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Does travel desire influence COVID-19 vaccination intentions?

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ABSTRACT

Since the economic recovery heavily depends on the population attaining herd immunity against the virus through the vaccination programme, understanding the factors that improve people's intentions to get vaccinated against COVID-19 is critically important for the hospitality and tourism industry. This research investigates whether travel desire can moderate the relationship between attitude toward COVID-19 vaccines and COVID-19 vaccination intentions. The proposed model was tested utilizing two sets of data collected from a total of 1,341 adults. The results of the study show that subjective norms and perceived risk are strong predictors of attitude toward COVID-19 vaccines. The effects of subjective norms and perceived vaccination risk on COVID-19 vaccination intentions are partially mediated by attitude toward COVID-19 vaccines. The findings show that the higher the travel desire individuals have, the stronger the effects of their attitude toward COVID-19 vaccines on COVID-19 vaccination intentions are.

2019冠状病毒疾病的严重影响, 经济复苏的严重依赖于通过疫苗接种来获得抗病毒的群体免疫, 了解影响人们对COVID-19接种疫苗的因素对于接待和旅游业至关重要. 本研究调查旅游意愿是否能缓和COVID-19疫苗与COVID-19疫苗接种意向之间的关系. 利用从1341名成年人中收集的两组数据对所提出的模型进行了测试. 研究结果表明, 主观规范和感知风险是对COVID-19疫苗态度的有力预测因子. 主观规范和感知接种风险对COVID-19疫苗接种意向的影响部分地通过对COVID-19疫苗的态度介导. 2019冠状病毒疾病2019冠状病毒疾病疫苗接种者的意愿高于对照组, 结果表明, 个体对旅游目的地的期望越高, 其对COVID-19疫苗接种效果的影响越大.

KEYWORDS

Attitude toward COVID-19 vaccines; vaccination intentions; perceived risk; travel desire

Introduction

The COVID-19 pandemic has resulted in a large-scale shutdown of social activities and economies. While the pandemic negatively impacted most industries, the hospitality and tourism industry has been one of the most negatively impacted industries (Gursoy & Chi, 2020). Due to international travel restrictions imposed by many countries, international travel was one of the hardest-hit segments of the industry, as international travel spending

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decreased by an unprecedented 69.4% globally in 2020 compared to 2019 while domestic travel spending declined by 45% worldwide (Word Travel and Tourism Council, 2021). Meanwhile, Business travel was down by 70%, and leisure travel was down by 27% in 2020 compared to 2019 (U.S. Travel Association, 2021).

Travel restrictions, lockdowns and social distancing requirements were some of the main causes of these declines. In addition to these externally imposed restrictions, individuals' level of risk awareness, fear of getting infected with the COVID-19 virus, and travel anxiety had further contributed to this decline. After the approval of COVID-19 vaccines and the following mass vaccination program, expectations of economic recovery have significantly increased (Gursoy & Chi, 2021). As the number of vaccinated people have been increasing, perceived health risks associated with traveling and travel anxiety are decreasing; going back to pre-pandemic levels of activity is a greater possibility (Li & Giabbanelli, 2021). There is therefore, a strong indication that increasing vaccination levels can help the recovery of the tourism industry.

Since the economic recovery heavily depends on the population attaining herd immunity against the virus (greater than 80% adoption) through the vaccination programme (Gursoy & Chi, 2021), understanding the factors that improve people's intentions to get vaccinated against COVID-19 is critically important for the hospitality and tourism industry. This is particularly important since many tourism activities are co-created, delivered and consumed in social settings where other people are also present. Studies that have examined individual and group factors associated with the adoption of voluntary vaccinations identified attitudes, beliefs and norms as critical antecedents of vaccination intentions and behaviors. Another potential factor that can influence vaccination intentions is individuals' desire for travel because research suggests that vaccination is the most effective way of mitigating the negative effects of the pandemic on travel. Millions of travelers had to cancel or postpone their travel plans due to the pandemic, with a significant proportion confined to their homes (Gursoy & Chi, 2021). People are now starting to dream about traveling as the number of cases declines in the U.S. and other countries. Considering the fact that an increasing number of people want to travel once they are able to, these individuals desire for travel may influence their vaccination intention by moderating the relationship between their attitudes toward COVID-19 vaccines and COVID-19 vaccination intentions. Some counties have already reopened their borders to fully vaccinated individuals. Other countries are likely to require travelers to show proof of vaccination in the near future, such as a COVID-19 vaccine passport. Increasing utilization of vaccine passports for international travel as proof of vaccination is likely to increase this effect further.

Thus, the study aims to investigate the critical determinants of individuals' COVID-19 vaccination intentions and whether travel desire can moderate the relationship between attitudes toward COVID-19 vaccines and vaccination intentions building on recent work (Adongo et al., 2021). From a travel point of view, this study contributes to our understanding of the relationship between travel desire and COVID-19 vaccination intentions. This is important because a comprehensive model that can be used to study current COVID-19 vaccination intentions for tourism is limited (Elizabeth et al., 2021). As stated by Habersaat et al. (2020), there is an urgent need for a better understanding of COVID-19 vaccine attitude and the factors that can determine COVID-19 vaccination intentions during the pandemic context. Hence the present study applies a framework that includes perceived vaccine risk and travel desire based on the conceptual premises of the Theory of Reasoned Action (TRA) and Self-Determination Theory (SDT). This study specifically

examines a model based on four health and travel oriented variables: subjective norms, perceived risk, attitude toward COVID-19 vaccines, and travel desire. This contribution is important as it extends the emerging academic discussion on travel desire and COVID-19 vaccination intentions from the disruption of experiences to identify approaches and mechanisms that can encourage the restart of tourism. From a practical perspective, the findings of this study can help to understand potential travelers' concerns about vaccination.

Literature review and conceptual framework

Tourism research has identified the drivers and barriers for travelers to adopt protective actions to minimize health risks using a number of theoretical frameworks. Behavioral approaches such as the Theory of Reasoned Action (TRA) posit that individuals follow a path in which acquisition of knowledge forms intentions which predict subsequent behavior such as vaccine adoption (Fishbein & Ajzen, 1977). According to TRA, subjective norms and attitudes influence this intention because an individual's intention is influenced by their attitudes and the relational pressures they receive from friends, relatives, associates, and society. This is also similar to Protection Motivation Theory (PMT) in which individuals assess the likelihood and impact of potential health threat along with the perceived efficacy of mitigation (Prentice-Dunn & Rogers, 1986). TRA and its subsequent development into the Theory of Planned Behavior (TPB) have been extensively applied to examine not only tourist behaviors (Japutra et al., 2021) but also the adoption of health-related products, services and behaviors, the limitations of these theories have been noted (Japutra & Loureiro, 2020). Positive motivation including desire and avoidance of anticipated regret can predict intention (Conner & Armitage, 1998). Perguini and Bagozzi (2001) criticized the TPB for not considering motivational processes and suggested desire as a critical factor explaining behavioral intention and actual behavior. Furthermore, the nudging approach, which has been applied in tourism to encourage adoption of new behaviors by information cues or financial incentives, suggests that intentional knowledge acquisition is not the only path to forming intention (Jackson, 2016).

In contrast, belief theories tend to explain behavior in terms of underlying beliefs about the nature of the uncertainty (positive or negative risk), personal impact, underlying causes, time and efficacy of the mitigating or corrective action (Leventhal et al., 1992). SDT extends cognition and emotion models to explain goal directed behavior by individuals (Deci & Ryan, 2000). SDT identifies the content of goals which are formulated based individuals' representations of a significant negative risk or positive benefit. The goals formulated as a result of these perceptions can be validated by knowledge acquisition and interaction with others. Representations are also not static and can be shaped by personal experiences, experiences of others, information and misinformation (Leitner et al., 2020). SDT is centrally concerned with self-determined behavior and the social conditions that enhance types of motivations (Ryan & Deci, 2007). Hagger and Chatzisarantis (2009) suggested additional motivational measures (e.g., self-determination) to TPB-based models to increase predictive power of the model. Research in tourism shows the indirect influence of attitudes on behavioral intention through desire (Das & Tiwari, 2020; Meng & Choi, 2016). Hence, this study is considered travel desire as a motivational measure and utilized as a moderator to explain the relationship between attitude toward COVID-19 vaccines and

COVID-19 vaccination intentions. Desire which refers to a motivational state, is defined as "the objectives to be accomplished through behaviour" (Koo et al., 2016, p. 1341). SDT can therefore complement the TRA to provide a conceptual framework that examines the impact of cognitive (perceived risk and subjective norms) and emotional (travel desire) on the intention to adopt a voluntary health protection measure. We omitted perceive behavioral control from the model since longitudinal examination of US residents has suggested that perceived risk, not perceived behavioral control is a stronger predictor of COVID-19 vaccination intentions (Daly & Robinson, 2021). Further some opposition to COVID-19 vaccination specifically has been rooted in identities with historical distrust of institutions who perceive higher risks of adoption and for whom incentive schemes do not improve vaccination intentions (Taber et al., 2021). Under these circumstances, the perceived risk of adoption may be a more useful concept than behavioral control. The next section introduces the research hypotheses and the conceptual framework.

Effects of subjective norms on attitude toward COVID-19 vaccination

Subjective norms are the relational pressures exerted on individuals during the decision-making practice, such as social approval (Ajzen, 1991). Social approval of practices and products from a trusted group can enhance the perceived value of adoption of health behaviors like vaccination. Social approval can also strengthen in-group ties (social, resource or communication bonds) between community members who have adopted a given practice or product, further increasing the perceived value of adoption for members of the group who have not yet done so. For vaccination, national promotion can increase the visibility of vaccine benefits across multiple communities and, thus, acceptance across social groups (Paul & Loer, 2019). If adoption is perceived as a positive social practice by a significant number of community members, it can become a social norm in which the practice is accepted (Silverman & Wiley, 2017). In the case of the COVID-19 vaccines, however, norms are still being established in some regions, and there are social and political movements to challenge vaccination (Bradshaw et al., 2021).

These movements highlight doubts and harmful health outcomes of vaccination in an attempt to create a socially negative image of vaccination (Puri et al., 2020). Outside of political mobilizing, informal knowledge exchange among friends, social media contacts, and community members about vaccination experiences can influence the establishment of social norms. This influence may be based on community members' interactions with the health system infrastructure and personnel or physical side effects from vaccination and can form the basis of positive or negative social norms about vaccination in a given geographical context (Ward & Raude, 2014). Based on the preceding discussion, this study proposes that:

H1: Subjective norms is positively related to attitude toward COVID-19 vaccines.

Effects of perceived risk on attitude toward COVID-19 vaccines

Individuals can vary on their perceptions of the likelihood of catching a disease, the negative physical impact of a given disease, the effectiveness of vaccination, the negative health outcomes from vaccination, and the vaccination programme's effectiveness. In SDT, these perceptions form representations that shape subsequent goals while in TRA, these

perceptions can shape attitude formation which influences subsequent intention. Previous research has suggested that demographic factors such as gender, income and education are associated with risk representations or perceptions that can influence the intention to adopt protective action. Specifically, women, lower-income and educated individuals are more averse to all types of risk and will actively mitigate health risks by voluntary vaccination when they are available (Dohmen et al., 2011). Other research has suggested that the health risk aversion of these individuals is based on a higher perceived likelihood of exposure to communicable diseases such as COVID-19 due to the nature of their employment (Abel et al., 2021). For COVID-19, published statistics indicate that individuals with poor health conditions or older have higher mortality rates (Ghisolfi et al., 2020). Despite these statistics, however, younger people perceive themselves to be at a higher risk of catching COVID-19, possibly due to the nature of their occupations (Schwarzinger et al., 2021).

Ethnic minorities in developed countries have expressed a greater level of concern about side effects that may not have been identified during the evaluation process due to their lack of inclusion in the testing population (Jamison et al., 2019). New medicines such as the COVID-19 vaccine can resurface previous incidents with medications that have not been adequately tested with particular ethnic groups, causing adverse health effects which can increase perceived risk (Motta, 2021). The variations in health care approaches by country, which can include administrative, delivery and vaccine variations, can also increase perceived risks. While some of these variations are due to differing regional health care systems due to geography and institutional arrangements, others cannot be so easily explained and can result in higher perceived risks (Kanitz et al., 2012). Therefore, it is proposed that

H2: Perceived vaccine risk is negatively related to attitude toward COVID-19 vaccines.

Effects of attitude toward COVID-19 vaccines on COVID-19 vaccination intentions

A negative attitude toward vaccine and people's unwillingness to receive the COVID-19 vaccination is a major health concern for handling the current pandemic (Paul et al., 2021). Attitude pertains to a summary of the evaluation of a psychological object. For example, individuals may perceive getting a vaccine as bad/good or risky/safe. According to the TPB, attitude toward behavior determines behavioral intentions (Ajzen & Kruglanski, 2019). Previous research has found that attitude toward vaccination is a good predictor of vaccination intentions (Lehmann et al., 2014: Renner & Reuter, 2012). Xiao and Wong (2020) also support the significance of targeting attitude to increase vaccination intentions. That is, general vaccine attitudes may be needed to be improved in order to increase vaccination intentions (Sherman et al., 2021). Hence, prior studies consistently verified the crucial role of attitude in influencing vaccination intentions.

H3: Attitude toward COVID-19 vaccines is positively related to COVID-19 vaccination intentions.

Moderating effects of travel desire on the relationship between attitude toward COVID-19 vaccines and COVID-19 vaccination intentions

A desire can guide actions and judgments (Japutra et al., 2019). In this study, desire to travel refers to the perceived objective to travel. Prestwich et al. (2006) distinguished desire from intention, such that whilst people's desire (behavioral or goal) reflects what they want to do or to achieve, intention assumes to indicate the particular factors that affect behavior and to reflect how hard they are willing to try to enact a behavior. They further posit that strong desire increases the effect of intention on behavior. McKercher and Du Cros (2003) demonstrated that strong desires for potential travelers in relation to having cultural experiences reinforce them to visit the destination and to learn about its culture and heritage. Within the tourism context, results of Han et al. (2014) indicated that golfer's desires enhance their intention to recommend and further desires partially mediate the impact of attitudes on intention to play screen golf. Japutra et al. (2019) determined that the effect of travelers' attitudes toward destination on behavioral intentions is mediated by travel desires.

SDT suggests that the desire to travel is likely to moderate the effects of attitude toward COVID-19 vaccines on COVID-19 vaccination intentions. Those individuals who want to travel may formulate goals based on their desire to travel and adopt required actions such as vaccination in order to achieve these goals. This may be manifested as an observed willingness to take the vaccine even if their attitudes toward COVID-19 vaccines is lower. This effect is likely to become stronger in the near future as an increasing number of countries require a proof of COVID-19 vaccination, such as COVID-19 vaccine passport, for entry and/or to avoid quarantines and COVID-19 tests. Thus, we expect that desire to travel will strengthen the predictive power of attitude on intention. Hence, we hypothesize the following:

H4: Travel desire moderates the strength of the relationships between attitude toward COVID-19 vaccines and COVID-19 vaccination intentions.

The proposed model is presented in Figure 1. The model proposes that subjective norms (H1), and perceived vaccine risk (H2) directly influence attitude toward COVID-19 vaccines. In turn attitude toward COVID-19 vaccines had a direct impact on COVID-19 vaccination intentions (H3). Travel desires moderates the effect of attitude toward COVID-19 vaccines on COVID-19 vaccination intentions (H4).

Methodology

Measurement items

This research employs two consecutive studies to test the research hypotheses. Study 1 test hypothesis 1 to 3. Study 2 confirms these results with a follow up study and test the moderating effect of travel desire (H4) on the relationship between attitude toward COVID-19 vaccine and COVID-19 vaccination intentions. Data for Study 1 and Study 2 were collected through an online survey. The survey instrument in both studies had two sections. The first section included questions that measured subjective norms, perceived vaccine risk, attitude toward COVID-19 vaccines, and COVID-19 vaccination intentions and travel desire. The second part included socio-demographic questions about the respondents.

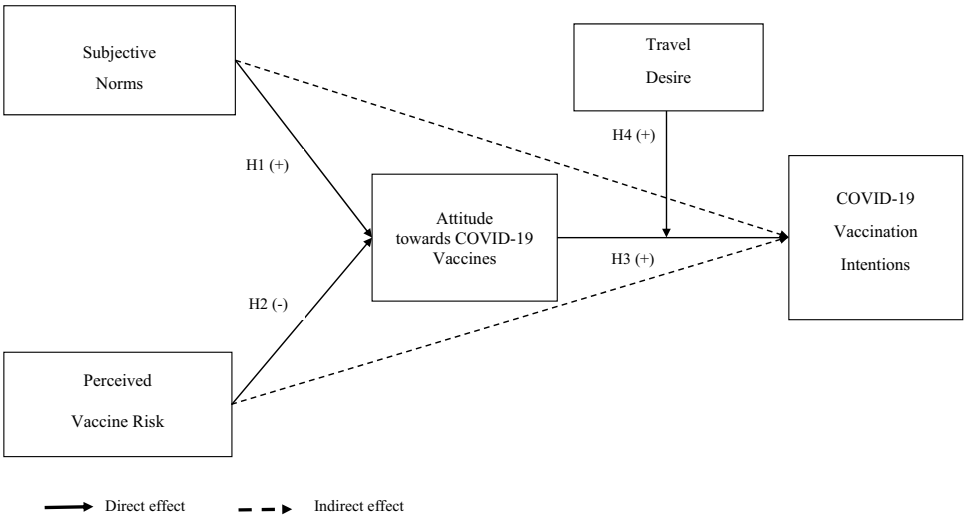

Figure 1. Conceptual framework.

Subjective norms were assessed by 4 items (α = .92) that were modified from Johnson and Ogletree (2017). Attitude toward COVID-19 vaccines was measured using four bipolar semantic differential adjectives (e.g., good/bad, harmful/beneficial) on a 7-point numeric scale (α = .97) adopted from Abhyankar et al. (2008). Four items measured COVID-19 vaccination intentions (α = .97) adopted from previous research (Chen et al., 2021). Perceived vaccine risk was assessed by 4 items (α = .86) modified from Freimuth et al. (2017). Travel desire items were adapted from previous research (Lee et al., 2012). Unless otherwise stated, respondents indicated their choices on a 5-point Likert type scale from (1) being "strongly disagree" to (5) "strongly agree."

Sample and data collection

Data for both studies were collected from individuals who reside in the USA through Amazon Mechanical-Turk (www.mturk.com). To ensure the data quality in the study, three measures were taken. First, respondents were restricted to individuals who are located in the USA. Second, a series of questions were included in the survey questionnaire to ensure the validity of the responses. Third, completion of respondents was examined to ensure that respondents spent adequate time on reading and responding to each item. Responses from individuals who resided in the USA, passed all attention checks and submitted a completed questionnaire within a reasonable time frame were included in the final data sets.

Study 1 results

Data analysis

This study utilized a four-step procedure to examine the proposed hypotheses. Firstly, the distribution of the demographic profile and the distribution of data were investigated to ensure a reliable sampling. Next, the measurement model reliability was tested using Confirmatory Factor Analysis (CFA). Afterward, a covariance-based structural equation

modeling (CB-SEM) was conducted using AMOS 26 software to examine hypotheses 1 to 5 (Hair et al., 2017). Path coefficients were used to test the direct effects of factors (H1 to H4), and the sizes of indirect effects were explored to reveal mediation effects of attitude toward COVID-19 vaccination. Lastly, the moderation effect of travel desire (H4) was investigated using the PROCESS macro model.

The sample

A thousand and eight responses (n = 1008) were collected and utilized in data analysis. Table 1 shows the demographic profile of the participants for Study 1.

The demographic profile (Table 1) indicated that most participants were female (49.4%), single (44.6%), and between 26 and 35 years old (32.8%). Most of them earned a four-year Bachelor's degree (36.9%) and occupied management or professional related jobs (26.4%). In addition, the majority of respondents made annual incomes between $20,000 and $39,999 (20.2%).

Table 1. Study 1: demographic profile of the sample.

		Percentage (n = 1,008)
Gender	Male	48.9
	Female	49.4
	Other	1.7
Marital status	Cohabiting	9.9
	Divorced/ Separated/ Widowed	7.7
	Married	37.7
	Single	44.6
Age	18–25	22.5
	26–35	32.8
	36–45	22.7
	46–55	12.2
	Over 55	9.7
Education	Less than high school OR High school graduate (high school diploma or equivalent including GED)	12.4
	Some college but no degree	19.9
	Associate degree in college (2-year)	10.2
	Bachelor's degree in college (4-year)	36.9
	Master's/Doctoral/Professional (JD, MD) degree	20.5
Annual income	Unemployed	11.8
	Less than $ 19,999	18.8
	$20,000–39,999	20.2
	$40,000–59,999	16.6
	$60,000–79,999	13.6
	$80,000 or more	18.9
Occupation	Construction, extraction, maintenance, farming, fishing, and forestry	3.6
	Frontline essential workers	2.3
	Government	4.8
	Healthcare professional	5.8
	Management, professional, and related	26.4
	Production, transportation, and material moving	4.1
	Retired	2.9
	Sales and office	14.2
	Service	13.3
	Unemployed	22.8

Measurement model assessment

Before hypothesis testing, the distribution of survey items and the attributes of the measurement model need to be investigated to treat statistical biases in data analysis (Hair et al., 2017). The results revealed that all items had skewness and kurtosis values less than 2 (Appendix), indicating a fairly normal-distributed data pattern (Hair et al., 2017). Meanwhile, the results of CFA indicated that all items have factor loadings greater than .70, suggesting the item-level convergent validity. All Average Variance Extracted values (AVEs) were higher than .50, pointing to a convergent validity at the factor level. In addition, all Cronbach's Alphas exceeded .80, demonstrating a measurement item reliability. Table 2 shows correlations, square-root of AVEs to support discriminant validity.

All square-root of AVEs were greater than their corresponding factor correlations, pointing to the discriminant validity of the measurement instrument. Furthermore, the measurement model exhibited acceptable model fit (χ^2 =456.50; df = 125; $p < .05$; NFI = 97; CFI = .98; TLI = .98; RMR = .02; RMSEA = .05). These results suggested that the measurement model was appropriate for measuring latent constructs.

Structural model assessment and hypothesis testing (H1 to H3)

To examine hypotheses 1 to 3, a CB-SEM analysis was conducted. The results revealed that the structural model exhibited an acceptable model fit ($\chi 2 = 584.34$; df = 86; $p < .05$; GFI = .93; AGFI = 90; CFI = .97; TLI = .96; RMR = .07; RMSEA = .07; $R^2_{\text{Attitude}} = .80$; $R^2_{\text{intention}} = .84$). In addition, the results supported all of hypotheses. More specifically, the study found that subjective norms positively predicted attitude toward vaccine ($\beta = .61$, $p < .001$), supporting H1. Perceived vaccine risk negatively related to attitude toward COVID-19 vaccine ($\beta = -.36$, $p < .001$) supporting H2. Attitude toward vaccine significantly related to COVID-19 vaccination intentions ($\beta = .92$, $p < .001$). Thus, H3 was supported.

Post-hoc analysis: the mediating role of attitude toward COVID-19 vaccination

To examine the mediating role of attitude toward COVID-19 vaccination, a CB-SEM analysis was conducted. The results revealed that the structural model exhibited an acceptable model fit ($\chi 2 = 396.15$; df = 84; $p < .05$; GFI = 95; AGFI = 92; CFI = .98; TLI = .98; RMR = .04; RMSEA = .06). The results supported the variables' direct effect on COVID-19 vaccination intentions. Hence the study found that subjective norms positively predicted COVID-19 vaccination intentions ($\beta = .38$, $p < .001$) and perceived vaccine risk negatively

Table 2. Study 1 correlations and square root of AVEs.

Constructs	SN	PVR	TD	A	I
Subjective Norms (SN)	(0.86)				
Perceived Vaccine Risk (PVR)	−.63**	(0.84)			
Travel Desire (TD)	.18**	−.12**	(0.84)		
Attitude toward COVID-19 Vaccines (A)	.79**	−.73**	.13**	(0.93)	
COVID-19 Vaccination Intentions (I)	.83**	−.72**	.17**	.88**	(0.94)

**. Correlation is significant at the 0.01 level (2-tailed). Square-root of AVEs are in bracket.

predicted COVID-19 vaccination intentions (β = −.11, p < .001). Also, significant indirect effects of subjective norm (β = .55, p < .001, 95% CI = .48 to .62) and perceived vaccine risk (β = -.37, p < .001, 95% CI = −.43 to −.30) on intention through attitude were revealed. These results indicated that attitude toward COVID-19 vaccines partially mediates the relationship between subjective norms, perceived vaccine risk and COVID-19 vaccination intentions.

Study 2 results (H4)

Study 1's results show that subjective norms, and perceived vaccine risk significantly affect attitude toward COVID-19 vaccines. Study 2 adds travel desire to the model and tests whether travel desire moderates the relationship between attitude toward COVID-19 vaccines and COVID-19 vaccination intentions.

This study utilized the same procedure that was utilized in study 1 to test the moderating effect of travel desire on the relationship between attitude toward vaccine and COVID-19 vaccination intentions. Firstly, the distribution of the demographic profile and the distribution of data were investigated to ensure a reliable sampling. Of the 320 participants who completed the study two survey, 13.1% of them were from 18 to 24 years, 31.9% from 25 to 36 years, 30.6% from 36 to 45 years, 15% from 46 to 55 years, and 9.4% were from the over 55 age group. 60% of the participants were females, and 39.7% were males. With regards to marital status, 40% of the participants are married, 36.6% are single, 13.1% are cohabiting, and 9.7% are divorced, separated or widowed. In terms of annual net income per year, 20% of them having an annual income level of 20,000–39,999 USD per year, followed by 19,7% of 80,000 USD or over and 19.1% of less than 19,999 USD. Table 3 shows the correlations between measures of the constructs.

The results confirm discriminant validity of the measures. That is there is no high correlations among the measurement of constructs. As expected perceived vaccination risk is negatively correlated with attitude toward COVID-19 vaccines (r = −.06) and COVID-19 vaccination intentions (r = −.55). All other variables are positively correlated with COVID-19 vaccination intentions.

A moderated mediation model (Model 14 of the SPSS PROCESS macro with 5,000 bootstrap samples at 95% CI; Hayes, 2018) tested the effect of travel desire on the relationship between attitude toward vaccine and COVID-19 vaccination intentions. Table 4 presents the resulting coefficients and models' summary.

The results showed that whilst subjective norms and perceived vaccine riks exert a significant influence on COVID-19 vaccination intentions. We conducted PROCESS analyses with the bootstrap method to analyze the mediation effects of attitude toward COVID-19 vaccines on the relationship between subjective norms, perceived vaccine risk,

Table 3. Study 2 correlations.

Constructs	SN	PVR	TD	A	I
Subjective Norms (SN)	1				
Perceived Vaccine Risk (PVR)	−.43**	1			
Travel Desire (TD)	.24**	−.10	1		
Attitude toward COVID-19 Vaccines (A)	.61**	−.06**	.09	1	
COVID-19 Vaccination Intentions (I)	.62**	−.55**	.18**	.80**	1

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4. Model coefficients for the conditional process model.

		Outcomes						
		Attitude toward COVID-19 vaccines (M)				COVID-19 Vaccination Intentions (Y)		
Antecedents		Coeff.	S.E.	P		Coeff.	S.E.	P
Model 1: Effect of Subjective Norms $R^2 = .68$, $F(4,315) = 169.002$, $p < .001$								
Subjective Norms	a	.65	.04	<.001	c′	.20	.04	<.001
Attitude toward COVID-19 Vaccines (Mediator)		-	-	-	b_1	.45	.08	<.001
Travel Desire (Moderator)		-	-	-	b_2	−.11	.07	.11
Attitude x Travel Desire		-	-	-	b_3	.06	.02	.005
Constant	iM	.91	.14	<.001	iY	.19	.25	.44
Model 2: Effect of Perceived Vaccine Risk $R^2 = .66$, $F(4,315) = 153.86$, $p < .001$								
Perceived Vaccine Risk	a	−.76	.05	<.001	c′	−.05	.05	.27
Attitude toward COVID-19 Vaccines		-	-	-	b_1	.53	.09	<.001
Travel Desire		-	-	-	b_2	−.08	.07	.23
Attitude x Travel Desire		-	-	-	b_3	.06	.02	.006
Constant	iM	5.42	.18	<.001	iY	.64	.36	.07

Y: Outcome variable; M: Mediator; a: Effect of X on M; b1: Effect of M on Y; c′: Direct effect of X on Y; b2: Effect of W on Y; b3: Moderated mediation effect of W on the relationship of M and Y. iM, iY = Coefficients for the constant.

and COVID-19 vaccination intentions. The conditional indirect effects of subjective norms and perceived vaccine risk on COVID-19 vaccination intentions through attitude toward vaccine were statistically significant.

Travel desire moderated the effect of attitude toward vaccine on COVID-19 vaccination intentions in Model 1 ($p < .01$) and Model 2 ($p < .01$). These results supported H4, such that the higher travel desire, the higher impact of attitude toward vaccine on COVID-19 vaccination intentions.

Conclusion

The influence of travel desire on vaccination intentions suggests that there may be hesitant vaccine compliers who have low confidence in vaccination but adopt them in order to achieve a given outcome. This phenomenon has been previously identified in parents who, despite their fears, saw vaccination as a social or personal responsibility and ensured that their children were vaccinated (Enkel et al., 2018). This research suggests that interest in travel activity may encourage vaccination adoption despite doubts. Two possible mechanisms exist, regulatory and attitudinal. For hesitant regulatory adoption, destinations' requirement for vaccination, testing and quarantine may encourage otherwise hesitant tourists to become vaccinated. Some countries have recently started requiring proof of COVID-19 vaccination from international travelers to enter the country. It is likely that the number of countries that require proof COVID-19 vaccination passport for entry is likely to increase in the near future. The proof of vaccination requirement such as a COVID-19 vaccination passport can have a significant impact on international travel and traveler's willingness to get vaccinated despite their vaccination beliefs. Beyond regulatory, the pervasive nature of the COVID-19 pandemic has heightened concerns about individual health. Customers who are interested in engaging in social activities may perceive vaccination as a prosocial behavior to protect community members, in a similar manner to hesitant complier parents.

The relationship between vaccine attitudes and vaccination intentions has been extensively covered in existing health research (Chu & Liu, 2021; Fridman et al., 2021; Paul et al., 2021). Using theoretical frameworks drawn from the TRA, TPB and the health belief model, this research has examined the influence of psychological, sociological and situational factors on COVID-19 vaccination intentions. Accordingly, the study extended the TRA model by adding perceived risk in predicting COVID-19 vaccination intentions. Similarly, travel health is an extensively covered domain along with the related dimension of travel vaccination (Adongo et al., 2021). For the latter, research has examined why potential visitors may seek to reduce travel health risk via vaccinations and how perceived health risks may shape destination choice. This research extends both domains further by examining the impact of perceived vaccination risk and travel desire on the adoption of voluntary health behavior (vaccination).

The results of the study found that social norm had a positive impact on attitude toward COVID-19 vaccines and COVID-19 vaccination intentions. Meanwhile, perceived vaccination risk had a negative influence on COVID-19 attitude and vaccination intentions. Hence the findings confirm earlier research on vaccination adoption that identified potential concerns based on the development process and efficacy of the vaccine (Motta, 2021; Xiao & Wong, 2020). These fears seem to have been continuing since a mass distribution program has begun.

The findings of the study indicate that travel desire can encourage COVID-19 vaccination intentions, adding to the body of knowledge on emotional influences on health behavior. While vaccination decision making has been modeled as a rational process, emotional influences such as the desire or craving for travel has now been identified as a moderator of the attitude and behavioral intention relationship. Previous work on tourism during the pandemic has indicated that travel desire or intention to travel has been shaped by the risk perception of destinations (Rastegar et al., 2021). Further, travelers may deploy risk reduction strategies based on the desire to engage in travel for reunion, recreational or religious purposes (Aebli et al., 2021). The findings of this study suggest that travel desire may encourage the adoption of a health protection measure that mitigates these potential risks. This adoption has both an immediate mitigation and an anticipatory effect. In the immediate, short term, it mitigates the risk of domestic tourism activity. For the latter, it can be seen as part of the preparation process for engaging in international travel activity when restrictions are removed. This finding also has the potential public health application into how to travel desire can be used to nudge the adoption of positive health behaviors. Since vaccination is a part of public health activities beyond the immediate pandemic (Khubchandani et al., 2021), these findings can be used to form part of future interventions to avoid vaccine complacency and hesitancy. Finally, the intense media coverage of varying national COVID-19 responses may influence destination perceptions. Emergent destination images may be formed that is influenced by reports of vaccine uptake by region, which may influence future travel intention of potential visitors.

Managerial implications

One of the key conclusions of this study is that social norm can improve COVID-19 vaccination intentions while perceived vaccination risks can reduce COVID-19 vaccination intentions. Government officials and policymakers can utilize these findings to develop suitable communication messages to reduce vaccine hesitancy and improve positive

attitudes toward COVID-19 vaccination (Gursoy et al., 2022). Another implication may be that the government officials should reduce the misinformation about the COVID-19 vaccine (e.g., anti-vaccination attitudes) in order to build public trust in the vaccination programme. As suggested by Xiao and Wong (2020, p. 5132), "despite years of accumulative scientific evidence supporting the effectiveness of vaccination, uptake rates of certain vaccines remain suboptimal or unsatisfactory in many countries." Once the specific causes of COVID-19 vaccine hesitancy are identified, a more targeted communication strategy can be developed for a vaccine-hesitant group to lower their perceived vaccine risk and enhance vaccination intentions and increase herd immunity (Gursoy, Can et al., 2021).

Another important finding of this study is that travel desire moderates the relationship between attitudes toward the COVID-19 vaccine and COVID-19 vaccination intentions. The US COVID-19 vaccination programme has been reaching the saturation point where not all individuals are willing to uptake the vaccine. Therefore, a more creative, persuasive oriented communication strategy is needed to motivate people for increasing vaccine uptake. A new vaccination promotion campaign can include messages about travel desire in order to reduce vaccine anxiety and stimulate a positive attitude toward COVID-19 vaccine intentions.

Limitations

The current research is not without limitations. First, the research sample is limited to U.S. residents. Further research needs to conducted in other countries to assess the validity of the proposed model in this study. Second, a vaccination program was set up for people who are in high risk and age groups. Hence, these groups were not truly represented in the surveys. Furthermore, message frames and appeals, along with information content, have been commonly applied in designing persuasive health messages (Chen et al., 2021; Guenther et al., 2020; Koinig, 2021) and in studies examining tourist behavior (Chi et al., 2021). Future studies may test the proposed model in this study through a longitudinal survey to investigate whether message frames and appeals improve participants' vaccine intention.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Appendix. Descriptive statistics, reliability and factor loadings

Item No.	Item Description	Mean	S.D.	Skewness	Kurtosis	Cron. Alpha	AVE	Factor Loading
Subjective Norms (S.N.)						0.92	0.74	
SN1	Most people who are important to me think that I should get vaccinated against COVID-19 virus.	3.61	1.41	−0.70	−0.81			0.89
SN2	Most of my family members would approve the decision to get vaccinated against COVID-19 virus.	3.79	1.35	−0.85	−0.51			0.81
SN3	It is expected of me to get vaccinated against COVID-19 virus.	3.52	1.42	−0.56	−0.97			0.85
SN4	Most of my friends would like me to get vaccinated against COVID-19 virus.	3.56	1.36	−0.60	−0.7			0.88
Perceived Vaccine Risk (PVR)								
R1	To what extend do you think that the COVID-19 vaccine will have harm on your health?	2.62	1.27	0.33	−0.90	0.88	0.72	0.91

(*Continued*)

Item No.	Item Description	Mean	S.D.	Skewness	Kurtosis	Cron. Alpha	AVE	Factor Loading
R2	How worried are you about the negative effect of the COVID-19 vaccine on your health?	3.00	1.47	0.00	−1.39			0.83
R3	How likely is that you would regret if you did get the COVID-19 vaccine?	2.61	1.43	0.37	−1.18			0.79
Travel Desire (TD)						0.96	0.87	
T1	I want to travel in the next 12 months.	3.91	1.31	−1.07	−0.03			0.94
T2	I wish to travel different places in the next 12 months.	3.87	1.31	−1.01	−0.15			0.94
T3	I am eager to go on vacation in the next 12 months.	3.76	1.35	−0.89	−0.42			0.91
T4	I wish to visit places in different states in the next 12 months.	3.87	1.32	−1.05	−0.09			0.91
Attitude Toward Vaccines (A)						0.97	0.88	
A1	Bad – Good	3.83	1.34	−0.84	−0.53			0.94
A2	Harmful – Beneficial	3.81	1.37	−0.85	−0.57			0.94
A3	Foolish – Wise	3.82	1.32	−0.83	−0.42			0.93
A4	Threatening – Assuring	3.74	1.35	−0.74	−0.67			0.92
COVID-19 Vaccination Intentions (I)						0.97	0.89	
I1	How likely you will get the vaccine?	3.52	1.586	−0.584	−1.265			0.93
I2	How likely you will recommend getting vaccinated to someone who seeks your advice?	3.54	1.500	−0.601	−1.081			0.94
I3	How likely you will encourage your friends and relatives to get vaccinated?	3.45	1.542	−0.492	−1.253			0.94
I4	How likely you will say positive things about getting vaccinated?	3.47	1.464	−0.548	−1.062			0.95

Measurement model fit statistics: $\chi 2$ =336.12; df = 171; RMSEA = 0.03; CFI = 0.99; TLI = 0.99; SRMR = 0.0.