citizens might not use it despite considering doing so due to their unfamiliarity with the method and its perceived difficulty and complexity.

4.3 Practical recommendations

Visitors should pre-book their visits to attractions, and operators should streamline the booking procedures and implement control measures to ensure that all visitors can enter the premises. This approach enhances the visitors' perceived behavioral control such that they view traveling during the pandemic as effortless. To effectively reduce visitors' perception of COVID-19 risk, relevant government departments and tourism operators should establish prevention and control protocols as we return to normalcy in the post-pandemic era. Tourism operators should use social media to promote the safety and quality of their attractions. New forms of tourism can be developed by fusing travel substitutes with the "untact" concept to minimize visitors' perceived risk. "Untact" is a term that describes minimal contact during consumption (Bae & Chang, 2020). For example, hotel operators can arrange for family guests to dine in separate dining rooms or provide self-service breakfast. Similarly, tourism-related industries can fully leverage digital technology to minimize necessary contact.

REFERENCES

[1] Ajzen, I., & Fishbein, A. M. (1975). A bayesian analysis of attribution processes. Psychological Bulletin, 82(2), 261-277.

[2] Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In Kuhl Julius & Beckmann

Jürgen (Eds.), Action control (pp. 11–39). Berlin: Springer.

[3] Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

[4] Ajzen, I., Fishbein, M. (1980). Understanding attitudes and predicting social behavior. Englewood, NJ: Prentice-Hall.

[5] Bae, S. Y., & Chang, P. J. (2020). The effect of coronavirus disease-19 (COVID-19) risk perception on behavioural intention towards 'untact' tourism in South Korea during the first wave of the pandemic (March 2020). Current Issues in Tourism. https://doi.org/10.1080/13683500.2020.1798895

[6] Bauer, R. A. (1960). Consumer behavior as risk taking. In R. S. Hancook (Ed.), Dynamic marketing for a changing world (pp. 389–398). American Marketing Association.

[7] Beirman, D. (2002). Marketing of tourism destinations during a prolonged crisis: Israel and the Middle East. Journal of Vacation Marketing, 8(2), 167–176. https://doi.org/10.1177/135676670200800206

[8] Chang, C. H. (2017). Exploring Taiwan Destination Image from Social Networks — A Comparison of Users in the United State and Mainland China. Master's thesis, National Chi Nan University Department of Tourism, Leisure and Hospitality Management, Nantou County.

[9] Chang, F. F. (2010). The Five Steps of Qualitative Data Analysis: Climbing up a Ladder of Abstraction. Journal of Elementary Education, (35), 87-120.

[10] Chen, M. (2015). A Study on Behavioral Intention of Hakka Museum Visitor- A Case of the Liudui Hakka Cultural Park. Master's thesis, National Pingtung University Department of Cultural and Creative Industries. Pingtung County.

[11] Chen, R. L. (2015). Tour Planning: Tour Product and Route Plan. Hwa Lih.

[12] Chen, Y. C. (December 20, 2020) Tragic! NT$370 billion in tourism output vanishes because of the pandemic. Visitor numbers to Taiwan only 11%. China Times. Retrieved from https://www.chinatimes.com/newspapers/20201220000322-260114?chdtv

[13] Chew, E. Y. T., & Jahari, S. A. (2014). Destination image as a mediator between perceived risks and revisit intention: A case of post-disaster Japan. Tourism Management, 40, 382–393. https://doi.org/10.1016/j.tourman.2013.07.008

[14] Chiang, C. K. (2014). Application of the Theory of Planned Behavior to Travelers' Behavioral Intentions for Hostel. Master's thesis, National Taitung University In-service Master Program of Leisure Services Management, Taitung County.

[15] Chieng, H. W. (2019). Discussion on family tourism in different children ages. Master's thesis, National Tsing Hua University Department of Environmental and Cultural Resources, Hsinchu City.

[16] Chin, W. W. (1998). Commentary: Issues and Opinion on Structural Equation Modeling. Management Information Systems Quarterly, 22(1), 7-16.

[17] Cox, D. F. (1967). Risk handling in consumer behavior- an intensive study of two cases. In D.F. Cox (Ed.), Risk Taking and Information Handling in Consumer Behavior (pp.34-81). Boston: Graduate School of Business.

[18] Dillard, A. J., Ferrer, R. A., Ubel, P. A., & Fagerlin, A. (2012). Risk perception measures' associations with behavior intentions, affect, and cognition following colon cancer screening messages. Health Psychology, 31(1), 106. https://doi.org/10.1037/a0024787

[19] Doll, W. J., Xia, W., & Torkzadeh, G. (1994). A Confirmatory Factor Analysis of the End-User Computing Satisfaction Instrument. MIS Quarterly, 12(2), 259-274.

[20] Dryhurst, S., Schneider, C., Kerr, J., Freeman, A., Recchia, G., van der Bles, A., Spiegelhalter, D., & et al. (2020). Risk perceptions of COVID-19 around the world. Journal of Risk Research, 23(7-8), 994-1006. https://doi.org/10.1080/13669877.2020.1758193

[21] Feng, H. Y. (2020). Crisis is Turning Point: Comprehensive Tourism Development for Domestic Tourism after COVID-19. Journal of Tourism and Leisure Management, 8(Special Issue), 46-55.

[22] Feyisa, H. L. (2020). The world economy at COVID-19 quarantine: contemporary review. International Journal of Economics, Finance and Management Sciences, 8(2), 63–74. https://dx.doi.org/10.11648/j.ijefm.20200802.11

[23] Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research, 18(1), 39-50. https://doi.org/10.2307/3151312

[24] Forsyth, P., Dwyer L., Spurr R. & Pham T. (2014). The Impacts of Australia's Departure Tax: Tourism

versus the Economy? Tourism Management, 40, 126-136. https://doi.org/10.1016/j.tourman.2013.05.011

[25] Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). Multivariate data analysis (5th ed.). New York: Macmillan.

[26] Hsing, I. L. (2002). Application of the theory of planned behavior to leisure choice---Predicting and explaining the leisure intention and behavior of National Dong Hwa University students. Master's thesis, National Dong Hwa University Department of Tourism, Recreation, and Leisure Studies, Hualien County.

[27] Huang, C. Y. (2000). Multivariate Analysis. China Institute for Economic and Enterprise Research, Taipei City.

[28] Huang, F. M. (2007). Structural Equation Modeling: Theory and Application (5th ed.). Taipei: Wunan.

[29] Huang, H. Y. (2012). Investigating Low-carbon Tourism Behavior by Integrating Personal Norm, Self-identity with the TPB Perspective. Master's thesis, National Cheng Kung University Department of Transportation and Communication Management Science. Tainan City. Retrieved from https://hdl.handle.net/11296/6g5bga

[30] Huang, Z. T. (2021). Applying the Theory of Planned Behavior to investigate teachers' attitudes and behaviors in tourism during Post Pandemic Era. Master's thesis, Cheng Shiu University, Graduate Institute of Sports, Health and Leisure. Kaohsiung City. Retrieved from https://hdl.handle.net/11296/37z232

[31] Huybers, T. (2003). Domestic tourism destination choices: A choice modeling analysis. International Journal of Tourism Research, 5, 445-459. https://doi.org/10.1002/jtr.450

[32] Juschten, M., Jiricka-Pürrer, A., Unbehaun, W., & Hössinger, R. (2019). The mountains are calling! An extended TPB model for understanding metropolitan residents' intentions to visit nearby alpine destinations in summer. Tourism Management, 75, 293–306. https://doi.org/10.1016/j.tourman.2019.05.014

[33] Kao, C. Y., & Lin, Y. H. (2004). Food and Beverage Management: Theory and Practice. Yang Chih Books.

[34] Karabulut, G., Bilgin, M. H., Demir, E., & Doker, A. C. (2020). How pandemics affect tourism: International evidence. Annals of tourism research, 84, 102991. https://doi.org/10.1016/j.annals.2020.102991

[35] Korstanje M. (2007) Re-visiting risk perception theory in the context of travel. e-Review of Tourism Research, 7(4), 68–81.

[36] Kourgiantakis, M., Apostolakis, A., & Dimou, I. (2020). COVID-19 and holiday intentions: The case of Crete, Greece. Anatolia.

[37] Kozak, M., Crotts, J. C., & Law, R. (2007). The impact of the perception of risk on international travellers. International Journal of Tourism Research, 9(4), 233–242. https://doi.org/10.1002/jtr.607

[38] Kuo, Y. C. (2012). A Study of Exploring Taipei Image from Travel Related Blogs in Taiwan and China. Master's thesis, Dayeh University Department of Information Management, Changhua County.

[39] Lam, T., Hsu, C.H.C. (2006). Predicting behavioral intention of choosing a travel destination. Tourism Management, 27(4), 589-599. https://doi.org/10.1016/j.tourman.2005.02.003

[40] Liang, F. C. (2013). A Study on the Behavioral Intention of Travel for the Middle-aged People. Master's thesis, Nan Kai University of Technology Department of Gerontic Technology and Service Management, Nantou County.

[41] Lin, L. C., Huang, K. N., Huang, M. H., Tseng, L., Hsu, M. Z., & Chen, Y. C. (2019). Travel and Culture. Wunan Books.

[42] Liu, J., Peng, Z., Cai, X., Peng, Y., Li, J., Feng, T. (2021). Students' Intention of Visiting Urban Green Spaces after the COVID-19 Lockdown in China. International Journal of Environmental Research and Public Health, 18(16), 8601. https://doi.org/10.3390/ijerph18168601

[43] Liu, Y., Shi, H., Li, Y., Amin, A. (2021). Factors influencing Chinese residents' post-pandemic outbound travel intentions: an extended theory of planned behavior model based on the perception of COVID-19. Tourism Review. ahead-of-print. http://dx.doi.org/10.1108/TR-09-2020-0458

[44] Manning, R. (1999). Studies in outdoor recreation (2nd Edition). Corvallis: Oregon State University Press.

[45] Maslow, A. H. (1943). A theory of human motivation. Psychological Review, 50(4), 370–396. https://doi.org/10.1037/h0054346

[46] Milman, O., (2022, Feb 04). Covid-era Americans are using public transit less and having more car crashes. The Guardian. https://www.theguardian.com/world/2022/feb/04/public-transit-car-crash-deaths-us

[47] Nunnally, J. C. (1978). Psychometric Theory 2nd ed.

[48] Page, S., Song, H., & Wu, D. C. (2012). Assessing the impacts of the global economic crisis and swine flu on inbound tourism demand in the United Kingdom. Journal of Travel Research, 51(2), 142-153.

https://doi.org/10.1177/0047287511400754

[49] Park, S. H., Hsieh, C. M., & Lee, C. K. (2017). Examining Chinese college students' intention to travel to Japan using the extended theory of planned behavior: Testing destination image and the mediating role of travel constraints. Journal of Travel & Tourism Marketing, 34(1), 113-131. https://doi.org/10.1080/10548408.2016.1141154

[50] Prati, G., & Pietrantoni, L. (2016). Knowledge, Risk Perceptions, and Xenophobic Attitudes: Evidence from Italy during the Ebola Outbreak. Risk Analysis, 36(10), 2000-2010. https://doi.org/10.1111/risa.12537

[51] Quintal, V., Lee, J. & Soutar, G. (2010). Risk, uncertainty and the theory of planned behavior: a tourism example. Tourism Management, 31 (6), 797-805.

[52] Rowell, A. (2021). Domestic and International Travel's Impact on the Lodging Industry's Recovery. Retrieved September 1, 2021, from https://www.cbrehotels.com/en/research/articles/travel-impact-on-the-lodging-industry-recovery

[53] Sarkady D., Neuburger L., Egger R. (2021) Virtual reality as a travel substitution tool during COVID-19. In Wörndl W., Koo C., Stienmetz J.L. (eds), Information and Communication Technologies in Tourism 2021. Springer, Cham. https://doi.org/10.1007/978-3-030-65785-7_44

[54] Schürhoff, F. (2021). What matters most: customers perceptions of A&O Hotels and Hostels during COVID-19: a quantitative case study. University of twente student theses. http://essay.utwente.nl/88351/

[55] Seong, B. H., & Hong, C. Y. (2021). Does Risk Awareness of COVID-19 Affect Visits to National Parks? Analyzing the Tourist Decision-Making Process Using the Theory of Planned Behavior. International journal of environmental research and public health, 18(10), 5081. https://doi.org/10.3390/ijerph18105081

[56] Shelby, B., Bregenzer, N., & Johnson, R. (1988). Displacement and product shift: Empirical evidence from Oregon Rivers. Journal of Leisure Research, 20, 274-288.

[57] Sirakaya, E., Sheppard, G. A., & McLellan, R. W. (1997). Assessment of relationship between perceived safety at a vacation site and destination choice decision: Extending the behavioral decision-making model. Journal of Hospitality & Tourism Research, 21(2), 1-10. https://doi.org/10.1177%2F109634809702100201

[58] Škare, M., Soriano, D. R., & Porada-Rochoń, M. (2021). Impact of COVID-19 on the travel and tourism industry. Technological Forecasting and Social Change, 163, 120469. https://doi.org/10.1016/j.techfore.2020.120469

[59] Skyscanner (July 20, 200). New challenges for the hotel industry: What changes will there be in the hotel industry after the coronavirus outbreak? https://www.skyscanner.com.tw/news/future-hotel-stay-after-coronavirus

[60] Sparks, B.A., & Pan, G.W. (2009). Chinese Outbound tourists: Understanding their attitudes, constraints and use of information sources. Tourism Management, 30, 483-494. https://doi.org/10.1016/J.TOURMAN.2008.10.014

[61] Taiwan Visitors Association (January 6, 2021). Overview of the global tourism industry from January-October, 2020. https://www.tva.org.tw/Trends_detail/9cc2fd7f80bd4ae2ad5e21d7f41564eb

[62] Tourism Bureau of Taiwan (2003). Basic Training Manual for Operating Personnel of Travel Agencies (1). Taipei: Tourism Bureau, MOTC.

[63] Tsaur, S. H., & Wang, L. C. (2001). The Perceived Risk of Travel Products and the Strategies of Risk Reducing. Tourism Management Research, 1(1), 1-26.

[64] UNWTO, W. (2020). I World Tourism Barometer, 18(1), 1-48. Madrid, Spain: World Tourism Organization. https://doi.org/10.18111/wtobarometereng

[65] van der Veen R. (2015) Substitution, tourism. In: Jafari J., Xiao H. (eds) Encyclopedia of Tourism. Springer, Cham. https://doi.org/10.1007/978-3-319-01669-6_341-1

[66] Wang, C. P. (2008). Exploring Visitors' Coping Behaviors of the Yang Ming Shan Flower Festival. Journal of Outdoor Recreation Study, 21(1), 27-50. http://dx.doi.org/10.6130%2fJORS.2008.21(1)2

[67] Wang, F., Xue, T., Wang, T., Wu, B. (2020). The Mechanism of Tourism Risk Perception in Severe Epidemic—The Antecedent Effect of Place Image Depicted in Anti-Epidemic Music Videos and the Moderating Effect of Visiting History. Sustainability, 12(13), 5454. https://doi.org/10.3390/su12135454

[68] Wu, Y. M. (2007). Exploring the Current Status and Future Prospects on Motel in Taiwan; Perspectives from Operators and Consumers. Master's thesis, Aletheia University Graduate School of Management Sciences, New Taipei City. Retrieved from: https://hdl.handle.net/11296/x4r2cm

[69] Xuereb, S., Kim, H. S., Clark, L., & Wohl, M. J. A. (2020). Substitution behaviors among casino gamblers during COVID-19 precipitated casino closures. https://doi.org/10.31234/osf.io/fvnmb

[70] Yan, C. W. (2019). A Study on Exploring Women's European Self-Travel Behavioral Intention Master's thesis, Nanhua University Department of Tourism Management, Chiayi County.

[71] Yang, C. C. (2012). Applying the Theory of Planned Behavior to Explore the Effects of Decision-making Influential Factors and Tourism Desire on Environmental Behaviors–A Case of Elementary School Teachers in Kaohsiung. Master's thesis, National Kaohsiung University of Science and Technology Department of Tourism Management, Kaohsiung City. Retrieved from https://hdl.handle.net/11296/3dzk4j

[72] Yang, K. H. (2005). Study of Vacation Lifestyle and Purchase Behavior of Travel Products by Taiwan's Young-Adult Backpackers engaging in Outbound Travel. Master's thesis, Shih Hsin University Department of Tourism, Taipei City. Retrieved from https://hdl.handle.net/11296/3h36v3

[73] Yeh, W. J. (2013). International students' behavior intention for leisure travel participation: using perceived risk as moderate. Master's thesis, Chung Yuan Christian University Department of International Business, Taoyuan County. Retrieved from https://hdl.handle.net/11296/f2jhdq

[74] Zeng, B., Carter, R. W. & DeLacy, T. (2005). Short-term perturbations and tourism effects: The case of SARS in China. Current Issues in Tourism, 8(4), 306-322, https://doi.org/10.1080/13683500508668220

[75] Zhu, H., Deng, F. (2020). How to Influence Rural Tourism Intention by Risk Knowledge during COVID-19 Containment in China: Mediating Role of Risk Perception and Attitude. International Journal of Environmental Research and Public Health, 17(10), 3514. https://doi.org/10.3390/ijerph17103514.

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