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Application of the Health Belief Model to Explain Public Perceptions, Travel Intentions and Actions during COVID-19: A sequential transformative design

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Abstract

Purpose

This paper uses a supplemented Health Belief Model (HBM) to explain the risk perception of COVID-19 coronavirus inflection by potential and actual domestic and international travellers (from mostly European countries) in the early, pre-vaccine phase of the pandemic, and its influence on their travel intentions, decisions and actions. With a health crisis of this magnitude, it is important to understand the effect of COVID-associated containment measures and safety industry strategies in abating public fear and apprehension associated with non-essential travel.

Methodology

We used a sequential transformative design consisting of a (QUAN + Qual) survey to explore the HBM dimensions. The questions in the quantitative part of the survey disseminated online examine perceptions of the severity and susceptibility of the disease, travel risks, and willingness to travel. The questions in the qualitative face-to-face survey examine how international/cross border travellers (from Spain and Germany) perceive the benefits and barriers of personal protective behaviour, and the potential influence of cues to action.

Findings

Results suggest that despite potential fear arousal and confusion associated with this infectious disease, people were willing to travel during periodic on-and-off travel restrictions and perceive the benefits of such travel as outweighing barriers like wearing masks, social distancing and other containment measures.

Implications

Our conceptual model enabled the capture of real-time traveller's feelings about the benefits of travelling in the presence of the coronavirus and their perceptions of COVID safety strategies used at destinations. Our study adds to the lack of existing knowledge about potential psychological factors that can influence travel decisions and behaviour, including self-protective behaviour. As borders reopen and we progress towards tourism and hospitality recovery, the results of this study can assist organizations, including health officials and governments, by reminding them of the likelihood of residual public fear when planning their COVID safety strategies.

Originality

Given the scarcity of COVID-19 research on people's travel intentions and behaviour following periods of social isolation due to lockdowns and border closures, this study captures sample public perceptions at two stages early in the pandemic. It is the first to apply all of the HBM dimensions with the addition of travel risk as a construct to investigate people's travel intentions and behaviours, without vaccinations or treatments, and to include cues to action in the investigation.

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Keywords

Health belief model, COVID-19 pandemic, perceived health threat, perceived travel risk, containment measures, willingness to travel.

1. Introduction

In January 2021, almost a year since the first officially diagnosed COVID-19 coronavirus case, the world recorded 100 million cases (Johns Hopkins University, 2021). As at the time of writing, despite the rollout of several vaccines in 179 countries and territories, there have been over 4 million COVID-19 deaths. Staggering as those numbers are, the true extent of coronavirus cases is unclear. Most countries have implemented public health containment measures to reduce the spread of the virus and its associated disease burden on health care systems. These measures and restrictions, while providing varying levels of protection, have dramatically affected travel and tourism, individuals and communities (UNWTO, 2021). Social-isolation and distancing, border closures and travel restrictions, are some of the most exacting on our economic, social, and psychological wellbeing (Holmes et al., 2020). Psychologically, lengthy restrictions on mobility and socializing can lead to heightened states of loneliness, fear, anxiety, panic, and depression (e.g. Black Dog Institute, 2020; Lau et al., 2008).

Since 2000, research of epidemic diseases and health-related crisis management in tourism has surged (e.g., for SARS, Kuo et al., 2008; for Ebola, Novelli et al., 2018). Studies found that government policies and interventions (e.g. Joo et al., 2019, Wan, 2013) can help post-disaster economic recovery. However, due to its global expanse, duration and tendency to mutate, COVID-19 has led to more extreme containment measures than those implemented in previous disease outbreaks (Fein, 2021). With mounting debate as to their effectiveness (e.g. Guy et al., 2021, van den Berg et al., 2021) public confusion and fear has understandably followed. As many countries face repeated waves of infection, early predictions are of pervasive and detrimental psychological impacts now, and in the future (e.g. Holmes et al., 2020). Meanwhile, vaccine hesitancy and public pushback against containment measures are becoming widespread (e.g., Centers for Disease Control and Prevention, 2021). A crucial question for tourism is how these side-and-after effects of the disease will influence people's travel perceptions, decisions, and actions, notably during future periodic on-and-off travel restrictions (Mukhtar, 2020).

As countries reopen their borders and relax containment measures, many are ready and willing to travel, and some do (Lamb et al., 2020) while others are more hesitant. To revive the tourism industry in the presence of successive waves of the pandemic, policy makers must consider how best to balance public health interests and business economic interests. Less understood is the role of social containment measures and COVID-19 safe tourism and hospitality industry plans (based on operational risk management) in abating fears and apprehensions associated with non-essential travel and destinations. As Zheng et al. (2021) (p.2) note, understanding people's pandemic 'travel fear' is an essential factor.

Research of tourism recovery following outbreaks of coronaviruses largely concern experiences of Asian and Middle Eastern countries. The relationship between peoples' health beliefs, perceptions of travel risks and self-protective behaviours in the early phase of a global pandemic is

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absent from the tourism literature. At the time of this study, Europe was becoming the epicentre for COVID-19 (Hoecklin and Hacker, 2020). It provided an important baseline of how people and governments were reacting to the emergence of a deadly virus with only non-pharmaceutical interventions available.

The Health Belief Model (HBM) provides a useful theoretical framework to explain public perceptions and personal protective behaviours. Tourism travel research has used the model since 2015 (Ban and Kim, 2020; Chaulagain et al., 2020; Donohoe et al., 2015). This study used a supplemented HBM to explore whether individuals are likely to engage in travel during the COVID-19 pandemic, and if so, their perception of containment measures and personal protective behaviour.

This is a new application of the HBM dimensions, since all participants had experienced the physical and psychological effects of containment measures. Previous studies have not considered this complex proposition in the context of non-compulsory travel during a highly contagious pandemic. Typically, the HBM is used to explain health-protective behaviour (e.g., stop smoking) rather than risky behaviour (travel), which overlooks the potential benefits of travel. Travel and tourism offer distractions from the fears, stressors, and pressures of life in a COVID-19 world. These are important influences on continued mental health and well-being (Bloom et al., 2017; Chen and Petrick, 2013), including for young people and those in high risk groups (Jia et al., 2020).

To profile potential travellers and capture their perceptions, we used a transformative sequential design (QUAN + qual) that began with an online survey swapping websites during the first wave of lockdowns and social restrictions in most countries. Then, during a temporary re-opening of borders and relaxation of travel restrictions between Spain and Germany, we used semi-structured interviews with a small sample of travellers. The survey and interviews occurred prior to the roll out of vaccines in 2021. This approach is novel and the study falls within “Changes in Tourist Behaviour”, one of six areas identified by Zenker and Kock (2020) as lacking in COVID-19 research. The findings add to an emerging body of knowledge concerning people’s perceptions of infection risk, containment measures, and COVID-safe strategies on travel intentions, decisions and behaviours. Such understanding is essential to tourism and hospitality recovery campaigns.

2. Literature Review

2.1 Theoretical framework - Health Belief Model (HBM)

The HBM emerged in the USA in the 1960s as a means of explaining the limited participation in public health service programs in response to disease risks (Rosenstock, 1960). To predict people’s likely action to avoid or mitigate health-related risks, the HBM relied on three key beliefs. These beliefs are that individuals perceive themselves as *susceptible* to a condition with potentially *severe* consequences (i.e., perceived threats energise action), there is *beneficial* action available to them that can reduce either of these threats, and the benefits of taking action outweigh implied barriers to action (e. g. Rosenstock et al., 1988). Other variables include demographic data and cues to action (Rosenstock, 1974: p.333). Cues are the various stimuli that can “trigger action in an individual who is psychologically ready to act” (Rosenstock, 1974: p.333). Cues presumably vary in intensity depending on perceived threats of a disease, but their actual role lacks research (p.332). In the COVID-19 context, social-distancing floor markers or window stickers and hand sanitizer stations at entrances are all likely to act as cues to self-protective action. To improve understanding of health related

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behaviour, *perceived self-efficacy* (expectations about self-competence to act or behave as needed to influence outcomes) was later added to the HBM (Rosenstock et al., 1988: p.182).

Tourism studies that rely on the HBM to explain actions taken by tourists to avoid contracting a disease (Donohoe et al., 2015) or to explain travel avoidance during a disease outbreak (Cahyanto et al., 2016) use a reduced HBM. For instance, they do not include the benefits, barriers and cues to action constructs. Cahyanto et al. (2016) added travel risk as a new construct to explore domestic travel avoidance as health protective behaviour. Zheng et al. (2021) used protection motivation theory to explore travel fear associated with COVID-19 and people's self-protective behaviours, but without considering travel options (e.g. domestic, international) or cues to action.

Our application of the HBM is novel since it includes all of the constructs. Additionally, cues to action and travel risk are included in our conceptual model; and as shown in figure 1, since all forms of travel during the pandemic carry significant health risks, we explored domestic (within the home country) and international (outside the home country) travel intention.

Figure 1 - Conceptual model here

2.2 Conceptual model

2.2.1 Individual beliefs (perceived susceptibility, severity, self-efficacy) and willingness to travel

Studies that have applied the HBM to explain travel during earlier pandemics are scarce. We found only one study (Cahyanto et al., 2016). It suggests a positive relationship exists between travel avoidance and both perceived susceptibility and self-efficacy, but not severity. These findings were inconsistent with earlier research findings based on other measures of perceived susceptibility and travel. For example, Yanni et al. (2010) surveyed passengers traveling to Asia in the wake of the Avian-flu outbreak. They found that while over half (65%) thought they might be susceptible to catching influenza, most (75%) travelled anyway believing they would not catch it travelling. Rudisill (2013) researched how optimism influences decisions to undertake health-protective behaviour against contracting H1N1. The study found that while most people (85%) would likely engage in avoidance behaviour, they would not avoid air travel. These studies indicate an inverse relationship between susceptibility and behavioural change suggesting that susceptibility will not stop people from travelling. Other motivations (e.g., perceived mental wellbeing benefits) might also explain travel during a pandemic. Therefore, we propose:

H1a: Perceived susceptibility will not influence willingness to travel domestically.

H1b: Perceived susceptibility will not influence willingness to travel internationally.

A recent study by Eichenberg et al. (2021) analysed the importance of the HBM, personality traits and the likeliness to stick to protective measures imposed by the government during the COVID-19 pandemic. Their study states that people who perceive COVID-19 as severe and are highly susceptible will strictly adhere to government measures and value them as beneficial to prevent contagion with the virus. In our study context, this would likely lead to lower willingness to travel. As found in a related study by Chong et al. (2020), illness perception of COVID-19 can significantly influence adherence to government prescribed measures (in this case, not travelling).

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We propose:

H2a: Perceived severity will decrease willingness to travel domestically.

H2b: Perceived severity will decrease willingness to travel internationally.

Three COVID-19 studies touch upon the concept of self-efficacy. Fong et al. (2020) relate self-efficacy with government-efficacy. Their study showed Macau residents anticipated quick tourism recovery based on beliefs that their government responded efficaciously and they themselves were efficacious in avoiding contagion. Chong et al. (2020) explain that self-efficacy influences adherence to protective measures (limiting unnecessary travel, hand washing). Zheng et al. (2021) show that people who consider themselves self-efficacious will experience reduced travel fear and are motivated to protect themselves during travel. These studies confirm earlier research that stipulates a positive relationship between self-efficacy and individual self-protection during travel (e. g. Anderson et al., 2020, Wang et al., 2019). Therefore, we propose:

H3a: Perceived self-efficacy will increase willingness to travel domestically.

H3b: Perceived self-efficacy will increase willingness to travel internationally.

2.2.2 Perceived travel risk and willingness to travel

Perceived travel risk and willingness to travel have not been widely researched using the HBM. Studies have found that perceptions of health risks are higher when associated with international travel (Reisinger and Mavondo, 2005), and travellers will avoid destinations they consider risky (Law, 2006). Cahyanto et al. (2016) found this to be the case in the context of contagious diseases. Hotle et al., 2020 researched local travel (to attend health checks, run errands, and go out) during influenza season. They found that while men are more likely to travel than women, higher risk perception led to travel avoidance. We propose that:

H4a: Perceived travel risk will decrease willingness to travel domestically.

H4b: Perceived travel risk will decrease willingness to travel internationally.

2.2.3 Structural variables and willingness to travel

The HBM allows for a range of structural variables as modifiers. Since COVID-19 is unprecedented in scope, this study is the first to use three modifiers, including knowledge of the disease, contact with the disease, and past travel experience to explore whether these will moderate the relationship between individual beliefs and willingness to travel (see figure 1).

With the exception of Ban and Kim's (2020) study, tourism studies have not modelled structural variables as modifiers in previous HBM research. Public health research has recognized the moderating role of disease knowledge on the relationship between the risk of failing to adopt self-protective behaviours and pessimistic illness expectation (e.g. Miller et al., 2021). This suggests that the greater the knowledge of the disease the weaker the relationship between pessimistic illness expectations and self-protective behaviours. Also, the moderating role of contact with the disease (sickness) has been shown to influence the relationship between fear of COVID-19 and increased stress, anxiety and depression (Koçak et al., 2021). We therefore propose:

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H5: Knowledge of the disease will moderate the relationship between individual beliefs (cf. figure 1) and willingness to travel such that the relationship will be stronger for those who have stronger beliefs.

H6: Contact with the disease will moderate the relationship between individual beliefs and willingness to travel such that the relationship will be weaker for those who were exposed to the disease.

Neuburger and Egger, 2021 look at the importance of past travel experience, travel risk and willingness to travel during a pandemic. They identify clusters of people, characterised by travel experience, who are willing to travel despite the health risk. As shown in other research, past travel experience can influence health risk perception. Rittichainuwat and Chakraborty (2009) compared travel risk perceptions of first time and repeat travellers during the H1N1 bird flu and the SARS outbreak. They found that perceived susceptibility to health risks was higher in first-time travellers than in frequent travellers; hence, they are more likely to refrain from traveling. We propose:

H7: Past travel experience will moderate the relationship between individual beliefs (cf. figure 1) and willingness to travel so that relationship will be stronger for experienced travellers.

2.2.4 Socio-demographic variables and willingness to travel

Socio-demographic variables (gender, age, education) are often analysed in different travel contexts, including in the presence of COVID-19. Graham et al. (2020) detect an ongoing willingness by ageing passengers to travel by air provided certain safety requirements are met. Kim and Kang (2021) explore the relationship between sociodemographic characteristics and leisure activities that involve crowding (including tourism). They found age (younger participants are more aware of dangerous situations) and gender (women are more aware of dangerously crowded situations) to be influential.

A study by Liu-Lastres et al. (2021) on the willingness of business women to travel during the pandemic, found that this is not a homogenous group, since age and education better explained their willingness to travel. Peluso and Pichierri (2020) tested whether socio-demographic variables influence the intention of Italians to go on vacation. They found age and health status were significant influences on vacation intention. Based on these findings, we propose that:

H8: Socio-demographic characteristics moderate the relationship between individual beliefs and willingness to travel.

2.2.5 Perceived benefits, perceived barriers, and willingness to travel

Five research studies that employ the HBM in the tourism context deal with the perceived benefits and barriers constructs differently. Some left them out altogether (Bae and Chang, 2020, Cahyanto et al., 2016). Others combined the HBM with the Theory of Planned Behaviour, which includes attitudes towards a preventive behaviour (Chaulagain et al., 2020; Huang et al., 2020). These studies suggest perceived benefits and barriers influence attitude but not willingness to travel. Ban and Kim's (2020) medical tourism study of cancer patients used a questionnaire to measure perceived benefits and barriers to travelling to Korea and found that the constructs significantly influenced decisions.

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To address gaps in previous studies, our study considers perceived benefits and barriers, as well as cues to action. With a qualitative survey, deeper understanding of the underlying motivations of travellers can develop. The COVID-19 health crisis is of such a magnitude, that it has led to predictions of significant short and long-term negative impacts on people's mental health and wellbeing. Consequently, it is important to consider the psychological factors that could influence travel intentions and behaviour. Our study focused on capturing travellers' perceptions of COVID-related risk management measures at their destinations in order to answer the following research questions:

RQ1: How do cues to action affect willingness to travel?

RQ2: How do perceived benefits and barriers influence willingness to travel?

3. Methodology

3.1 Research design

A sequential-transformative design, where the core component is quantitative and the supplemental component is qualitative was used for the present study (Creswell and Plano Clark, 2011). The authors chose the design to meet the study's main objective of expanding understanding of the consequences of an ongoing global disease crisis on people's travel attitudes and behaviour. It allowed for the better understanding of perceptions of COVID-19 infection risk, in real-time, including the benefits, barriers and cues to action associated with travel and risk management measures. The design also lowers methodological/instrument bias (Creswell and Plano Clark, 2011).

The quantitative survey was conducted during the first wave of border closures, lockdowns and social restrictions, and the qualitative survey when these restrictions were relaxed. Existing scales were adapted for the quantitative survey, and semi-structured interviews were used in the qualitative survey.

3.2 Methods for quantitative approach

3.2.1 Development of research instruments

5-point Likert scales (1 – strongly disagree; 5 – strongly agree) were employed to measure the items comprising the research instrument. The first section of the quantitative survey asked about perceived domestic and perceived international travel risk. Eight items measured on a 5-point Likert-scale (1-strongly disagree; 5-strongly disagree) adapted from Cahyanto et al. (2016) comprised this section of the questionnaire. The second section was comprised of two items designed to measure intentions to travel domestically and internationally in the next 12 months measured with two items adapted from Floyd et al. (2004). The third section measured perceived severity of the disease with four items adapted from Cahyanto et al. (2016). The fourth and final section of the questionnaire included socio-demographic characteristics such as gender, generational cohort, education, and nationality.

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3.2.2 Data collection and procedure

The target population for this study are travellers of at least 18 years of age. The online survey was distributed in English internationally via different survey sampling engines (e.g. Surveycircle, Amazon MTurk) with Survey Monkey between April and August 2020. We collected a total of 605 usable questionnaires from more than 20 different countries. Incomplete questionnaires were deleted. Our conceptual model tested seven latent variables (self-efficacy, perceived susceptibility, perceived severity, domestic travel risk, international travel risk, willingness to travel domestically, and willingness to travel internationally) and 20 indicators. The proportion of indictors (r) to latent variables is 3.33:1. The modest sample size is consistent with Boomsma's (1982) minimum sample size recommendation (n = 200) for a proportion of 3:1 (r = 3).

3.2.3 Data analysis

Descriptive statistical analyses included an assessment of skewness and kurtosis. Applying the < -1 and > + 1 threshold affirmed that the dataset is asymmetrically distributed. Since PLS-SEM is more appropriate for non-normally distributed data (Esposito Vinzi, 2010), it was employed to test the HBM. Due to a lack of goodness-of-fit in PLS-SEM, the confirmatory factor analysis in AMOS 26 was used to assess how well the model fits the dataset.

3.3 Methods for qualitative approach

To better understand the results of the quantitative study and explore the perceptions and motivations of mostly European travellers in greater depth, we used a holistic approach and conducted 20 face-to-face interviews with tourists (Taylor and Bogdan, 1996). The interviews were conducted in Spain and Germany, during relaxed COVID-19 travel restrictions in August and September 2020, with an approximate duration of between 12 and 20 minutes. Tourists were randomly chosen via street interception. The answers were mechanically recorded using a voice recorder. We chose Germany and Spain as these countries signed a safe travel agreement shortly after the first lockdown (Neuroth, 2020). For consistency, only travellers who met the quantitative survey's dominant sample profile were included in this study, with the addition that they had travelled since July 2020. The pool of available interviewees was limited due to the prevailing and unique circumstances of the pandemic.

To ensure internal validity, the recordings were re-checked with the participants so that they could correct errors and expand the information. At the same time, external validity was ensured through a description of the place and the characteristics of the people where the study was carried out. In this case, the degree of transferability in similar destinations and circumstances is high. On the other hand, reliability was achieved by triangulation of researchers.

The semi-structured interview instrument contains 7 questions (3 closed and 4 open). The closed questions collected data on the tourists' profile. The open questions collected data on their perceptions about benefits and barriers of travel, including self-protective measures, and cues to action. The audio files obtained from the interviews were transcribed analysed and coded using NVIVO, 12.0.

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The 20 interviews were divided into 99 separated meaning units or references and assigned to one of 4 nodes previously defined by the researchers to fit the study design and the analysis of the problem. These 4 nodes corresponded to the main topics covered by the open-ended questions

Table I here

Each node was analysed by describing the three most cited words (keywords) within the references that had been assigned to the given node. The coding scheme of the keywords in each node or category serves as a tool for analysing the narratives. As an indicator, the keyword depth was calculated after dividing the absolute frequency of the given word by the total number of words in the node. The core sentences of each node were also selected, i.e., those that specifically include the keywords and are fundamental to understand the perception and motivation of the travellers.

4. Results

4.1 Results of quantitative survey

4.1.1 Sample profiling

The sample is comprised of mostly female (60.6%), Millennial (born between 1981 and 1999) (67.1%), university educated individuals (85.5%) of various nationalities. Most participants were from European countries, that is, 35.7% were German, 24.5% Spanish, 4.8% Turkish, 3.8% Dutch and 1.8% Austrian. The remaining participants were of other nationalities.

4.1.2 Descriptive statistics and measurements

Table II presents data on mean scores and standard deviations of the constructs, items, and variables. Scores are based on a 5-point Likert scale. The results show that for perceived international travel risk, willingness to travel domestically, self-efficacy and past travel, the data are not normally distributed. For perceived domestic travel risk, willingness to travel internationally, perceived severity and perceived susceptibility, skewness and kurtosis tests point to a normal distribution of the data.

Table II here

4.1.3 Common method Variance

In line with past studies, common method variance (CMV) was evaluated by examining the correlation matrix. As can be observed from table III, all values are below the 0.9 cut-off suggested by Park and Tussyadiah (2017). Furthermore, Harman's single-factor was used to assess CMV. The assessment involves the inspection of the variance explained by the first factor. The first factor accounted for 24% of the variance and hence falling below the 50%cut-off (Dayour et al., 2019). Consequently, the results provide further confirmation to the lack of CMV.

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4.1.4 Validation of the conceptual model using CFA

Prior to running an analysis to assess the fit of the proposed model, all relevant items were reversed-scored. Using AMOS 26, we employed structural equation modelling (SEM) to test the fit of the Conceptual Model. Data screening procedures were conducted to check for missing values in the data. Likewise, deletion of missing values was employed. We omitted from analysis items with loadings below the recommended 0.5 cut-off in the structured model (Filieri et al., 2015). Two items were dropped from the domestic travel risk construct (DTR2 & DTR 3) due to falling below the 0.5 threshold. As shown in Table III, all items loaded significantly on their respective constructs ($p < 0.001$). Furthermore, with the exception of one item (PS3) all factor loadings ranged from 0.6 – 0.9 suggesting unidimensionality. Convergent validity was assessed by inspecting composite reliability values employing AMOS 26 and AVE using SPSS 25.

Table III here

Internal consistency was examined by assessing Cronbach's α and construct reliability values. Cronbach's α values were at or above the 0.7 cut-off recommended by Fornell and Larcker (1981) (see Table IV). The composite reliability values of all latent variables were at or above the recommended threshold of 0.6 (Fornell, 1992) (see Table IV). Consistent with Fornell and Larcker (1981) discriminant validity was estimated by assessing AVE. AVE scores of all constructs included in the HBM are above the 0.5 cut-off recommended by Fornell and Larcker (1981). The square root of AVE (shown diagonally in italics in Table IV) is higher than the inter-correlations between the constructs comprising the Conceptual Model.

Table IV here

4.1.5 Assessing the quality of the model

SEM in AMOS 26 was used to assess the fit of the Conceptual Model. In all, 20 observed items are retained in the HBM. The cut-off sets recommended for latent factor models having between 12 and 30 observed items are at least 0.92 for the comparative fit index (CFI) and no more than 0.07 for the root mean-squared error of approximation (RMSEA) (Hair, 2006). Hence, the results of the HBM point to an adequate fit ($\chi^2 = 265.187$, df = 100, p = 0.00, CFI = 0.95, RMSEA = 0.05).

The HBM accounts for 25% in intentions to travel internationally, and 13.5% in the desire to travel domestically. Bootstrapping using a sample of 5000 was performed to calculate the t-statistic and strength of the relationships between the endogenous and exogenous constructs in the HBM (Hair et al., 2017). For the analysis of H1a and H1b the data suggests that perceived susceptibility is significantly associated with domestic travel ($\beta = 0.08$, $t = 2.010$, $p < 0.001$) but not international travel ($\beta = 0.06$, $t = 1.725$, $p > 0.05$). According to H2a negative and significant relationship is observed between perceived severity and domestic travel ($\beta = -0.13$, $t = 2.861$, $p < 0.001$). A similar relationship is observed between perceived severity and international travel (H2b, $\beta = -0.09$, $t = 2.492$, $p < 0.001$). Next, we evaluated the relationship between self-efficacy and domestic/international travel (H3a and b) which returned no relation. For H4a and b we observed a negative and significant association between perceived domestic travel risk and domestic travel ($\beta = -0.22$, $t = 4.208$, $p < 0.001$). Similarly, the data suggests that perceived international travel risk is negatively associated with international travel ($\beta = -0.20$, $t = 4.485$, $p < 0.001$). We also assessed whether any of the structural variables postulated in H5-H7 (past travel experience, knowledge of

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the disease, contact with the disease) included in the study and demographic variables stated in H8 (gender, age cohort, and education) moderate or mediate any of the relationships tested. Only gender moderates the relationship between international travel risk and international travel (β = 0.08, t = 2.559, p < 0.001), showing a stronger correlation among males (r = -0.45) than females (r = -0.32). Finally, we examined mediation effects. When an arrow was drawn directly between perceived susceptibility and international travel, no statistically significant relationship was observed (β = 0.06, t = 1.631, p > 0.05). This changed to a full mediation effect when past travel (H7) was employed: β = .03 (95% Bias-corrected CI: 0.00).

Perceived severity is directly associated with international travel (β = -0.09, t = 2.446, p < 0.05). When past travel was defined as a mediating variable in the relationship between perceived severity and international travel, the indirect relationship was significant but the correlation coefficient is lower than that observed in the direct relationship. Thus, it only points to partial mediation for international travel: β = -.03 (95% Bias-corrected CI: 0.05) and domestic travel: β = .03 (95% Bias-corrected CI: 0.05). However, past travel does not mediate the relationship between perceived susceptibility and domestic travel. To assess the predictive relevance of the PLS path model, Stone Geisser's Q^2 was estimated (Hair et al., 2017). Using the blindfolding technique, estimates were employed to supplant actual data points recursively at an omission distance of 7 (the default omission distance in SmartPLS). The analysis results corroborate the predictive relevance of the model for all the variables in the HBM (see Table V and figure 2).

Table V here

Figure 2 - Empirical Model here.

4.2 Results of qualitative study

When asked about perceived barriers (self-protective measures to prevent infection), all but one participant stated that they used facemasks, even if it was not a requirement. Over half of the participants (11) said they also carry hand sanitizer gel, three said they washed their hands more often, and two used disinfectant spray to clean surfaces. Importantly, most (15) adopted social distancing measures and (13) said they took additional safety measures beyond those required at their travel destination. For instance, eleven said they "tried to maintain safety distances" or "to avoid crowds"; three said they "stayed outdoors in restaurants"; four mentioned the "use of a private car, when possible" or "avoid public transport"; and two mentioned the "use of gloves". Those that only adopted compulsory measures gave the following explanations, "I think the measures are enough"; "I don't know any others"; "I did what made me feel more secure"; or "I trust the German government". All of the responses indicated a perception that the safety measures taken were effective and not barriers to travel.

To detect the perceived benefits of travelling during the pandemic, we asked participants why they travelled. Each gave a variety of reasons, but the most repeated responses were "holidays", "leisure", or "disconnection". This suggests that leisure travel remains strong during a disease crisis. Some participants mentioned economic or education factors. For instance, three mentioned "it was cheap", one said travelling is good for the country and its economy, and two travelled to pursue their university studies. Other reasons for travel included going to places where the pandemic "was not very bad at that moment" or "there were less tourists on beaches". These responses suggest potential residual fear of the disease persisted despite relaxed travel and social restrictions. Notwithstanding, it appears that at the time the benefits of leisure travel, including potential

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psychological wellbeing, took precedence over any perceived health threats or travel risks. The COVID safety measures appear to have played a significant role in reassuring them. Importantly, since they had engaged in travel, it is evident that they perceived the psychological benefits of non-essential travel (following periods of social isolation and mobility restrictions) as outweighing perceived burdens of having to adhere to travel safety measures or engaging in health-protective behaviour (RQ 2).

When asked about cues to action (e.g. how they stayed informed about COVID-19 while travelling, RQ1), all of the participants said they kept "more or less informed" through various sources. Most (18) mentioned using radio or television news media, and two relied on "family and friends" to keep informed. Also five mentioned the Internet ("news and coronavirus websites"), four used social networks and four said they were "informed by the airlines". Only one person stayed actively informed "all the time" by checking regularly each country's coronavirus webpage, suggestive of a heightened sense of apprehension but also confidence in sourcing relevant information about COVID risks.

Finally, when asked what would make them feel more secure while travelling, most participants (17) indicated a desire for an increase in existing safety measures, "I would feel more confident with border control tests…", "Destinations should have stricter requirements before travelling…". Only three participants were satisfied with existing measures. These responses strongly suggest that most participants felt the containment measures present during their travel and at their destinations were sufficient to reassure them, despite any perceived threats of the disease. It confirms that organizations that adopt higher levels of COVID safety measures are more likely to encourage these types of visitors.

5. Discussions, conclusions, implications and future research

5.1 Discussions

The purpose of this paper is to add to an emerging body of knowledge about the effects of a novel infectious disease, extreme containment measures, and self-protective hygiene strategies on people's travel intentions, decisions and actions, specifically at an early stage of the COVID-19 pandemic. We used a supplemented HBM to consider the perceptions of people in mostly European countries, in the early or 'first wave' of COVID-19, of their susceptibility to the disease, its severity, and associated travel risks (includes destination risks). Overall, we found the following constructs had no explanatory power: self-efficacy, demographics (except gender, H5) and structural variables (except past travel experience, H6).

Our findings indicate that perceived severity and perceived susceptibility elicited different responses with regard to international and domestic travel. Whereas domestic travel was perceived as acceptable under pandemic conditions, international travel was not. Expanding the study to include travel intentions for both categories is novel. Previous research focused on either domestic or international travel but not both. More specifically, the findings of the quantitative study indicate that while most of the sample, which was comprised of Millennials, perceived themselves as susceptible to contracting the virus, they did not consider it a severe health threat. Generally, they did not appear to consider travel as being overly risky. Early predictions that younger people were less vulnerable to

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severe reactions to COVID-19, or will recover faster if infected (Köppe, 2020), may have influenced these perceptions.

The results indicate that perceived susceptibility increases willingness to travel domestically, but not internationally (H1a/b). Given the uncertainties associated with the disease, this finding is unsurprising and in line with earlier studies by Yanni et al. (2010) and Rudisill (2013). People are likely to feel safer travelling domestically, and many governments suggest citizens support their local tourism industries and domestic businesses (Sönnichsen, 2020). Outbreaks of infections and associated travel restrictions are unpredictable, and likely to have created concerns, notably for international travellers should they have become stranded in foreign destinations, unable to return to their homes. This can have devastating financial and psychological implications. Further, news reports of exhausted health care workers and strained health systems in many countries may added to a hesitancy to travel internationally.

The results also suggest that higher perceptions of disease severity decreased willingness to travel (H2a/b). This finding is likely associated with COVID-related uncertainties and daily reports of escalating new infections and death rates in the European region.

Self-efficacy was found to have no explanatory power (H3a/b). However, the qualitative study results indicate that tourists have knowledge of COVID self-protective measures and will follow them. Any inconveniences of complying with safety interventions did not outweigh the participants' desire to relax or escape on holidays (RQ 1). These findings suggest that health-protective behaviour may be less of a consideration for people before they travel, than it is once they engage in travel.

Our study observed a negative relationship between travel-risk and willingness to travel domestically or internationally (H4a/b). This is consistent with Cahyanto et al. (2016) findings for domestic travel, and Abraham et al.'s (2020) findings for international travel in a COVID-19 study using a different model. Knowledge of the disease (H5) as well as contact with the disease (H6) did not have any moderating or mediating effect. Our research took place at a period when the number of infected people was comparably low. Consequently, this likely lessened people's exposure to the virus. Similarly, knowledge of the disease was still in its infancy.

Past travel experience (H7) was only found to mediate the relationship between perceived susceptibility and willingness to travel internationally. This suggests that experienced travellers who believed themselves susceptible to the disease were still willing to travel internationally but surprisingly, not domestically. Earlier studies have found a similar inverse (but direct) relationship between these constructs (Rudisill, 2013, Yanni et al., 2010); Experienced travellers may also be more knowledgeable about the potential pitfalls of travel during uncertain and volatile times. Further, technologies like Zoom provided an economical, COVID safe means to communicate with others replacing the need for non-essential travel.

We found that gender moderated the relationship between travel-risk and willingness to travel internationally (H8). Consistent with Hotle et al.'s (2020) study, we found men were most likely to travel internationally.

5.2 Conclusions

Unlike earlier health-related crises, epidemiologists and infectious disease modellers agree, the future depends on unknowns, including whether people will develop lasting resistance against the

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worst effects of the virus and its mutations following vaccination and boosters. This uncertainty will likely impact on the choices made by governments in terms of containment measures such as how and when social mixing resumes, and what kind of protective measures will be promoted by policy makers, used by tourism organisations, and tolerated by different individuals and societies.

5.3 Theoretical implications

Our study has several theoretical implications. First, our supplemented HBM with its additional constructs provides a more powerful approach in tourism research to understanding people's underlying intentions and willingness to travel during a major disease crisis. Earlier research applied the HBM to focus on explaining travel avoidance as a protective behaviour in regional epidemics (e.g. Cahyanto et al., 2016). Our conceptual model expands this knowledge. It shows that even during an extreme disease outbreak, some people consider the benefits associated with travel (e.g. relaxation, psychological well-being) outweigh perceived travel risks and barriers.

Second, our conceptual model confirms that past travel experience can have a mediating effect between individual beliefs and international travel. This is a novel finding that requires further investigation. The question is whether the finding is specific to our predominantly young sample or if it is generalizable to the entire public.

Third, our model confirms the relevance of including cues to action in studies exploring people's willingness to travel in the presence of disease related travel risks. Cues to action can help explain what motivates people to keep informed of infection risks while at the same time remind and reinforce the use self-protective messages. Our findings confirm that travellers want to keep informed about disease developments, and they rely on news media to do so. Researching cues to action during the different phases of the tourists' travel journey could help to explain which messages are most influential.

Overall, our supplemented HBM and mixed method approach confirms that despite perceived COVID-19 infection risks, there is a strong demand for travel, including domestic and international leisure travel, when containment measures are relaxed and borders open.

5.4 Practical implications

Several observations can be made about the practical implications of the findings of our study. First, it appears that travel can resume during a disastrous pandemic and in the presence of, and potentially because of extreme containment measures and readily available self-protective strategies. In our study, travellers stated that the stricter the COVID safety measures and strategies at tourism destinations, the safer they felt.

Second, while recovery plans and patterns may differ between countries, their mass media campaigns to improve public knowledge about risk management measures for safer travel is important, at least to younger travellers. Governments may want to encourage the development of response strategies to mitigate the risk of introducing and spreading coronavirus diseases associated with international travel and prioritise emergency funding to assist specific tourism associated sectors impacted during an outbreak (Mao et al., 2010). In this sense, the requirement of a vaccination passport or negative PCR tests both at borders and by tourism and hospitality organizations may enhance travellers' confidence and reduce underlying travel fears.

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A third observation is that while our study indicated a hesitancy for international travel in the early phase of the pandemic, it is important to maintain the public's interest in tourism and hospitality businesses/destinations alive, even while they close during intermittent lockdowns. Tourism destinations and businesses may want to target individuals through segmented and individualized marketing and promotion campaigns to influence public and individual perceptions. Clearly articulated safety strategies and guidelines used by tourism businesses can induce visitors and assist them in making their travel decisions (Mao et al., 2010). Destination Management Organizations (DMO) and hospitality businesses may also want to stay in touch with potential travellers by offering vacation-like benefits such as online wine-tastings, sending out parcels with specialties of the destination, or offering virtual guided tours and so on.

Finally, our findings can assist DMOs as well as individual hospitality businesses in planning for increased awareness of individual space and safeguards. Like Wen et al. (2020), we found that additional hygiene measures reassure travellers. Our study confirms that European travellers appreciate the benefits of outdoor eating and home delivery services, and that businesses should consider a shift to 'slow' and 'smart' tourism to minimise crowding. In addition, DMO's can increase trust in the destination and thereby visiting intention if real-time information on crowding is publicly available. In this sense, big data and geolocation can help to organize the flow of travellers in a destination, avoiding crowds visiting tourist attractions at certain times of the day. To increase the feeling of security during travel, destination authorities should enable ways to communicate up-to-date and transparent data on the incidence of COVID-19, not only on the internet but also through signage in the most frequented places.

5.5 Limitations and Future Research

This study has several limitations. The quantitative survey took place early in the pandemic when young people were thought to be less susceptible to the virus and its effects than older age groups. Since our sample consisted mainly of younger adults, this might have biased people's responses on self-efficacy or perceived susceptibility of infection.

The inclusion of additional demographic variables (e.g. income) and structural variables (e.g. personal risk-taking behaviour, travel companion, travel purpose) would have provided deeper understanding. Additionally, the quantitative survey ran between April and August 2020 when containment measures were partly in place, and then partly loosened. Thus, the timeframe of past international travel experience (previous 12 months) did for some respondents cover a period less than a year. Therefore, the measures for travel experience might be biased.

For the qualitative survey, we interviewed tourists who, despite meeting similar demographics, had not necessarily participated in the quantitative study. This means that the opinions and perspectives of people who refrained from travel were excluded. On the other hand, the quantitative study may not have captured important individual perspectives. Finally, self-protective measures have evolved (e.g. vaccines and antigen tests) so proof of immunisation or mandatory testing before entering a restaurant or a store was not required or available at the time of the study. The modest qualitative sample is also predominantly university educated and female, which might have caused other response biases.

Research can benefit manifold from our results. A deepened understanding of emotions as moderators (e.g. travel associated joy or fear) can help expand knowledge of people's travel

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motivations, intentions and decisions. Perhaps future studies can combine the HBM with other theories (e.g. attachment theory) to explore underlying drivers of willingness to travel further. Deeper investigation of the potential benefits of travel on mental health and wellbeing as a counter lever against potentially detrimental effects of various containment measures is an interesting path for future studies.

Second, research can build on our results and benefit from a detailed analysis of the kind of domestic travel that people consider acceptable or necessary during a pandemic (e.g. visiting friends and relatives, leisure travel to holiday homes, stays in hotels or spas). For example, people may perceive a visit to a crowded hotel or spa in their home country as riskier than a stay in a foreign holiday home accessed by car. Therefore, instead of focusing on the distinction between domestic or international travel, a radius around the hometown might provide greater insights.

Third, our research has only looked at willingness to travel without considering willingness to pay more (e.g. for more space, increased hygiene protocols). Future research might want to analyse the moderating influence of prices on the link between individual beliefs and willingness to travel. This could provide interesting insights, including for those engaged in research associated with the reduction of over tourism.

Finally, future studies could explore the influence of a variety of potential cues, such as reports about disease numbers, pictures of overcrowded hospitals, even mask-wearing emojis, and so on. Knowledge on cues to action would likely better inform public health officials, politicians, airlines, and other carriers in their efforts to create a safer environment for tourists and locals alike.

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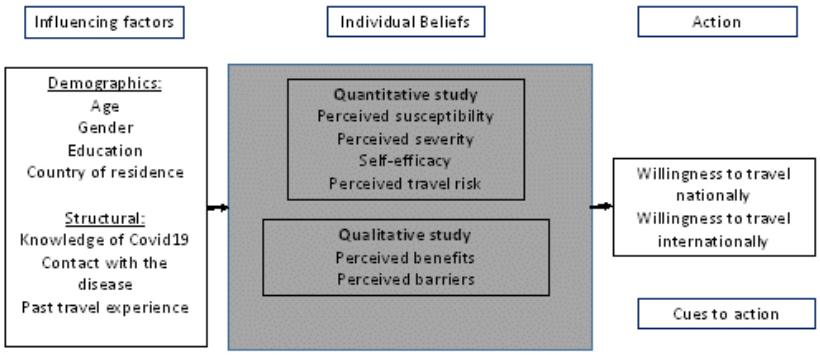

Conceptual Model

404x227mm (38 x 38 DPI)

Table I

Name of Node and Sub-nodes	Respondents	References	Total Words
1. Barriers of travel	20	36	1181
2. Benefits of travel	20	22	237
2. Cues to action	20	21	273
3. Safety Measures	20	20	490
TOTAL	**20**	**99**	**2181**

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Table II: Measurement items

Item	N	Mean	SD	Skewness	Kurtosis
Domestic travel risk (Mean = 3.6, SD = 1.0)					
Domestic travel is risky now.	605	3.5	1.1	-0.680	-0.882
Because of Coronavirus, domestic air travel should be avoided right now.	605	3.7	1.2	-0.449	-0.791
International travel risk (Mean = 4.1, SD = 0.8)	605				
International travel is risky now.	605	4.2	1.0	-1.459	1.617
*International travel is safe now.	605	4.2	1.0	-1.267	0.739
Because of Coronavirus, international air travel should be avoided right now.	605	4.1	1.1	-1.190	0.806
It is dangerous to travel internationally right now because of Coronavirus.	605	4.1	1.0	-1.454	1.640
Domestic travel					
How likely are you to travel internationally in the next 12 months?	605	3.9	1.1	-1.062	0.417
International travel					
How likely are you to travel domestically in the next 12 months?	605	3.3	1.3	-0.482	-0.915
Perceived susceptibility					
Do you think that you could contract Coronavirus in the coming year if you do not take any preventive measures?	605	3.7	1.0	-0.607	-0.329
Past travel					
Have you travelled internationally in the last 12 months?	605	3.9	0.3	1.608	0.592
Perceived severity (Mean = 2.4, SD = 0.8)	605				
If I get sick from the Coronavirus, I will die.	605	1.8	0.9	1.108	0.879
If I get sick from Coronavirus, I am afraid that I may die.	605	2.3	1.1	0.638	-0.492
If I test positive for Coronavirus, I could pass it to my family and friends who may die.	605	3.6	1.2	-0.733	-0.319
I am at greater risk of dying if I contract Coronavirus because of my general health.	605	1.9	1.1	1.081	0.180

*Reversed-scored items.

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Table III: Confirmatory factor analisis

Constructs	Indicators	Factor loadings	S.E	t-statistic	Cronbach's alpha
Domestic travel risk (DTR)					0.70
Domestic travel is risky now.	DTR1	0.924	0.000	48.584	
Because of Coronavirus, domestic air travel should be avoided right now.	DTR4	0.801	0.001	21.765	
International travel risk (ITR)					0.87
International travel is risky now.	ITR1	0.851	0.000	38.041	
*International travel is safe now.	ITR2	0.824	0.001	29.282	
Because of Coronavirus, international air travel should be avoided right now.	ITR3	0.817	0.000	32.418	
It is dangerous to travel internationally right now because of Coronavirus.	ITR4	0.900	0.000	74.170	
Perceived severity (PS)					0.72
If I get sick from the Coronavirus, I will die.	PS1	0.755	0.003	8.981	
If I get sick from Coronavirus, I am afraid that I may die.	PS2	0.892	0.002	17.401	
If I test positive for Coronavirus, I could pass it to my family and friends who may die.	PS3	0.584	0.006	5.226	
I am at greater risk of dying if I contract Coronavirus because of my general health.	PS4	0.683	0.003	7.869	

S.E = Standard error; $p < 0.001$***.

*Reverse-scored items

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Table IV: Latent correlation matrix

Construct	CR	AVE	DTR	ITR	PS
DTR	0.855	0.748	*0.864*	0.629	0.194
ITR	0.911	0.720	0.629	*0.848*	0.182
PS	0.827	0.551	0.194	0.182	*0.742*

DTR– domestic travel risk, ITR-international travel risk, PS – perceived severity; Correlations significant at p≤0.01 (2-tailed). The square root of AVE appears on the diagonal of each matrix in italics; inter-construct correlations appear off the diagonal.

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Table V: Stone Geisser's Q^2 values

Variable	SSO	SSE	Q^2 (=1-SSE/SSO
Domestic travel	605.000	536.033	0.114
International travel	605.000	469.245	0.224
Past travel	605.000	599.199	0.010

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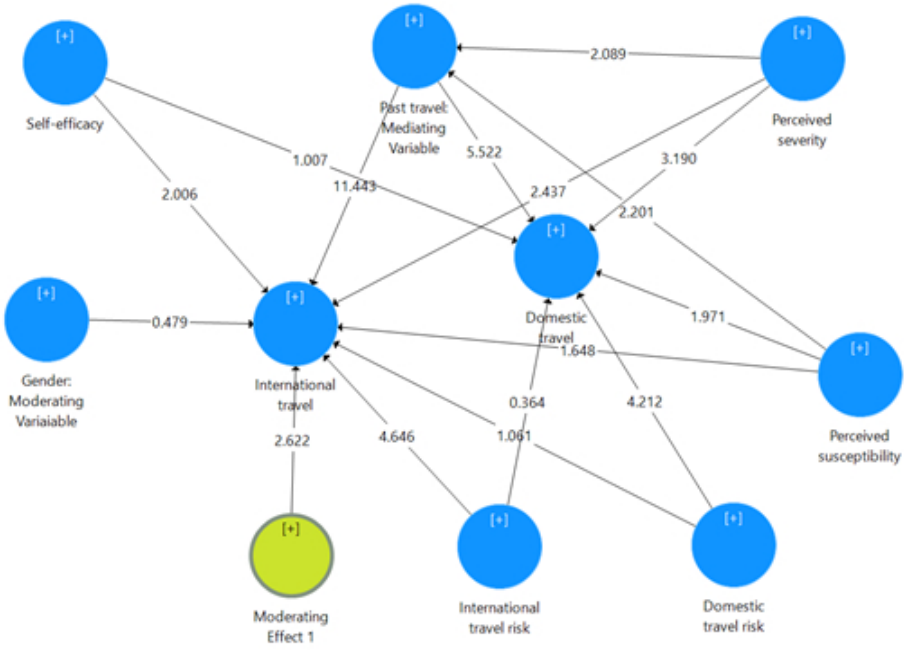

Empirical model

370x245mm (38 x 38 DPI)