Modeling behavioral intention toward traveling in times of a health-related crisis

Diep Ngoc Su[ORCID]

The University of Danang – University of Economics, Vietnam

Kim Phuong Thi Tran

The University of Danang – University of Economics, Vietnam

University of Economics Ho Chi Minh City, Vietnam

Ly Ngoc Thi Nguyen, Tram Huyen Thi Thai, Thanh Hoai Thi Doan and Vinh Trung Tran

The University of Danang – University of Economics, Vietnam

Abstract

This study proposes an integrated model based on the Risk Perception Attitude (RPA) framework and the Theory of Planned Behavior (TPB) model to investigate behavioral intention toward traveling in times of a health-related crisis. A survey was conducted via online networks of travelers, yielding 338 valid cases. The findings indicate that health risk perception is affected by information search about the Covid-19 disease. The relationship between health risk perception and behavioral intention toward traveling during a health-related crisis is not direct, but indirect via health self-efficacy and attitude about their future trip. The study contributes to understand a cognitive process of tourists' behavior intention toward traveling in a health-related crisis. Practically, this study's findings provide tourists, government agencies, tourism marketers, and policy-makers and other tourism stakeholders with important suggestions for tourism recovery during and after the pandemic.

Keywords

Covid-19, health risk perception, information search, self-efficacy, travel intention

Introduction

The year 2020 witnessed an unprecedented worldwide outbreak of the novel coronavirus (COVID-19), which was first reported to the WHO in China on December 31, 2019. Although Wuhan was then put into lockdown, the global air transport has already brought the virus to all continents (Gössling et al., 2020). Compared to other epidemics in the 21st century such as Severe Acute Respiratory Syndrome (SARS) in 2003, Middle East Respiratory Syndrome (MERS) in 2012 and the Ebola virus disease outbreak in 2014, the COVID-19 outbreak is considerably larger in size and scope. Indeed, while the previous disease outbreaks tend to be regional, for example, SARS had most cases in China, Hong Kong, Taiwan and Canada; MERS was mainly identified in Egypt; and Ebola occurred in African destinations, at the time of writing, over a year since the first case in Wuhan, the Covid-19 has been affecting 219 countries and territories with approximatedly 105 millions of infectious cases and over 2

Corresponding author:
Diep Ngoc Su, Faculty of Tourism, The University of Danang – University of Economics, 71 Ngu Hanh Son, Danang, Vietnam.
Email: diepsn@due.udn.vn

millions of deaths (World Health Organization, 2021). Such previous disease outbreaks: SARs, MERS and Ebola did not led to a long-term decline in the global economy and development of tourism, however the impact and recovery from Covid-19 pandemic will be unprecedented (Gössling et al., 2020). Compared with SARS with an estimated global economic loss of US$100 billion (McKercher and Chon, 2004), a loss of global export revenues caused by the Covid-19 is nine times at US$935 billion over a period of 10 months between January and October, 2020 (UNWTO, 2020a). International and domestic tourism have been severely affected with a massive fall because many countries-imposed travel bans, closed borders. According to UNWTO (2020a), international tourist arrivals fell by 72% in January-October, 2020 over the same period in 2019. Undoubtedly, the tourism industry is one of the most vulnerable and most affected sectors by the Covid-19 outbreak that has increasingly attracted academic interest on various related topics at different levels including government, industry and consumer.

At the government and industry level, post-crisis recovery, which is conceptualized as 'the development and implementation of strategies and actions to bring the destination back to a normal (pre-event) condition or an improved state' (Mair et al., 2016: 2), has been research topic of interest for many scholars after pandemics such as foot-and-mouth and SARS (Frisby, 2003; Jayawardena et al., 2008; Mair et al., 2016; Ritchie et al., 2004). Similarly, a large number of articles has been found on databases such as Scopus, Web of science and Googlescholar with topics regarding the government or industry response toward tourism destination recovery (Avraham, 2020; Hall et al., 2020; Li et al., 2020; McCartney et al., 2021; Zhang et al., 2021). However, in a narrative review of destination-focused researches, Mair et al. (2016) highlighted that changes in tourist behavior would pose a threat to recovery campaigns of tourist destinations. Undeniably, once tourists canceled, postponed or abandoned their travel plans to avoid potential risks caused by a crisis event, the tourism industry could face threats of after-crisis recovery (Hajibaba et al., 2015). As a result, it is important to understand the travel demand in times of a crisis (Mair et al., 2016), especially when the Covid-19 still exists which provides both tourism academics and practitioners with implications for the coronavirus pandemic era.

UNWTO (2020a) had an optimistic view that the announcement and roll-out of vaccine in the beginning of 2021 have been gradually contributing to ease travel restrictions and increasing the consumer confidence. It can be said that the key factor shaping travel demand in a pandemic is the need for safe and less health-risky. Several studies have also investigated the process of the decision-making concerning the influences of health risk perception before the trip in the context of Covid-19 (Bae and Chang, 2020; Chua et al., 2020; Matiza, 2020; Zheng et al., 2020). Health risk perception is considered to be one of the most important factors influencing the attitude and travel behavior of tourists (Huang et al., 2020; Jonas et al., 2011). The interplay of health risk perception and tourists' behavior has been studied in few recent studies applying different theories including the protection motivation theory (Wang et al., 2019; Zheng et al., 2020) and the health belief model (Huang et al., 2020). Such previous studies have established the conceptual framework of travel behavioral intention from the theoretical underpinnings of health risk perception. By adding risk-relevant psychological constructs such as mental well-being and perceived uncertainty (Chua et al., 2020), or attitudinal contructs (Bae and Chang, 2020), or coping and resilience constructs (Zheng et al., 2020), the direct and indirect relationships betweeen health risk perception and travel behavioral intention in the post-Covid-19 were found. However, it needs to be recognized that tourists' evaluation of threats might be uncertain before the trip that may be affected by some factors. As a result, understanding the antecedent of health risk perception and its direct and indirect influences on travel behavioral intention in the case of a health-related crisis (Covid-19) is needed and should have a more comprehensive explanation by incoporating psychological and behavioral theories (Mair et al., 2016).

In response to the above-discussed research gaps, the objective of this study is to investigate the antecedents and behavioral consequences of individuals' health risk perception in times of a health-related crisis. To understand health-related issues in the context of tourism, health belief model (HBM) and protection motivation theory (PMT) were applied to examine the relationship between health risk perception, attitude and preventative behavior (Bae and Chang, 2020; Huang et al., 2020; Wang et al., 2019; Zheng et al., 2020). Rather than assuming that health risk perception may may not merely lead

to attitude toward protective behavior, the study posits that risk perception leads to attitude and behavior toward traveling in a health-related crisis. Bae and Chang (2020) have proved the TPB's efficiency in predicting behavioral intention toward untact tourism in the context of Covid-19 with the addition of dimensions of risk perception derived from health belief model. For this reason, the Theory of Planned Behavior (TPB) model also serves as the theoretical foundation to propose an integrated model of travel behavioral intention when an adverse external event occurs in the current study. However, although the Risk Perception Attitude (RPA) framework is considered important to analyze health-related behaviors, few studies have combined them to explore health risk issues in the context of tourism (Liu-Lastres et al., 2019).

This study combined the TPB model and RPA to provide comprehensive insights in understand the role of health risk perception in forming attitude and bahvioral intention toward traveling via the efficacy belief. In addition, this study also examines the influence of information search on health risk perception in the context of an on-going global pandemic. The study contributes to extend the body of literature of tourism risk and behavior by providing a cognitive process of travel behavior intention in a health-related crisis. Practically, this study offers both potential tourists and destination management and marketing organizations with timely guidelines to design effective tourism plans to encourage tourists to travel despite the persistence of the Covid-19.

The role of perceived risk and health risk perception in travel decision-making

Terrorism, health hazards and natural disasters have all posed different kinds of potential risks facing travelers while they travel (Dolnicar, 2005; Huang et al., 2020; Kozak et al., 2007; Schmude et al., 2018). Various types of risks have been found in the consumer behavior literature, particularly physical, psychological, financial, social, time, satisfaction and equipment risks (Korstanje, 2009; Roehl and Fesenmaier, 1992). In the context of tourism, Maser and Weiermair (1998) explored a range of risks, including cultural barriers, language barriers, natural diseases, transportation, hygiene, crime, or destination laws/ regulations. Risk can be considered from

multi-perspectives including a traveler, a tourist destination or a tourism business and also can be categorized into (1) perceived risk or subjective perception of risk, or (2) actual risk or real risk (Bauer, 1960). Most studies in the tourism literature focus on perceived risk rather than actual risk as it is the perception of risk influencing consumer's decision making (Ritchie and Jiang, 2019; Yang and Nair, 2014). Against such potential travel-risks, tourists have their anxiety or worries about their exposure to risk when they make travel decisions that can be conceptualized as a perceived risk (Quintal et al., 2010). As a result, in the current study, perceived risk has been taken into consideration as an influential factor in the context of travel decision-making.

In the literature, scholars have provided various conceptualizations about perceived risk (Fuchs and Reichel, 2011; Nguyen-Phuoc et al., 2020; Reisinger and Mavondo, 2005; Weifeng, 2005). However, in this study, perceived risk could be defined as 'a consumers' perception of the overall negativity of a course of action based upon an assessment of the possible negative outcomes and the likelihood that those outcomes will occur' (Fuchs and Reichel, 2011: 267). Tourist's perceived risk plays an important role in predicting their travel decision-making; therefore it is crucial to understand the power of tourists' risk perception (Reisinger and Mavondo, 2005; Yang and Nair, 2014; Yüksel and Yüksel, 2007). The present research has mainly focused on perceived travel risks of specific destinations such as the Central Florida (Milman et al., 1999), Cape Town (George, 2003, 2010), Korean demilitarized zone (Shin, 2005), Southeast Asia destinations (Weifeng, 2005), Israel (Fuchs and Reichel, 2006), Thailand (Batra, 2008; Rittichainuwat and Chakraborty, 2009), China (Qi et al., 2009), Taiwan (Chang, 2010), Japan (Chew and Jahari, 2014). Despite the insights into the effect of perceived travel risks on travel behavior in a particular destination, the aforementioned studies emphasized tourists' perception during their travel or post-travel rather than pre-travel phase. Therefore, more attention should be devoted to how travelers' perceived risks influence their travel preparations and behavioral intention toward choosing a destination (Huang et al., 2020; Liu-Lastres et al., 2019).

In addition, previous studies explored risk perception in the tourism industry regarding a specific situation such as crime, terrorism, war, political instability and natural disaster (Chew and Jahari, 2014; Fletcher and Morakabati, 2008;

Mansfeld and Pizam, 2006; Park and Reisinger, 2010; Pizam and Mansfeld, 2006; Roehl and Fesenmaier, 1992; Ryan, 1993). However, few studies of perceived risk leaned toward the situation of a disease outbreak (Jonas et al., 2011; Rittichainuwat and Chakraborty, 2009) despite the development of some recent epidemics such as SARS, foot-and-mouth diseases or the swine flue (H1N1). Not many studies have provided the understanding of health risk perception from the identification of health-related problems varying from infectious viral diseases to global pandemics before the vacation (Jonas et al., 2011; Liu et al., 2015; Peattie et al., 2005), but those studies have not refered to a current public health crisis. The outbreak of an infectious disease today has spread over borders and is no longer limited to one or two continents such as Asia or Africa. As an effect of globalizations, the current Covid-19 pandemic has changed travel behaviors (Bae and Chang, 2020; Gössling et al., 2020; Neuburger and Egger, 2020; Wen et al., 2020), of particular interest to tourism researchers is the influence of the Covid-19 crisis on travelers' risk perception and how it potentially affects future travel behavior of tourists (Chua et al., 2020; Matiza, 2020; Zheng et al., 2020). As a result, in the emergence of such topic, this study contributes to understand tourists' health risk perception, its antecedents as well as its consequences that contributes to better understanding the role of perceived health risks in travel decision-making on the level of the individual tourist in times of crises (Jonas et al., 2011).

The antecedents of health risk perception

Previous studies have found many influential factors of health risk perception in the context of international travel, including travelers' specific characteristics/demographics (e.g., age, culture, social status, level of education) (Reisinger and Mavondo, 2005), tourist status (e.g. psychological, mental, medical status) (Wilks, 2006), subjective knowledge about a disease (Régner et al., 2018) and environmental conditions existing at the destination (Cossar, 2003; Jonas et al., 2011; Ruan et al., 2020). Such factors could be categorized into two groups: internal and external factors. While the formers are related to tourist attributes, the latters are information sources about actual risks that tourists might encounter during their travel at a destination. According to a review of risk and perceived risk in tourism by Yang and Nair (2014: 250), the prior literature focuses on internal factors including 'sociocultural, socio-demographic, psychographic, and biological' as underlying factors of tourists' risk perception. The influence of a behavioral construct on perceived risk has not yet widely investigated in tourism research, suggested a direction for research. Yang and Nair (2014) also identified the increasing importance of information seeking behavior in the tourism risk literature. Although health-information seeking behavior and its relationship with risk perception has been studied in the health literature (Deng and Liu, 2017; Zimmerman and Shaw Jr, 2020), there is a lack of an empircal evidence for the influence of such kind of behavior in forming health risk perception in the context of tourism. As a result, this study proposed and tested the role of information search in the formation of perceived health risk and travel decision-making in the context of a health-related crisis.

The outcomes of health risk perception

The influence of health risk perception on tourist behaviors has been studied in the literature of tourism (Huang et al., 2020; Jonas et al., 2011; Wang et al., 2019). In particular, a recent study by Huang et al. (2020) has found the relationship between the health risk perception and traveling satisfaction mediated by tourists' preventive behavior. This study has contributed to confirming the effectiveness of health-related theoretical framework (e.g., health belief model and protection motivation theory) in explaining tourists' health-protective behavior when they travel (Huang et al., 2020). In particular, the study by Huang et al. (2020) have integrated the theory of planned behavior (TPB) and health belief model (HBM) to examine the relationship between health beliefs and attitudes toward preventative behavior and further validated the influence of preventative behavior on tourists' satisfaction. Another study by Wang et al. (2019) has marked an early attempt in tourist studies that test the full protection motivation theory (PMT). Accordingly, Wang et al.'s (2019) have explained how tourists' health related intentions and behavior were formed from threats and coping appraisals. More importantly, the most popular preventative measure agaisnt health risk was found by Wang et al.'s (2019) that is seeking pre-travel health information. As reviewed, the topic regarding health risks has been paid attention in reccent years and even before the Covid-19 pandemic, however, these prior studies have only provided

the understanding how and why travelers behave to protect their health but do not further explore the effect of such health-related behavior on travel decision-making process (Chien et al., 2017; Wang et al., 2019). Jonas et al. (2011) asserted that tourists' health risk perception toward a travel destination could affect their decision-making about their trip. In order to fill this gap, a combined model of the TPB and risk perception attitude (RPA) framework is applied to provide a better understanding of the attitude and behavioral intention toward traveling in times of a pandemic from the health risk perception and efficacy belief.

Conceptual framework and hypotheses

The theory of planned behavior (TPB) was originated based on the theory of reasoned action (TRA), in which an individual's behaviors can be predicted by his/her beliefs and attitudes (Ajzen, 1991). Attitude is defined as a 'person's degree of favorableness or favorableness with respect to a psychological object' (Ajzen and Fishbein, 2000: 2). It is considered to be a function of behavioral beliefs, which is central to the theory of consumer decision-making (Ajzen and Fishbein, 2000). According to both TRA and TPB, attitude predicts behavioral intention, a phenomenon which has been extensively tested in the context of tourism (Cohen et al., 2014; Lee et al., 2012). A review by Yuzhanin and Fisher (2016) indicated that attitude has been widely found as an important predictor of behavioral intention toward traveling to a destination (Chien et al., 2012; Hsu and Huang, 2012; Quintal et al., 2010; Seow et al., 2017) while other two factors subjective norms and perceived behavioral control might not explain travel intentions in some case. As a result, to enhance the predictive power of the TPB in the tourism context, many scholars have extended the original TPB by adding other influential factors such as past behavior (Lam and Hsu, 2006), information choice (Han et al., 2011), or travel motivation (Hsu and Huang, 2012) to investigate travel behaviroal intention. Risk perception has also been added to the TPB in the context of choosing a travel destination (Bae and Chang, 2020; Quintal et al., 2010; Seow et al., 2017). For example, Quintal et al. (2010) confirmed the influence of perceived risk on attitude and intention to visit Australia of three markets such as Korean, Chinese and Japanese tourists. Seow et al. (2017) found that perceived

risk was the antecedent of attitude and intention to visit Thailand for medical tourism. The most recent research by Bae and Chang (2020) also examined the effect of Covid-19 risk perception on behavioral intention toward 'untact tourism in South Korea by applying the TPB model. It can be concluded from these prior studies that perceived risk was found to have direct influences on attitude and behavioral intention. There have been research gaps: (1) exploring factors which have direct influences on risks and (2) exploring factors which might play the mediating role in the links between risk perception, attitude and behavioral intention. Regarding the first gap, due to the development of information technology and the means of communication in which social media plays a dominant role, information search has been an increasingly-studied topic the literature of tourism risk (Yang and Nair, 2014). Accordingly, tourists' risk perception is built upon available information that they searched for on communication channels such as Facebook and other social networks (Shin, 2005). However, such information sources are not limited from internal (e.g., personal experience, memory-based information) to external media (e.g., worth-of-mouth, TV, radio, newspapers, travel agency) (Roehl and Fesenmaier, 1992). Thanks to such references, Reisinger and Mavondo (2005) asserted that information search is an activity contributing to form the risk perception. As a result, this work also examined information search as a predictor of health risk perception in the proposed model. The reason is that although information search has been explored to contribute to the formation of risk perception (Roehl and Fesenmaier, 1992), this relationship has been not yet empirically tested.

For the second gap, as discussed above, risk typologies include food safety, weather, socio-psychological, financial, environmental, political and physical (Adam, 2015; Fuchs and Reichel, 2011). In addition, Matiza (2020) asserted that three risk typologies including health, psychological and social risk are most pertinent to the likelihood of travel and torusim post the Covid-19 pandemic. Out of these types, the perceived health risk, which is considered as potential harards to the health and well-being of the tourist, is one of the most critical to the decision-making process of tourists within the contemporatry travel and tourism (Huang et al., 2020). With specific reference to the present literature, this work theorized that potential tourists might consider health risk perception to be more
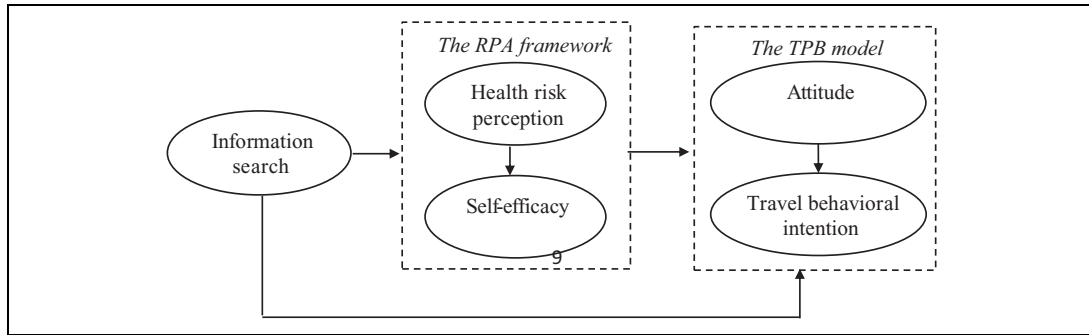
Figure 1. The conceptual framework of the study.

important than other types of risk before their travel make-decision in the context of Covid-19 pandemic. The effective process of coping with possible health-related risks should be defined in the mechanism for attitude and behavior toward traveling. These propositions are justified by the discussion of the risk perception attitude (RPA) framework which offered a theoretical approach to understand health risk perception in forming health-related behavior (Rimal and Real, 2003).

The RPA framework has been applied to investigate health-related behaviors toward a disease like HIV/AIDS, diabetes or skin cancer (Rimal and Real, 2003) or toward climate change. In the context of tourism, the RPA framework was only applied in very few studies to understand the impact of terrorism-related RPAs on individuals' travel decisions (Liu et al., 2016) or to investigate RPA on cruise travel intention (Liu-Lastres et al., 2019). In the RPA framework, efficacy beliefs, which are examined from two perspectives, including self-efficacy and response efficacy, are considered to be the outcomes of risk perception (Liu-Lastres et al., 2019). Self-efficacy refers to the estimation of one's ability to perform a recommended behavior while the perceived effectiveness of such recommended behavior is understood as response efficacy. The self-efficacy construct is considered as a major aspect of social-cognitive theory which is conceptualized as 'beliefs in one' capabilities to organize and execute the courses of action required to produce given levels of attainments' Bandura (1998: 624). In situations of tourists coping with a contagious disease, they were likely to become well-informed about the disease crisis before forming an attitude and behavioral intention to travel during a viral disease crisis (Lee et al., 2012; Régner et al., 2018). In the current research, tourists' behavior was studied in the pre-trip stage, efficacy beliefs

could be understood from the perspective of self-efficacy that refers to possible preventative measures adopted by travelers in their future vacation. Due to the utility of the RPA framework in the health-related contexts, this study combined the RPA framework and TPB model to understand the influence of Covid-19 risk perception on attitude and behavioral intention to travel in times of a crisis through efficacy beliefs. Figure 1 presents the theoretical framework of this study including five constructs: information search for an infectious disease epidemic, health risk perception, efficacy beliefs, attitude and behavioral intention to traveling in times of a health-related crisis.

Proposed hypotheses

In a public health context, information seeking is seen as the behavioral manifestation of risk perception attitude (Rimal and Real, 2003; Yang and Nair, 2014). In the context of tourism, searching for information is an important activity for travelers to plan and prepare for their trips that guides their travel decision-making (Abulibdeh and Zaidan, 2017). Based on the literature, in this study, information search is hypothesized as a determinant of constructs in the proposed model.

> H1a: Information search for an infectious disease epidemic has a direct influence on health risk perception.
> H1b: Information search for an infectious disease epidemic has a direct influence on self-efficacy
> H1c: Information search for an infectious disease epidemic has a direct influence on attitude toward traveling in times of a health-related crisis
> H1d: Information search for an infectious disease epidemic on travel behavioral

intention toward traveling in times of a health-related crisis

Previous studies have investigated the relationships between health risk perception and self-efficacy, attitude and behavior toward health protection (Chien et al., 2017; Huang et al., 2020; Jonas et al., 2011; Wang et al., 2019) in health-related contexts. For example, Rimal and Real (2003) explored the interaction between perceived risk and self-efficacy in a study of motivation to seek health information. The level of risk that each traveler perceived as low or high would lead to his/her negative or positive attitude toward a destination. In turn, attitude is a contributor to the likelihood that a traveler takes a vacation after a disease outbreak. Health risk perception, which was considered as a component of perceived risk associated with a tourist destination, was also found to affect the decision-making of whether tourists visit or avoid such a destination (Dolnicar, 2005; Fuchs and Reichel, 2010; Rosselló et al., 2017). The most recent study by Bae and Chang (2020) investigated the impact of perceived risks on behavioral intention toward untact tourism in the context of the Covid-19. Accordingly, an extended TPB model was developed with the addition of two new constructs (e.g., cognitive risk perception and affective risk percecption) to predict the rising untact tourism behavior in Covid-19 pandemic. Affective risk perception, which was described as potential tourists' worry about contracting Covid-19, has been found to significantly influence both attitude and behavioral intention toward untact tourism (Bae and Chang, 2020). As a result, based on the literature, this study proposes three hypotheses that present the influential relationship between health risk perception and self-efficacy, health risk perception and attitude and health risk perception and behavioral intention toward traveling in times of a health-related crisis as below.

> H2a: Health risk perception has a direct influence on self-efficacy
> H2b: Health risk perception has a direct influence on attitude toward traveling in times of a health-related crisis
> H2c: Health risk perception has a direct influence on behavioral intention toward traveling in times of a health-related crisis

There has been a wide range of studies examining self-protection intention in several models in the field of public health and environmental behaviors (Homburg and Stolberg, 2006; Wang et al., 2019). In tourism, self-efficacy has recently gained much attention, with scholars focusing on tourists' intentions to adopt precautionary actions in different traveling contexts (e.g. on cruise ships) (Fisher et al., 2018), toward crowded places (Lu and Wei, 2019), to national parks (Wang et al., 2021), or toward the destination with high altitude, like Tibet (Huang et al., 2020). Lee et al. (2012) argued that personal non-pharmaceutical interventions as adaptive behaviors (e.g. information seeking, handwashing, mask-wearing, social distancing) had predictive power over tourists' travel intention in the context of the H1N1flu pandemic. As a result, the following hypotheses are established in this study:

> H3a: Self-efficacy has a direct influence on attitude toward traveling in times of a health-related crisis
> H3b: Self-efficacy has a direct influence on behavioral intentions toward traveling in times of a health-related crisis

Fisbein and Ajzen (1975) defined attitude as 'a learned predisposition to respond in a favorable or unfavorable manner concerning a given object' (p. 10). Many previous studies have found that attitude is one of the most important factors influencing tourist decision-making (Hsu et al., 2010; Lam and Hsu, 2006; Peters et al., 2018). In addition, the attitude was found to play an important role in some basic behavior models (Hsu et al., 2010; Nguyen-Phuoc et al., 2020). For example, the theory of the planned behavior model has shown the following link between attitude and intention toward traveling (Fishbein and Ajzen, 1975). Attitude toward a behavior positively affects a person's intention to conduct that behavior (Lam and Hsu, 2006). From that, the following hypothesis is proposed:

> H4: Attitude has a direct influence on behavioral intentions toward traveling in times of a health-related crisis

Research methodology

Measurement instrument development

Measurement scales for five constructs in the proposed model were adapted from the literature including six items measuring health risk perception (Dolnicar, 2005), five items measuring information search (Cahyanto et al., 2016), five

items measuring self-efficacy (Ruan et al., 2020; UNWTO, 2020b; World Health Organization, 2020), three items measuring attitude and four items measuring behavioral intentions toward traveling (Bae and Chang, 2020; Lam and Hsu, 2006) *(see Table 2)*. A seven-point Likert scale ranging from strongly disagree (1) to strongly agree (7) was used to evaluate the level of agreement on all 26 measurement items. In order to check the content validity, five tourism scholars working at universities were asked to evaluate the relevance of each measurement item on their associated construct based on a 5-point Likert-scale from 'strongly irrelevant' (1) to 'strongly relevant' (5). With the mean value of each item greater than 4, experts agreed on the rationality and coherence of the scales being used.

A preliminary questionnaire is then designed with an introduction about the research objective at the beginning, followed by a scanning question 'Do you intend to travel although the Covid-19 persist?'. If respondents answer 'yes', they would go to the section about their future trip and then the main part about tourists' evaluation related to five constructs. Questions measuring socio-demographic variables (e.g., gender, age, education, occupation, regions of residence) are asked at the end of the survey. In order to ensure the understandability of the questionnaire, a pilot study was conducted with 20 respondents who are active members of an online travel group. This process helped to clarify the structure of the questionnaire as well as identify the weakness and ambiguities of the language used in the questionnaire. For example, for the item IS2 which is initially 'I try to search for the Covid-19 related information from informal sources of information', examples were added including relatives, friends, online social networks as required by the pilot sample (Table 2). Similarly, official information sources (e.g., WHO, government's sites) were added into item IS3 to help respondents have full information. Some typing mistakes were also fixed after the pilot study.

Data collection and analysis

Since through a self-administered online survey via the social networks of travelers on Facebook. Travelers' group with a minimum of 10,000 members were selected for this study, for example, Solo Traveler, the Traveler, Travel Community, Worldwide Travel, Europe Travel Discovery and many others. Some reasons for selecting such online social networks are (1) they have a large number of members involved, (2) they have many posts for discussion among tourists every day, (3) information about Covid-19 and travel is also updated in such groups, and (4) language used is English. Accordingly, the survey link is designed using the Qualtrics platform and was then uploaded on the homepages of these groups. After a week, inbox messages were sent directly to groups' members to increase the response rate. Data were collected within 2 weeks since the beginning of August, when many countries opened for both domestic and international tourism (Kucheran, 2020). A total of 340 completed questionnaires were collected. However, two cases were eliminated after a data screening process (e.g., unengaged response and extreme outliers). Finally, 338 cases were determined to be; their demographic profile is presented in Table 1.

The PLS-SEM was employed for the evaluation of measurement models and the structural model (Hair et al., 2014). Currently, it has been widely applied in many areas such as in business research (Su et al., 2021) or transportation research (Nguyen-Phuoc et al., 2020; Su et al., 2019). With newly added constructs, PLS-SEM lends itself well for exploration in this research (Fornell and Bookstein, 1982). A systematic procedure for data analysis, including descriptive analysis, first-order measurement model evaluation, second-order measurement model evaluation and structural model evaluation was conducted applying IBM-SPSS 25.0 and SmartPLS 3.0.

Results

Measurement model evaluation

This measurement model evaluation for five constructs was based on the criteria for the reflective measurement model recommended by Hair et al. (2014). The results shown in Table 2 indicated that most of the measurement items had factor loadings higher than the threshold value of 0.7 (Hulland, 1999). However, the factor loading of item, 'HR5_I might travel to infectious places' was 0.209, which was eliminated from the measurement scales for the next analysis. After deleting this item, all composite reliability values of the five proposed constructs were higher than the recommended value of 0.7 (Henseler et al., 2009), ranging from 0.873 to 0.968. The AVE values of all constructs were higher than 0.5, ranging from 0.581 to 0.892 (Fornell and

Table 1. Demographic profile of respondents.

Group	Frequency	Percentage	Group	Frequency	Percentage
Gender			**Education**		
Male	148	43.8	High school	11	3.3
Female	190	56.2	College	25	7.4
Age			Bachelor's degree	183	54.1
15–24	66	19.5	Postgraduate	117	34.6
25–34	174	51.5	Other	2	0.6
35–44	76	22.5	**Region of residence**		
45–54	15	4.4	Asia	199	58.9
55–64	5	1.5	Europe	78	23.1
65 and over	2	0.6	North America	23	6.8
Occupation			South America	9	2.7
Workers/Farmers	72	21.3	Australia	29	8.6
Officers	175	51.8	Africa	0	0
Retired	1	0.3			
Self-employed	43	12.7			
Unemployed	47	13.9			

Table 2. Measurement model evaluation.

Measurement scales	Loadings	CR	AVE
The Covid-19-related information search (IS)		0.873	0.581
IS1_I try to obtain a more exact picture of the Covid-19 disease	0.653		
IS2_I try to search for the Covid-19 related information from informal sources of information (e.g., relatives, friends, online social networks)	0.815		
IS3_I try to be informed about how the coronavirus disease can be prevented from official information sources (e.g., WHO, government's sites)	0.781		
IS4_I make sure I search for more exact information about the Covid-19 epidemic	0.735		
IS5_I take the opportunity to talk to others about the Covid-19 epidemic	0.814		
Health risk perception (HR)		0.899	0.641
HR1_I might be exposed to the risk of contagious diseases	0.770		
HR2_I might get sick	0.859		
HR3_I might feel physically uncomfortable	0.857		
HR4_There might be a lot of health incidents involved	0.781		
HR6_I might feel nervous and stressful in the vacation	0.728		
Self-efficacy (SE)		0.883	0.603
SE1_I can be more careful than usual while traveling	0.831		
SE2_I can change my itineraries suitable for the situation of Covid-19 epidemic while I travel	0.762		
SE3_I can limit contacts with other people while I travel	0.801		
SE4_I can adopt all preventive measures to ensure my safety (e.g. wearing masks, using hand sanitizers) while I travel	0.804		
SE5_I can learn more about effective ways to prevent coronavirus disease (e.g., wearing masks, using hand sanitizers)	0.675		
Attitude (AT)		0.961	0.892
AT1_I feel safe when I travel in times of a disease outbreak	0.940		
AT2_I feel positive when I travel in times of a disease outbreak	0.962		
AT3_I feel pleasant when I travel in times of a disease outbreak	0.932		
Travel behavioral intention (BI)		0.968	0.885
BI1_I am planning to travel to a destination that I feel safe in times of a disease outbreak	0.912		
BI2_I intend o travel to a destination that I feel safe in times of a disease outbreak	0.955		
BI3_I want to travel to a destination that is recommended by friends/ relatives in times of a disease outbreak	0.957		
BI4_I will choose to travel to a safe destination that is recommended by official sources of information (e.g., WHO, WTO) in times of a disease outbreak	0.937		

Note: CR=Composite Reliability; AVE=Average Variance Extracted

Larcker, 1981). As a result, all five constructs met the requirements, indicating a high level of convergent validity of the measurement model.

Discriminant validity was measured by the square root of AVE using the Fornell-Larcker criterion. According to the findings shown in Table 3, the square root of AVE for each construct was highest compared to its correlation values with other factors. In summary, the above discussion indicated that all evaluation criteria for the reliability, convergent and discriminant validity were met, supporting all measurement models in this study.

Structural model evaluation

The structural model evaluation included an examination of direct and indirect effects through path coefficients (β), coefficient of determination (R^2) and cross-validated redundancy (Q^2). As shown in Table 4, 9 of 10 hypotheses were empirically supported ($p < 0.05$) while H2c was rejected. It is therefore implied that health risk perception had no influence on travel behavioral intention in times of a health-related crisis. However, three other constructs including information search, self-efficacy and attitude had significant effects on behavioral intention toward traveling in such times. In particular, the attitude-behavioral intention and the information search-behavioral intention relationships were shown to be positive with the β coefficients values greater than 0. By contrast, the effect of self-efficacy on travel behavioral intention was negative ($\beta_{SE \to BI} = -0.214, t = 4.228, p < 0.001$). In addition, this study also applied a bootstrap method suggested by Zhao et al. (2010) to examine any indirect effects in the proposed model (Table 5). Accordingly, if the bootstrapped indirect effect is significant with an empirical t-value greater than the critical value of 1.96 at a

Table 3. Fornell-Larcker criterion of the first-order factor model.

Construct	AVE	IS	HR	SE	AT	BI
IS	0.581	0.762				
HR	0.641	0.306	0.735			
SE	0.603	0.570	0.513	0.776		
AT	0.892	−0.167	−0.405	−0.478	0.945	
BI	0.885	−0.102	−0.327	−0.474	0.813	0.941

Note: The bold diagonal elements are calculated by the square root of the AVEs, and non-bold off-diagonal elements are latent variable correlations

Table 4. Results of direct effects.

Path relation (Hypothesis)	Path coefficient	t-value	p Values	Result
H1a: Information search → Health risk perception	0.306	5.533***	0.000	Supported
H1b: Information search → Self-efficacy	0.455	7.475***	0.000	Supported
H1c: Information search → Attitude	0.161	2.332*	0.020	Supported
H1d: Information search → Travel behavioral intention	0.131	3.140**	0.002	Supported
H2a: Health risk perception → Self-efficacy	0.373	7.118***	0.000	Supported
H2b: Health risk perception → Attitude	−0.220	3.984***	0.000	Supported
H2c: Health risk perception → Travel behavioral intention	0.047	1.027[ns]	0.305	Rejected
H3a: Self-efficacy → Attitude	−0.457	7.086***	0.000	Supported
H3b: Self-efficacy → Travel behavioral intention	−0.214	4.228***	0.000	Supported
H4: Attitude → Travel behavioral intention	0.752	21.047	0.000	Supported

Note: [ns] non-significant, ***$p < 0.001$, **$p < 0.01$, *$p < 0.05$

Table 5. Results of indirect effects.

Indirect paths	Path coefficient	t-value	p Value	97.5% confidence intervals	
				Lower	Upper
IS → HR → BI	0.015	0.953[ns]	0.341	−0.013	0.048
IS → SE → BI	−0.097	3.598***	0.000	−0.156	−0.049
IS → AT → BI	0.121	2.292*	0.022	0.020	0.225
HR → SE → BI	−0.080	3.687***	0.000	−0.126	−0.042
HR → AT → BI	−0.165	3.871***	0.000	−0.252	−0.085
SE → AT → BI	−0.344	6.987***	0.000	−0.438	−0.242

Note: [ns] non-significant, ***$p < 0.001$, *$p < 0.05$

significance of 5%, and the value of zero is excluded from the confidence interval, the mediation relationship will be supported (Hair et al., 2014). The results shown in Table 5 indicated that AT played a mediating role in the causal links from IS, HR, and SE to BI, with all t-values > 1.96 at $p < 0.05$. Similarly, SE also had the mediating effects on the relationships between IS, HR and BI. However, HR did not mediate the relationship between IS and BI. Due to the significant effects of AT and SE on BI (See Table 4), all mediating effects of AT and SE were partial in this study.

Predictive accuracy (R^2) and predictive relevance (Q^2) were then tested. The proposed constructs in this model explained 28.1% of the variance in attitude toward traveling and 68.4% of the variance in travel behavioral intention. To evaluate predictive relevance, this study applied the blindfolding procedure which produced the Q^2 value in Smart PLS 3.0. As Chin (2010) suggested, $Q^2 > 0$ indicated the predictive relevance of the endogenous variable in the extended model. Accordingly, the findings provided all positive Q^2 values, illustrating the predictive relevance of the model in this study.

Discussion and conclusion

Given the case of an emerging disease pandemic (Covid-19) causing potential health risks for tourists, this study examines the antecedent and outcomes of health risk perception. An integrated framework of five constructs including information search, health risk perception, self-efficacy, attitutde and travel behavioral intention is proposed and empirically tested by adapting the theory of planned behavior and the risk perception attitude framework. As a result, the current research contributes to understanding the formation of travel decision-making in times of a health-related crisis and provides potential tourists, destination marketing and management organizations with practical implications for an effective tourism plan during the Covid-19 pandemic.

Theoretical implications

First, findings of this study indicate the direct influence of information search on perceived health risk, attitude and behavioral intention toward traveling in times of a health-related crisis. Indeed, information seeking is found as a predictor of health risk perception, contributing to confirm its increasing importance in the prior literature of tourism risk (Cahyanto et al., 2016; Reisinger and Mavondo, 2005). This finding is consistent with recent studies which also found a correlation between informations searches and risk perception associated with the Covid-19 virus (Huynh, 2020). However, while sources of information are only limited to information (e.g., growth of infectious cases or death rates) about Covid-19 on media channels in previous studies (Huynh, 2020; Neuburger and Egger, 2020), the current research underlines the role of both internal and external sources in the formation of health risk perception. In addition, tourists also search for health crisis-related information from informal (e.g., friends, relatives and online social networks) and formal sources (e.g., WHO or WTO) to make travel-decision. Indeed, the comparison of information sources that people actively use to keep informed about the Covid-19 pandemic by Kunst (2020) also indicated that TV, news websites, search engines (e.g., Google), social media, friends and acquaintances and medical websites are the five most-used sources in Germany, United Kingdom and United States. Therefore, this study implies that information about the Covid-19 on multiple-platforms including the reference sources from informal channels, as well as official sources from organizations or destinations are critical for tourists to make their decision toward traveling in times of the pandemic. While the empirical study by Huang et al. (2020) recommended tourists to engage in preventative behavior to mitigate health risks when traveling to Tibet, our study found that seeking information about Covid-19 is also found as an activity that helps tourists gain their confidence in practicing health protective measures when they travel in times of crisis in our study. Such findings of this study provide a comprehensive understanding of the cognitive process from health risk perception formed by information search to attitude–behavioral intention through health risk perception and health self-efficacy.

Second, the RPA framework is considered as a useful conceptual approach to understand how to communicate health-related risks (Rimal and Real, 2003). In different contexts of tourism, the RPA framework has been applied in several studies (Liu-Lastres et al., 2019; Liu et al., 2016). However, instead of simply testing relationships between constructs in RPA to understand the tourists' response to health communication issues, this study is the first applying the RPA

framework and the TPB model to investigate the influence of health risk perception on behavioral intention toward traveling in the context of a health-related crisis. This direct effect has been found in a recent year by Neuburger and Egger (2020). However, the current research shows differences with previous findings that the relationship between health risk perception and travel behavioral intention is not direct, but indirect via tourist' self-efficacy toward traveling. Indeed, the perception of whether traveling is safe or not safe for health during an epidemic outbreak does not directly enable tourists to make their travel-decision. Such perceived health risk only makes changes in tourists' confidence about protective measure adoption if they travel. Particularly, if individuals perceived more serious health risks, they could be more ready for adopting measures (e.g., change itineraries suitable for the situation, wear masks, use hand sanitizers) to protect their health if they travel. As a result, these findings of the mediating effect of self-efficacy contributes to broadening the understanding of the role of perceived risk in tourism from the health-related perspective.

Third, another result of this study is the negative effect of self-efficacy in forming attitude and behavioral intention toward traveling in times of a health-related crisis. This finding could be explained if traveling during an epidemic outbreak is considered as a form of adventure tourism. Tourists could, therefore gain exciting experiences as well as personal growth when traveling despite the likelihood they face health risks (Dickson and Dolnicar, 2004). Instead of avoiding travel to deal with risks, our study provided the similar findings with Huang et al. (2020) and Zheng et al. (2020) that reveal the influence of self-efficacy on protection motivation and travel intention. This argument could also be supported by the fact that risk was a positive element to motivate tourists to make travel decision in a risky situation (Cater, 2006). It is implied from this study that individuals who intend to travel during the Covid-19 pandemic can be seen as risk-averse travelers who want to take stress-free travel rather than take a trip under stress caused by protective measures.

Finally, out of determinants of travel intention, attitude is found as the most affected factor that is consistent with previous studies in the context of Covid-19 and tourism (Bae and Chang, 2020). However, the study has generally uncovered why people have the intention to travel in times of a health-related crisis by exploring the full mediating effect of attitude in the relationship between perceived health risk and travel intention. Moreover, attitude also plays a partial mediating role in the causal links from information search and self-efficacy to behavior intention. As a result, this study contributes to confirming that the relationship of attitude-behavioral intention can be explained from a socio-psychological perspective, responding to the call for demand-side research stated by Mair et al. (2016).

Practical implications

Practically, this study offers for both potential tourists and tourism industry stakeholders with implications to help tourists make their trips with ease despite the influence of a global pandemic. The first stream of recommendations is for people who are considering whether to travel or not during an infectious disease epidemic in general and in times of the COVID-19 outbreak in particular. As information search is found to be a predictor for both health risk perception and self-efficacy, travel safety advices for tourists are necessary to make themselves feel less risky and more confident with disease-preventative measures. Such suggestions can be: (1) checking the official web links of a destination country or other reliable resources for the latest updates and information related to possible infectious diseases; (2) following the latest World Health Organization guidelines for preventative measures; and (3) regularly practicing and getting more familiar with protection measures. Indeed, with newly discovered influenza-like viruses expanding rapidly in terms of their coverage and severity in recent decades, tourists should have good preparation strategies to feel more confident in planning their trips and become responsible travelers during such a crisis. For both domestic and international tourists, it is important to check travel requirements or restrictions of destinations including testing requirements, stay-at-home orders, quarantine requirements upon arrival.

On the other hand, in response to the significance of information search and self-efficacy in attitude and behavioral intention toward traveling during a disease outbreak, destination management organizations (DMOs) should work in close cooperation with governmental agencies and tourism stakeholders to provide updates on the progress of the infectious disease outbreak

through official media communication channels. Indeed, communication with customers is important because tourists need to have access to accurate local information (Mair et al., 2016). Visitors who had already booked their trip should be given priority to communicate by DMOs. Educational initiatives should be implemented to fully inform targeted markets about virus transmission routes and protective measures. These safety guidelines are better tailored to tourists during their decision-making process, either via online communication channels or through paper promotional publications. In addition, learning from Walters and Mair (2012), DMOs should access the use and success of a range of recovery messages (e.g., usual, solidarity, celebrity endorsement, restoring confidence, short-term discounts, and guest/ visitor testimonials) to persuade travelers to visit/ return to their destination. Such practices help tourist destinations promote a safe and responsible destination image in the minds of potential tourists.

In addition, the Vietnamese government have been making practical and policy responses to rebound and recover well the tourist industry from the crisis, which are firstly for stimulating domestic tourism. For example, the programme called 'Vietnamese people travel Vietnam' or the 'Safe Vietnam Tourism' campaign have encouraged tourists to travel to destinations/ places where the pandemic had been controlled (Quang et al., 2020). As a result, together with strategies helping destinations maintain hygienic standards, it is recommended from this study that the government and tourism operators should have a good corporate strategy to welcome tourists back to their destinations by providing them with safe travel experiences. For example, instructions on personal preventive measures like hand washing, mask-wearing and social distancing should be widely available from onboard transportation notices, airports, stations, and public restrooms to places exposed to tourists at hospitality facilities; therefore, travelers can enjoy their trips with less stress. Accordingly, marketers and tourism organizations can make promotional videos/ records of tourists coming back to their destination after the crisis. This strategy reduces travelers' apprehensions about traveling by highlighting the fact that although a global pandemic inevitably influences a destination, and travelers may encounter health risks, they can make a trip or proceed with their journey safely during the epidemics. Such specific practices are promoted not only for the Vietnam destination, but also for other destinations in the phase of tourism recovery.

Limitation and further research

Despite the theoretical and managerial contributions, the current study is not without limitations. In this study, the data was only collected from online travelers' social networks or groups where English is a language used for discussion. This factor limits the generalization of this study's results to those who used other languages (e.g., Chinese, Japanese, Korean, German, Italian, French and more). As a result, there is a need to understand travel intention from non-native English-speaking markets. A comparison between different cultural groups can, therefore, be an idea to explore further the formation of travel intention during and after the disaster from the influence of culture. Future researchers can also examine the framework further to investigate the impacts of contextual factors (e.g. social media, destination management practices, government policies) on health risk perception or testing these additional factors in the attitude-travel behavior intention relationship in the context of a disease pandemic. Finally, a qualitative study conducting interviews with tourists who had actual trips in the pandemic to explore other potential Covid-19 related factors can be an idea for future research to fully understand their travel-decision making.

ORCID iD

Diep Ngoc Su ⓘD https://orcid.org/0000-0001-8944-5628

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