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COVID-19 experiences and cruise booking behavior: Insights from YouTube viewers applying revised protection motivation theory

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ABSTRACT

The purpose of this study is to examine the relationship between risk perceptions (crowding risk perception, health risk perception) and self-protective behavioral intentions and booking intention for COVID-19 using the theory of protection motivation previously verified in the study and to analyze the structural relationship between all variables. In particular, it was intended to investigate the specific impact relationship between COVID-19 risk perception, including crowding risk perception and health risk perception, and self-protective behavior and cruise booking intention. The survey was conducted on subscribers of travel YouTube channels with cruise video content, and the respondents actively responded by providing convenience store beverage coupons. In an online survey conducted for a month from January 15, 2023, 312 samples were collected from travelers who have experienced cruises in the past five years. SPSS and AMOS statistical programs were used, and first, frequency analysis and discriminant validity analysis were verified. In addition, the verification of structural relevance between variables was analyzed by the covariance-based structural equation modeling (CB-SEM). Demographic characteristics, confirmatory factor analysis, correlation analysis, and structural model analysis verified the hypothesis. Based on the results of the analysis, this study presents basic evidence useful for establishing management strategies for cruise companies.

Contribution/ Originality: This study analyzed the perceptions and behaviors of potential cruise travelers in terms of PMT by applying the Chi and SEM statistical techniques. This study aims to provide fundamental information for developing future management strategies for cruise companies.

1. INTRODUCTION

The outbreak of COVID-19 has had a serious global impact, with a series of national control measures (e.g., travel restrictions, border shutdowns) implemented globally to impede the spread of the pandemic. Consequently, tourism is one of the hardest-hit sectors [1] as the disease was spread worldwide by foreign tourists returning home from visiting infected areas [2]. According to a survey conducted by Morning Consult in 2020, almost two in three adults (65%) say that cruise ships are not safe and sanitary, compared to 57% who expressed concerns about airplanes and 31% about hotels.

During the COVID-19 period, the cruise industry was one of the most vulnerable sectors of the tourism industry. Because cruise ships are prone to outbreaks of infectious diseases due to the closed environment, contact between

travelers from various countries, and crew movement between ships [3] for instance, the Diamond Princess, departing from Yokohama Port, Japan experienced a mass infection in February 2020, leading to the detention of all passengers and crew on board [4]. Because the event was broadcast in real time around the world, it presented a decisive occasion on which the risk and negative image of cruise travel were spread [5]. For this reason, on March 14, 2020, the Centers for Disease Control and Prevention (CDCP) of the U.S. Department of Health issued a ban on the navigation of all cruises, giving the following reasons for this strict response: First, cruises are crowded with many people in closed or semi-closed environments that are likely to be in close contact; second, cruise passengers infected with COVID-19 can travel from different geographical locations (exit-stop), which can expand the scope of infection [6]. This situation can have a negative effect on both the health risks of potential cruise travelers and their future cruise travel intentions.

Reflecting this industrial environment, various studies have been conducted to investigate the relationship between the perceived risks of cruise travelers and their behavior. For example, the relationship between passenger attitudes, norms, behavioral control, and behavioral intention has been examined using planned behavioral theory [7] the relationship between behavioral intention applying the Theory of Reasoned Action (TRA) and the prospect theory to Chinese travelers [8] and the relationship between safety and security risks of cruises perceived by generation Z travelers [9]. While researchers present both positive and negative views about the post-COVID-19 cruise industry, there are limitations, as many such views are speculative and based on theoretical or logical bases. Protection motivation theory (PMT) can identify specific behaviors and attitudes, such as travel avoidance, and examine the cognitive processes involved in the potential harmfulness of an event and coping appraisal, not simply the influence of emotional states such as fear or risk perception [10]. In addition, PMT can structurally identify self-protective intentions to avoid the perceived risk of harmful events through individual cognitive processes. This is effective for examining the impact on booking intentions, such as avoiding cruise travel during dangerous events like the COVID-19 pandemic environment.

Previous studies have been conducted on the effect of PMT on the behavior of travelers in various fields of the tourism industry [5, 11-15]. However, despite, industry-specific differences in customer perceptions and the need for different corporate management strategies, research on cruise passengers remains inadequate. Therefore, quality research and analysis for efficient management of cruise companies is an important contribution to the development of the post-COVID-19 marine tourism industry. PMT is a representative theory used to examine human cognitive processes in dangerous situations [16] which allows a systematic examination of human behavior being mediated or controlled by psychological factors rather than immediate changes in attitude/behavior caused by external threats [17]. For example, if an individual underestimates the severity or likelihood of a risk or thinks that they cannot do anything about it, no motive for protection occurs, and consequently, no change in behavioral intentions occurs [18].

Based on the differences from the aforementioned previous studies, the purpose of this study is to trigger various discussions on 1) the impact of changes in passenger perceptions on cruise travel and 2) how to protect passengers from the risk of catching COVID-19. Specifically, considering the characteristics of the cruise, risk perceptions comprise crowding [19] and health risks [20, 21] which are verified by applying PMT (threat appraisal and coping appraisal). Through the analysis results of this study, the perceptions and behavior of potential cruise travelers are verified in terms of PMT, thereby providing basic evidence for establishing future management strategies in cruise companies.

2. THERORETICAL BACKGROUND

2.1. COVID-19 Risk Perception

Risk is defined as an uncertain situation that is likely to be part of an event of negative value or that may have undesirable consequences, such as the possibility of physical injury or loss, the possibility of danger, and exposure to the potential of losing something valuable [22]. Within the marketing field, we distinguish risk perception from objective and stochastic risks, characterizing it as a subjective risk that consumers perceive beyond objective

situational awareness in brand selection situations [23]. In general, risk perception is represented mainly by research on natural disasters such as earthquakes, floods, volcanic eruptions, health problems (such as drinking, gambling, disease, and fine dust), which are social problems; consumers' purchasing and consumption activities that assume uncertainty in decision-making; and nuclear power plants or information technology usage [24]. In all of these areas, interest in risk perception starts with the premise that customers are prevented from undesirable future actions or decisions and that risk perception has an important influence on leading behavior in a positive direction.

Risk in the tourism sector is recognized and experienced by tourists in the process of purchasing and consuming travel services [25]. As the risk of travel and tourism has increased and diversified worldwide since the 2000s due to terrorism, political instability, religious conflicts, diseases, and natural disasters, research on risk perception has been conducted extensively [26] and the perceived risk for tourists varies depending on individual characteristics. In addition, since 2000, the type and frequency of new infectious diseases (and the associated risk of pandemics) have increased; for example, severe acute respiratory syndrome (SARS), high-pathogenic avian influenza (HPAI), and swine flu [27]. In the past, infectious diseases were primarily local, but since 2000, infectious diseases that are introduced into a country spread as a result of rapid climate change, globalization, international exchange, trade, and international travel [28]. Previous studies [27, 29, 30] have demonstrated that viral infectious diseases have a significant impact on reduced demand for tourists worldwide and the economic status of the tourism industry. In particular, COVID-19, which was declared a pandemic in 2020 by the WTO (World Trade Organization) [31] resulted in the loss of 121.1 million jobs and $3.435 trillion in global GDP in the global travel and tourism sector [32].

Economic, physical, corporeal, psychological, social, and temporal factors are the six most commonly factors to measure risk perception, according to Jacoby and Kaplan [33]. Based on this, the measurement items for risk perception were classified and utilized in various ways for each individual study. However, as the risk of political terrorism, natural disasters (such as earthquakes and volcanic eruptions), and diseases such as SARS, MERS (Middle East Respiratory Syndrome), and COVID-19 has increased since 2000, studies now also measure the sub-dimension of risk perception as a single dimension.

The tourism industry has conducted a number of previous studies on risk perception. In Lee and Deale's study of Airbnb customers [34] and the study of restaurant customers by Leung and Cai [35] risk perception was found to consist of social, physical, performance, and convenience risk. Foroudi, et al. [36] of restaurant customers identified health risks, while Quan, et al. [15] targeting hotel customers applied the single factor of financial risk perception. As such, risk perception in the tourism industry in terms of cruises [37-39], flights [40-42], travel [43, 44] and hotels [15, 45] has been applied in various ways. Various approaches have been taken to predict customer behavior in most studies, so this study attempts to verify the hypothesis by dividing the COVID-19 risk perception perceived by cruise passengers into crowding risk perception and health risk perception based on previous studies verified in these various fields. COVID-19 risk perception (crowding and health risk perception) is considered to be more effective in grasping the risk psychology of respondents in that it reflects various disaster accidents that have occurred worldwide.

2.2. Risk perception Link to Protection Motivation Theory

Protection motivation theory, developed by Rogers [46] is based on expectancy value theory and examines how humans go through cognitive processes in threat situations. According to PMT, when a person is exposed to threatening and risk control situations, cognitive evaluation is performed on anxiety and fear, and through the evaluation process, the motivation to protect is adjusted in response to the cognitive response, changing behavior and attitude. Thus, PMT is not a cognitive prediction but a basic theory of fear appeal, as developed by Rogers [46] and Rogers [47] to explain the effectiveness of fear appeal in behavior and attitude changes through threat messages. Since then, Leventhal [48] has divided the process of processing cognitive and emotional reactions into responses to fear claims—fear control and danger control. This process responds to cognitive reactions by identifying and addressing various causes of fear through risk control. However, it has been pointed out that there was a lack of

specific logic and proof of the process of occurrence of risk control reactions and the transition between risk control and fear control processing [49, 50]. Accordingly, the version of PMT revised in 1983 also comprises aspects of self-efficacy theory [51].

Protection motivation theory mainly comprises coping appraisal and threat appraisal. Threat appraisal refers to the degree of threat an individual feels, which includes perceived severity and vulnerability. Perceived severity is the severity of the damage that can occur in various threat situations. Coping appraisal—consisting of coping efficacy, self-efficacy, and cost response barriers—indicates how well a person can prevent and avoid loss and damage from threats [12, 13, 46, 51]. Coping effectiveness represents an individual's expectation that adopting recommended behavior can eliminate risk, and self-efficacy represents confidence in an individual's ability to successfully perform recommended behavior [13, 52]. Perceived vulnerability, on the other hand, refers to the potential harm but dangerous situations or the various possibilities of exposure to them may cause [53]. In other words, when a person is exposed to a risk message, their behavior does not simply change; psychological factors are affected, resulting in an individual behavior change.

Protection motivation arises through the evaluation of harmfulness, possibility of occurrence, and efficacy of risk perception and mediates the effect of risk perception on individual attitudes and behaviors [14]. For example, if an individual underestimates the severity or probability of a risk or thinks that they can do nothing about it, there is no protection motivation occurs. Consequently, no change in behavioral intentions occurs [46]. Accordingly, the component of an individual's protection motivation is regarded as a useful theoretical means by which to explain the behavior of people who are not active in response behavior or who are active in travelers' behavior in the risk-perceived situation of COVID-19.

It is evident from looking at previous studies based on PMT against the backdrop of COVID-19 in the tourism industry [10, 14, 54-57] that studies on disease and health have actively been conducted, and most studies have empirically analyzed the relationship between customers' behavioral intentions. However, studies that simultaneously examined specific self-protective intentions and booking intentions for cruise travelers applying PMT are currently lacking. Therefore, the COVID-19 epidemic presented in this study is also a reaction recognized through the PMT, and the following hypothesis was established based on previous studies.

Hypothesis 1. Crowding risk perception has a significant effect on protective motivation theory.

H1-1 Crowding risk perception has a significant effect on perceived severity.

H1-2 Crowding risk perception has a significant effect on perceived vulnerability.

H1-3 Crowding risk perception has a significant effect on perceived coping efficacy.

H1-4 Crowding risk perception has a significant effect on perceived self-efficacy.

H1-5 Crowding risk perception has a significant effect on perceived cost response barrier.

Hypothesis 2. Health risk perception has a significant effect on protective motivation theory.

H2-1 Health risk perception has a significant effect on perceived severity.

H2-2 Health risk perception has a significant effect on perceived vulnerability.

H2-3 Health risk perception has a significant effect on perceived coping efficacy.

H2-4 Health risk perception has a significant effect on perceived self-efficacy.

H2-5 Health risk perception has a significant effect on perceived cost response barrier.

2.3. Protection Motivation Theory Linked to Traveler's Cruise Behavioral Intentions

The PMT model, developed by Rogers [46] explains why people take precautions when they perceive a health danger. According to this approach, people defend themselves against threats primarily due to perceived risk severity, perceived likelihood that something bad will happen (vulnerability), perceived effectiveness of the advised preventive behavior, and perceived self-efficacy [58]. One of the main focuses of this research is whether PMT traits—including

susceptibility, severity, perceived efficacy, rewards, and reaction costs—have an impact on self-protective intent and behaviors [13, 59, 60].

The two procedures that PMT assumptions use to ascertain a person's intention to defend themselves from harm are threat appraisal and coping appraisal [61]. In this study, this is in relation to COVID-19. In other words, people's perceptions of their health risks are assessed using threat and coping appraisal, which encourages them to adopt preventative steps [62].

First, threat assessment focuses on how each person assesses the severity of the health problem and their level of susceptibility to it. Threat appraisal takes into account either the anticipated benefits or rewards of engaging in risky activity, as well as the perception of any potential health risks [63]. Thus, in terms of eating out as an example, people who eat out a lot compared to people who see fewer benefits from dining out would typically attend restaurants more frequently, be more inclined to follow COVID-19 preventative measures, raise their intentions to protect themselves, and engage in COVID-19 protective behaviors while doing so.

Second, coping appraisal depends on individual assessments of the ability to carry out a specific behavior and confidence in that behavior's effectiveness in reducing a health threat (i.e., perceived efficacy). As well as what response costs are associated with engaging in a specific behavior to counter the health threat [13, 14, 61, 64]. This suggests that people who have a high level of perceived effectiveness and confidence in their ability to defend themselves against COVID-19 should be more prepared to do so when dining out during the epidemic [65]. Due to their increased self-assurance and utilization of protective measures when dining out, they tend to visit restaurants more frequently [65, 66]. However, people tend to have less intention to self-protect while dining out, visit restaurants less frequently, and engage in fewer protective behaviors if they perceive high levels of expenses or difficulty in adopting protective practices. Although behavioral intentions may lead to actual behavior, this may not always be the case, particularly during times of uncertainty and unknowns such as the current COVID-19 crisis. Therefore, extending the study beyond simply understanding behavioral intention to further investigating actual behavior is necessary. So, the following hypothesis was established:

Hypothesis 3. Protection motivation theory has a significant effect on self-protective intentions.

H3-1 Perceived severity has a significant effect on self-protective intentions.

H3-2 Perceived vulnerability has a significant effect on self-protective intentions.

H3-3 Coping efficacy has a significant effect on self-protective intentions.

H3-4 Self-efficacy has a significant effect on self-protective intentions.

H3-5 Cost response barrier has a significant effect on self-protective intentions.

Hypothesis 4. Protection motivation theory has a significant effect on booking intentions.

H4-1 Perceived severity has a significant effect on booking intentions.

H4-2 Perceived vulnerability has a significant effect on booking intentions.

H4-3 Coping efficacy has a significant effect on booking intentions.

H4-4 Self-efficacy has a significant effect on booking intentions.

H4-5 Cost response barrier has a significant effect on booking intentions.

Hypothesis 5. Self-protective intentions have a significant effect on booking intentions.

3. METHOD

3.1. The Measurement Methods

This study used an online questionnaire presented in two sections. The first part of the survey requested demographic information (i.e., gender, age, marital status, level of education, and job type). We constructed the conceptual model in the second part using CRP, HRP, PSV, PVN, CEC, SEC, CRB, SPI, and CBI. To assess the study constructs, the measures were employed from the existing literature [5, 19, 57, 67-71]. Multi-items with a five-point scale were utilized to evaluate the constructs.

To be specific, at first, based on the study of Castaldo, et al. [5] Covid-19 risk perception was composed of two sub-factors: crowding and health risk perception for cruise, crowding risk was defined as the degree to which travelers on the cruise perceived the risk of Covid-19 due to crowding, and five questions were used based on research by Lee, et al. [67] and Novelli, et al. [68] health risk was defined as the degree of perception of health threats due to Covid-19 on cruise, and 4 questions based on the research of Machleit, et al. [69] and Hyun and Kim [19] were used, and crowding risk and health risk were measured as a total of 9 questions. Second, the protection motivation model measured a total of 19 items consisting of five sub-factors (3 items perceived severity, 4 items perceived vulnerability, 6 items coping efficacy, 6 items self-efficacy, and 4 items cost response barriers) based on the study of Zhu, et al. [70]. Perceived severity was defined as the degree of perceived severity for the consequences of Covid-19 infection, perceived vulnerability was defined as the degree to which potential domestic tourists perceive the possibility of being infected with Covid-19; coping efficacy was defined as the perceived efficacy of coping behavior to eliminate the risk of Covid-19 infection, self-efficacy was defined as the degree of perception of an individual's ability to perform response actions to eliminate the risk of Covid-19 infection, the cost response barrier was defined as the degree of behavior and cost (taking effort, time, and inconvenience) consumed to protect against the risk of Covid-19. Third, protective behavior intention was defined as the degree to which travelers themselves were willing to comply with the COVID-19 protection regulations on cruise, and the 3 items used in the study of Ryu, et al. [57] were measured as a single factor. Fourth, cruise booking intention was defined as the degree of willingness to plan a cruise trip in the near future, and 5 items used in the study of Hung and Petrick [71] were measured as a single factor. Finally, 6 demographic items were measured: gender, age, education level, marital status, occupation, and travel purpose.

3.2. Data Collection Process

Graduate students and faculty members majoring in hospitality and tourism pre-tested the questionnaire, which led to its improvement. It confirmed and reviewed by academics and industry experts. The accuracy of the questionnaire's content and adequacy of its items were checked by 10 hotel management PhDs for a week starting January 5, 2023. Moreover, the questionnaire's design aims to safeguard respondent anonymity and minimize evaluation anxiety [72, 73]. In response to respondents who have experienced cruise boarding over the past five years in Korea, this study shows crowding risk perception, health risk perception, protective motivation theory (perceived severity, received vulnerability, copying efficiency, self-efficacy, cost response barriers), protective behavioral intention, and cruise booking intentions. In order to measure the relationship with cruise booking intentions, a self-written survey, which is a judgment sampling method, was conducted among the non-probability sampling methods.

Although it is shifting to a phased daily recovery due to the easing of quarantine measures against COVID-19, face-to-face surveys for survey responses are still difficult, so online mobile (Google Doc Survey) has been used. We specifically collected responses from subscribers of travel YouTube channels featuring cruise video content, and offered convenience store beverage coupons to those who completed the survey as a promotional strategy. Users who subscribe to YouTube channels with travel content will have a relatively high desire for travel, and indirect experiences and direct experiences through cruise videos can positively affect the participation of this study as a synergy effect.

3.3. Data Analysis and Demographic Profiles

To analyze the data, we used SPSS 20 and AMOS 20. As recommended by Anderson and Gerbing [74] the measurement model with a confirmatory factor analysis (CFA) was initially evaluated before assessing the proposed structural model. Reliability and construct validity of measurement items for each construct were evaluated. Structural Equation Modeling (SEM) was then conducted. A chi-square difference test was employed for modeling comparison. Lastly, a test for metric invariance was utilized in order to evaluate the hypotheses.

Of the 312 respondents, 174 respondents (55.77%) were female, and 138 respondents (44.23%) were male. Present marital status was for married people (163 respondents, 52.24%), followed by single people (149 respondents, 47.76%). Survey participants were 30–39 years old (117 respondents, 37.50%), 20–29 years old (89 respondents, 28.53%), 40–49 years old (52 respondents, 16.67%), 50 years old (40 respondents, 12.82%), and 60 years old and older (14 respondents, 4.49%) appearing in order. As for the level of education, university (109 respondents, 34.94%), college (113 respondents, 36.22%), graduate school students or higher (72 respondents, 23.08%) and high school (18 respondents, 5.77%) were in order. Job types were salary employees (91 respondents, 29.17%), freelancers (75 respondents, 24.04%), self-employment (71 respondents, 22.76%), students (62 respondents, 19.87%), others (13 respondents, 4.17%). The purpose of travel abroad was leisure (218 respondents, 69.87%), business (83 respondents, 26.60%), and others (11 respondents, 3.53%).

4. RESULTS

4.1. Measurement method and Confirmatory Factor Analysis

The measurement tools used in this study include risk perception (crowding, health), protection motivation theory (perceived severity, perceived vulnerability, coping efficacy, self-efficacy, cost-response barriers), self-protective intentions, behavioral intentions, and confirmatory factor analysis (CFA) results. The confirmatory factor analysis (CFA) was performed to verify the reliability and validity. As a result of the measurement model, goodness-of-fit statistics for the measurement model $\chi^2 = 1450.848$, df = 740, $p < 0.001$, $\chi^2/df = 1.961$, RMSEA = 0.058, GFI = 0.982, CFI = 0.913, IFI = 0.913, TLI = 0.903, were judged to be overall excellent [75]. We checked the factor loadings, significance probability of t-value, average variance extracted (AVE), and construct reliability (CR) to ensure the convergent validity of the latent variables in the measurement model. The confidence coefficients (Cronbach's α) of factor loading were shown between 0.715 and 0.917, which was more significant than the 0.6 suggested by Bagozzi, et al. [76]. Moreover, AVE values were constructed to range from 0.643 to 0.767. These values were all greater than the levels of 0.5 and 0.7 suggested by Anderson and Gerbing [74]. In addition, correlation analysis was performed as shown in Table 1. to verify discriminant validity. As a result of Pearson's correlation analysis, all variables of CRP, HRP, PSV, PVN, CEC, SEC, CRB, SPI, and BI were $p < 0.05$, indicating a significant correlational association [77]. Thus, discriminant validity was confirmed.

4.2. Structural Equation Model Analysis

In this study, SPI and BI were investigated based on model of protection motivation theory. The structural equation model (SEM) analysis was generated by using the maximum likelihood estimation method as an estimation method for both model and procedures' evaluation [75]. The goodness-of-fit statistics for the structural model: $\chi^2 = 1442.472$, df=752, $p< 0.001$, $\chi^2/df=1.918$, RMSEA=0.056, GFI=0.983, CFI = 0.915, IFI = 0.916, TLI = 0.907) were satisfactorily higher than the standard value.

Moreover, SEM had shown high prediction power for R^2(PSV)=0.657, R^2(PVN)=0.422, R^2(CEC)=0.454, R^2(SEC)=0.463, R^2(CRB)=0.474, R^2(SPI)=0.700, R^2(BI)=0.886 and t-values and standardized path coefficients were shown as the result in Table 2. The path estimates show that CRP had a significant effect on PSV (β=0.041, t =1.025), CRP had a significant effect on PVN (β =0.129, t=2.234***). CRP had a significant effect on CEC (β =0.152, t =1.396). CRP had a significant effect on SEC (β=0.151, t =1.980*). CRP had a significant effect on PSV (β =0.156, t =3.160***). Thus, H1-2,4, and 5 are supported while H1 and 3 are not supported, and HRP had a significant effect on PSV (β=0.820, t =11.121***), HRP had a significant effect on PVN (β =0.265, t =4.511***). HRP had a significantly effect on CEC (β =0.332, t =3.204***). HRP had a significantly effect on SEC (β=0.257, t =3.389***). HRP had a significant effect on PSV (β =0.105, t=2.291**). Thus, H2-1,2,3,4, and 5 are all supported. And when it comes to the relationship between PMT and outcome variables, the path estimates are shown in Table 2.

Table 1. The measurement model and correlation.

Construct and scale item		Standardized loading	Mean (SD)	AVE (CR)	CRP	HRP	PSV	PVN	CEC	SEC	CRB	SPI	BI
CRP	CRP1	0.876	3.60 (0.731)	0.696 (0.917)	0.834								
	CRP2	0.806											
	CRP3	0.868											
	CRP4	0.819											
	CRP5	0.792											
HRP	HRP1	0.784	3.67 (0.823)	0.644 (0.880)	0.219 ***	0.802							
	HRP2	0.862											
	HRP3	0.888											
	HRP4	0.722											
PSV	PSV1	0.623	4.18 (0.367)	0.659 (0.715)	0.232 ***	0.766 ***	0.812						
	PSV2	0.665											
	PSV3	0.711											
	PSV4	0.613											
PVN	PVN1	0.639	3.65 (0.567)	0.646 (0.759)	0.209 ***	0.317 ***	0.367 ***	0.804					
	PVN2	0.687											
	PVN3	0.732											
	PVN4	0.819											
CEC	CEC1	0.790	3.61 (0.777)	0.643 (0.914)	0.119 ***	0.186 ***	0.232 ***	0.401 ***	0.802				
	CEC2	0.863											
	CEC3	0.748											
	CEC4	0.807											
	CEC5	0.777											
	CEC6	0.809											
SEC	SEC1	0.754	3.85 (0.610)	0.675 (0.838)	0.199 ***	0.227 ***	0.307 ***	0.283 ***	0.274 ***	0.822			
	SEC2	0.795											
	SEC3	0.740											
	SEC4	0.623											
	SEC5	0.642											
	SEC6	0.963											
CRB	CRB1	0.966	4.13 (0.541)	0.676 (0.851)	0.169 ***	0.117 ***	0.112 ***	0.105 ***	0.077 ***	0.162 ***	0.822		
	CRB2	0.609											

	CRB3	0.669											
	CRB4	0.780											
SPI	PRI1	0.849	4.18 (0.546)	0.767 (0.889)	0.144 ***	0.125 ***	0.166 ***	0.401 ***	0.769 ***	0.336 ***	0.111 ***	0.876	
	PRI2	0.851											
	PRI3	0.783											
BI	BI1	0.756	4.32 (0.453)	0.727 (0.893)	0.138 ***	0.144 ***	0.179 ***	0.378 ***	0.826 ***	0.259 ***	0.118 ***	0.626 ***	0.853
	BI2	0.766											
	BI3	0.834											
	BI4	0.809											
	BI5	0.788											

Note: ***$p<0.001$

CRP=Crowding risk perception, HRP=Health risk perception, PSV=Perceived severity, PVN=Perceived vulnerability, CEC=Coping efficacy, SEC=Self-efficacy, CRB=Cost response barrier, SPI=Self-protective intentions, BI=Behavioral intentions.

PSV had a significant effect on SPI (β=0.188, t=2.274**), PVN had a significant effect on SPI (β =0.273, t=2.949**), CEC had a significant effect on SPI (β =0.692, t =12.203***), SEC had a significant effect on SPI (β=0.142, t=2.629**), CRB had a significant effect on SPI (β =0.099, t =1.276). Thus, H3-1,2,3, and 4 are all supported. And, PSV had a significant effect on BI (β =-0.143, t =-1.862), PVN had a significant effect on BI (β =0.207, t =2.386**), CEC had a significant effect on BI (β=0.971, t=9.705***), SEC had a significant effect on BI (β=0.048, t =0.971), CRB had a significant effect on BI (β =0.164, t =2.367***). Thus, H4-,2,3, and 5 are supported while H4d is not supported. and, SPI had a significant effect on BI (β =0.331, t =3.366***). Thus, H5 is supported.

Table 2. Structural model results and hypothesis testing.

Hypothesized paths	Coefficients	Std. error	t-values
H 1-1: CRP→PSV	0.042	0.041	1.025
H 1-2: CRP→PVN	0.129	0.058	2.234***
H 1-3: CRP→CEC	0.152	0.109	1.396
H 1-4: CRP→SEC	0.151	0.080	1.980*
H 1-5: CRP→CRB	0.156	0.049	3.160***
H 2-1: HRP→PSV	0.820	0.074	11.121***
H 2-2: HRP→PVN	0.265	0.059	4.511***
H 2-3: HRP→CEC	0.332	0.104	3.204***
H 2-4: HRP→SEC	0.257	0.076	3.389***
H 2-5: HRP→CRB	0.105	0.046	2.291**
H 3-1: PSV→SPI	0.188	0.083	2.274**
H 3-2: PVN→SPI	0.273	0.093	2.949***
H 3-3: CEC→SPI	0.692	0.057	12.203***
H 3-4: SEC→SPI	0.142	0.054	2.629**
H 3-5: CRB→SPI	0.099	0.077	1.276
H 4-1: PSV→BI	-0.143	0.077	-1.862
H 4-2: PVN→BI	0.207	0.087	2.386**
H 4-3: CEC→BI	0.971	0.100	9.705***
H 4-4: SEC→BI	0.048	0.049	0.971
H 4-5: CRB→BI	0.164	0.069	2.367**
H 5: SPI→BI	0.331	0.098	3.366***

Note: Crowding risk perception (CRP), Health risk perception (HRP), Perceived severity (PSV), Perceived vulnerability (PVN), Coping efficacy (CEC), Self-efficacy (SEC), Cost response barrier (CRB), Self-protective intention (SPI), Behavioral intentions (BI); Goodness-of-fit statistics for the structural model: χ^2 = 1442.472 df=752, p<0.001, χ^2/df=1.918, RMSEA=0.056, GFI=0.983, CFI=0.915, IFI=0.916, TLI=0.907 *p<0.05, ** p<0.01, *** p<0.001.

5. DISCUSSION AND CONCLUSION

The risk of perceiving potential travelers with cruise travel plans after COVID-19 was set as a causal variable, which was divided into two sub-factors—crowding risk and health risk—to investigate the relationship between potential travelers' perceptions and behavioral intentions. We specifically applied the revised PMT to predict the outcome variables, adding perceived severity, perceived vulnerability, coping efficacy, and cost response barriers as sub-factors for verification. In addition, we tried to verify the structural relationship based on the hypothesis by continuously confirming the relationship between self-protective intentions and cruise booking intentions as a dependent variable. This expanded and supported the results presented by studies in the tourism industry related to COVID-19 risk perception [8, 40, 42-45] as well as studies that tried to predict travelers' behavior based on PMT [10, 14, 54-57]. In particular, it was possible to suggest academic and practical implications by supporting or different results from previous studies targeting cruise travelers. To summarize the research results, they are as follows: It was found that the crowding risk did not significantly affect perceived severity or coping efficacy among risk perceptions. Moreover, perceived severity and self-efficacy did not have a significant effect on cruise booking intention. In particular, health risk perception was found to have a significant effect on all factors of PMT, and all factors of PMT were found to have a significant effect on self-protective intentions. Therefore, the results of this study provide marine

tourism companies (cruises) with basic evidence for establishing future management strategies for any forthcoming post-COVID-19 activity, when the safety should be more important than ever.

Based on the results of this study, the following theoretical and practical implications are presented: First, PMT was applied to verify the decision-making process of potential travelers for the cruise industry, which was seriously affected by COVID-19. The results of this study extended the verification of existing studies on the influential relationship between COVID-19 risk perception and behavioral intentions [27, 29, 30]. Accordingly, COVID-19 risk perception has been verified in a number of studies and shows that it affects PMT, a psychological variable that affects specific behavior. Furthermore, studies have found that among PMT factors related to COVID-19 risk perception, crowding risk and health risk significantly influence perceived vulnerability [61]. Therefore, strategies should be implemented to offset people's fears and concerns about crowding and health risks. For instance, we should conduct extensive promotional marketing to reinvigorate the cruise tourism industry, which has suffered due to the high COVID-19 infection rates on cruise ships during the pandemic. Specifically, it is necessary to improve cruise-ship medical and air conditioning systems to prevent infectious diseases, by installing a high-level medical center on board and installing a HEPA (High Efficiency Particulate Air) filter in the existing HVAC (Heating Ventilation Air Conditioning) system to inject 100% externally sourced fresh air. Next, it is necessary to reduce events where many people gather in confined and narrow spaces and ensure that only an appropriate number of people board. It is believed that gradually building trust with customers in this way will alleviate perceived vulnerability.

Second, while a number of studies in the tourism field (travel, aviation, and hotels) related to COVID-19 have verified customer behavioral intentions, cruise behavioral intentions in this study were verified simultaneously by adding self-protective intentions. Accordingly, the decision-making process of potential passengers for the behavioral intention verified in previous studies was specified. Additionally, we applied PMT to the incidence of infectious diseases to confirm the specific impact of the COVID-19 situation. We can confirm that self-protective intentions play a crucial role in decision-making before deciding to embark on a cruise. In this regard, potential travelers who perceive the risk of COVID-19 can positively influence their willingness to take a cruise through their willingness and belief that they can actively protect themselves. Therefore, cruise companies need to be transparent about how well they are coping with COVID-19. Accordingly, accurate information disclosure and promotion of health and safety protocols to cope with COVID-19 should be continuously carried out to improve consumer awareness of cruise tourism, which has been negatively affected by COVID-19. In addition, it is necessary to present a focused professional manual that tells passengers on the cruise how they can protect themselves, and actively support it. For example, in the case of cabins, a cleaned room can enhance psychological stability for passengers by hanging a "protective seal" on the door handle, and other auxiliary facilities (such as health centers and swimming pools) can also be managed in this way to actively protect passengers' safety. In addition, it is necessary to create conditions for passengers to protect themselves at any time anywhere on the ship by providing disposable masks and hand sanitizers in preparation for various situations.

Finally, to discuss the results comprehensively, this study focused on crowding risk and health risk through factors presented in various tourism industry studies related to risk perception. The analysis accepted both hypotheses 2a-e and 3a-e, indicating a significant influencing relationship. Despite the rejection of one or two factors related to PMT in hotel and aviation studies, this study confirmed the significant influence of cruise passengers on each COVID-19 health risk and PMT factor. This cannot be completely free from the fallacy of generalization, but since there may be differences in risks perceived by customers according to industry, these findings provide macroscopic implications that strategic corporate management suitable for cruise companies should consider based on different results.

Despite the stated academic and practical implications, the following limitations are also evident: First, the survey only included respondents with prior cruise experience, potentially limiting its representativeness. In presenting basic data useful for future development directions and strategies for cruise companies in the travel and tourism industry, it is also important to understand the potential intentions of travelers who do not have boarding experience. In future studies, it is hoped that additional verification will be performed through comparative analysis of passengers who have

cruise experience and passengers who do not. Second, responses may differ depending on the respondents' cruise companions. For example, respondents accompanied by preschoolers, pregnant women, and the elderly may be relatively more sensitive to COVID-19 risks and behaviors, but specific details on this were not reflected. In future studies, it would be meaningful to analyze cruise companions by categorizing participants into sub-groups (preschoolers/pregnant women or the elderly/healthy adults) for the purposes of more detailed analysis. Third, there may be a differing degree of influence depending on the level of knowledge and experience of the respondent. Future studies expect to further improve the structural model's fitness by performing a conditioning analysis and dividing the knowledge level into high and low groups.

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