# Investigating air travellers' travel motivation during a pandemic crisis

Yi-Hsin Lin [a], Chrystal Zhang [b],*

[a] *Department of Business Administration, National Taichung University of Science and Technology, Taiwan*
[b] *Aerospace Engineering and Aviation, School of Engineering, STEM College, RMIT University, 124 La Trobe Street, Melbourne, 3001, Victoria, Australia*

## ARTICLE INFO

## ABSTRACT

The growth of the air transport industry has been accompanied by various crises including aircraft incidents and accidents, terrorist attacks, and pandemics such as COVID-19. These crises to a great extent affect air travelers' motivation, which in turn affects the air travel demand that justifies airlines' legitimate existence and sustainability. However, there has been relatively little research into understanding air travelers' motivation during and after such crises, despite some studies having been conducted in the tourism domain to understand the motivation of tourists to travel to specific destinations. An enhanced knowledge in this field is important and would benefit the airline industry, which is facing increasing competition from other transportation modes as well online conferencing technologies. By applying the Push and Pull Factor model, this study has sought to identify the travel motivation and further determine whether Push factors have any positive influence on Pull factors. To this end, 760 questionnaires were collected from Taiwan. Both descriptive and inferential statistical analyses were conducted to test the hypotheses. Our findings reveal that the Destination image remains the most influential Pull factor, while Aviation-specific products and services is the least attractive Pull factor. Self-realization/achievement topped the rankings for the Push factors, while Flying experience was a selling point in its own right among the Push factors, although it was not as appealing as anticipated. The millennium generation, fewer frequent flyers and low-income consumers are more likely to take advantage of flying deals. This paper suggests that a more collaborative approach between airlines, airports and destination organizations could be adopted to design and promote tailor-made aviation and travel products to stimulate segmented consumers' demand for air travel during crises. Effective marketing strategies need to be in place to promote the specially-designed travel products.

## 1. Introduction

The airline industry has experienced exponential growth since deregulation in the late 1970s, despite the growth rates varying from country to country. Such growth, however, has been accompanied by crises and disastrous events, instances of which include but are not limited to political instability, terrorist threats and attacks, economic recessions, natural disasters, and pandemics such as COVID-19. Crises in the airline industry also include fatal aircraft incidents and accidents resulting in casualties that have tarnished the reputation of carriers.

The impacts of these crises on the industry are threefold. Air travelers have been able to adjust their travel behavior by adapting to new operational routines, such as going through more rigid security procedures, or choosing to alter their travel plans (Zhu et al., 2018). They have also been able to choose an alternative transportation mode, such as driving a vehicle (Fall and Massey, 2006), or taking the high-speed

rail where accessible, or sometimes abandoning air travel completely. Service providers, such as airlines, airports, and aircraft manufacturers, have experienced significant challenges in their recovery endeavors following the crises, due to various contributing factors including a negative impact on the brand, weak demand, and a decrease in the travelers' confidence in the carrier and the aircraft (Piccinelli et al., 2021). To survive, they have been compelled to adjust their business models, introduce new and improve existing operational procedures, and invest in new technologies (Husemann et al., 2018), with an ultimate goal being to reduce cost, enhance productivity and improve their competitiveness to satisfy travelers needs and retain their loyalty. Governments, which have relaxed their economic control over airline operations through liberalization (ICAO, 2003), even though the level of control varies from country to country, appear to have re-emerged with an intervening hand in the airlines both during and after the crises. The interventionist measures have taken various formats, including direct

cash injections (Shankar, 2020), compensation for losses incurred by carriers as a result of airspace closure due to volcanic eruptions (ICAO, 2003), stimulus packages for flight subsidies (Gleday and Snape, 2021), and offering bailout, commercial loans and guarantees, or state equity (Abate et al., 2020).

The impact of COVID-19, the global pandemic, on the global airline industry and economy has been unprecedented (ICAO, 2021). Travelers are reluctant to board a flight, due to both imposed travel bans by individual governments as well as their concerns about virus transmission throughout the journey (Zhang et al., 2021). Air travelers' confidence has dropped to a historical low, with 40 percent of respondents in IATA's survey indicating that they would wait for 6 months or longer before considering air travel (IATA, 2020a). Consumers have also joyfully experienced using virtual communication platforms, such as Zoom and Microsoft Teams, which boast of their ability to remove the necessity of air travel for business purposes (European Commission, 2020).

During the pandemic, more than 80 percent of the global airline capacity has been suspended, more than 18,000 aircraft have been parked, and hundreds of thousands of workers have been laid off (ICAO, 2021). Airlines are on the edge of bankruptcy, and have been calling for financial aid and a coordinated approach to supporting the recovery of the sector (IATA, 2020b). A handful of airlines, however, have aptly launched marketing campaigns in order to continue to stimulate travel demand and satisfy their zest for flying during the crisis. For example, an innovative idea of having "fly-nowhere" flights was designed and introduced by Qantas, which departed and landed at the same airport after cruising in the domestic airspace for several hours to make possible a spectacular sightseeing and flying experience (Cockburn, 2020). The response from the public was unexpected with the tickets being sold out in 8 minutes. Domestic and off-island air travel in markets such as Taiwan also experienced increased demand due to the effective COVID safety measures having been put in place (ET today, 2021). For example, Taiwan's two main domestic carriers - Mandarin Airlines affiliated to China Airlines and Eva Air's Uni Air - have added extra capacity over the summer to Taiwan's sun-soaked offshore islands and rugged east coast (Wang, 2020). The Penghu, Kinmen and Matsu islands have become the hottest air travel destinations, which were hardly considered in non-crisis circumstances (Taiwan News, 2020), with the factor load being as high as over 90 percent (Lee, 2020).

At the same time, national governments have provided support to the airline industry in various forms, with a view to ensuring essential connectivity during the pandemic and protecting millions of jobs that the industry supports (Abate et al., 2020). As of August 2020, governments or government-backed entities across 57 countries had offered approximately US$159 billion in relief measures to the global airline industry (Abate et al., 2020), which was 38% of the total projected revenue loss for airlines of US$419 billion in 2020 (IATA, 2020a). A few examples included the provision of subsidies to aviation and tourism businesses by Australia's federal government (Morrison et al., 2021), a travel voucher scheme by Australia's Victoria state government (State Government of Victoria , 2021), and the Triple Stimulus Voucher Scheme by the Taiwan authority (Taiwan Ministry of Economic Affairs, 2020). The common purpose was to encourage public spending to stimulate economic activities including air travel.

These phenomena raise some interesting questions: Why are some travelers motivated to fly in spite of the crises? What are the factors that motivate air travelers to fly during crises? Are those factors associated with marketing campaigns or stimulus packages, or do the travelers have an inherent desire to fly?

Travel motivation, including travel motivation during and after a crisis, have received increasing attention recently in attempts to understand the considerations of travelers who make individualized decisions regarding travel. Several theoretical models have also been developed to either identify and depict the factors or establish any associations between personality and travel motivation. The findings of incumbent research are also mixed, with some suggesting that crises and

disasters would only defer the travelers' intention temporarily, while others observe a resilient travel intention (Karl et al., 2020). Nevertheless, the existence of a disparity between intentions and actual behavior has been established (McKercher and Hui, 2004), which requires further investigation (Mair et al., 2016).

A close examination also reveals that the incumbent literature predominantly focuses on the travel motivation associated with destination crises, e.g., examining the visitors' motivation in traveling to a destination, which has been hit by various types of crises such as flooding, a tsunami, social unrest, or by social and economic crises such as SARS, or by a financial crisis (Hajibaba et al., 2015). Research that examines the consumer's motivation to fly with airlines during and after crises has, however, been scarce.

A thorough understanding of air travel motivation is important, particularly for the travel industry. It will allow businesses to make better-informed decisions on product and service development and to engage in richer interactions leading to long-term customer loyalty (Amadeus, 2015). An improved understanding of air travel motivation during and after a pandemic is even more important, as it will help businesses with the strategic planning to weather such crises.

This paper intends to address this knowledge gap. Using quantitative data collected from Taiwan, it aims to identify external and internal factors affecting consumers' air travel motivation during and after crises, especially in relation to COVID-19, and to determine which factors might be more influential than the others. It further attempts to establish whether external stimuli have any influence on the travelers' internal desires. This paper is structured as follows. Section 2 provides a critical review of the literature on travel motivation, its relationship with travel demand, and the underpinning theoretical model. The methodology in Section 3 outlines the research design, data collection and analysis approach, and hypothesis development. Sections 4 and 5 respectively present and discuss the findings in light of the incumbent literature. The paper concludes with a theoretical contribution, the implications for the relevant industry, and acknowledges the research limitations and future research direction.

## 2. Literature review

### 2.1. Air travel motivation and demand

Air travel motivation and demand are different concepts. Motivation is a psychological concept, which is a 'driving force' through which people strive to achieve their goals and fulfill a need or uphold a value (Mullins, 2016). Travel motivation refers to a set of needs that causes a traveler to take part in any kind of travel and tourism activities (Jenkins, 1999), or a traveler's decision-making when choosing a destination (Siri et al., 2012). In this paper, we define travel motivation as the desire that impels an individual to engage in air travel regardless of destination and travel purpose. Travel motivation can be complex, as individuals are predictably irrational in their decision-making based on many factors that encompass psychological, emotional and social aspects. Studies on air travel motivation investigate travelers' desires and needs as well as external intrigue that entice consumers to take a flight, hence treating travel as an individual form of behavior.

Travel demand is a function of various variables such as GDP, disposable income, price elasticity, and local economic development. It treats air travel activities from an economic perspective. For example, Baker et al. (2015) have established the causal relationship between regional aviation activities and economic growth, suggesting that a bidirectional positive relationship exists between economic growth and air travel demand/activities. Travel demand can be forecasted using different models involving historical data. Forecasters aim to be as accurate as they possibly can, but they tend to exercise caution regarding the outcome, acknowledging the unpredictable nature of the future. Travel demand forecasting is critical for the airline industry as it informs infrastructure and resources planning and deployment.

Travel motivation and demand are also interrelated. Travel motivation can be stimulated and consequently transformed into travel demand. Throughout aviation history, air travel has been presented as a social norm and necessity, with its significance being highlighted by its ability to connect people and the community, its positive impact and benefits in relation to wellbeing and inspiration, and its contribution to global mobility and economic development (Gössling et al., 2019). Prospective travelers are motivated to realize their personal goals, maintain their bonds with family and community and explore the intricacies of the world. When the trip is made, travel motivation becomes a realized demand.

However, not all travel motivations will be transformed into air travel demand. When air travel is considered in association with environmental concerns such as "flight shame", or "necessity" (work can be done without the need for travel), travelers are demotivated to the extent that they could either suspend or cancel the trip completely, or use an alternative to achieve the same purpose. In this scenario, travel motivation becomes an unfulfilled demand.

The airline industry tends to segment travelers into three categories according to their purposes: business, leisure, and visiting family and relatives (VFR). For business travelers, airlines design and create products and services such as "frequent flyer programs", "lounge access", and "prioritized services", with air travel being labeled as a luxurious enjoyable experience and promoted as a lifestyle. For leisure and VFR travelers, airlines develop tactics such as lower fares, destination appeals, and best-combined deals to appeal to the motivation.

There is an abundance of studies on air travel demand, a handful of which have attempted to forecast air travel demand and the emerging airline business model during and after COVID (Bauer et al., 2020; Lamb et al., 2020; Czerny et al., 2021). However, little has been done to investigate air travelers' motivation during and after COVID. It is thus justifiable to argue that forecasting travel demand and travel motivation are two different domains of research, both of which deserve a vigorous inquiry.

## 2.2. The Push and Pull Factor model

The consumer behavior literature emphasizes that motivations and needs are interrelated, with needs arising first (Witt and Wright, 1992), which subsequently stimulates motivation. Travel motivation has been considered as a critical exploratory factor of tourist behavior and an important topic in tourism and travel research (Hsu and Huang, 2008) in the past few decades. However, it is also widely acknowledged that it is a relatively difficult research area in the tourism inquiry (Hsu and Huang, 2008). There are several justifications for this proposition, one of which is that tourist motivations may be heterogeneous by nature, e.g., there may be multiple motivations (Ryan and Glendon, 1998), or the motivations are likely to change from time to time (Pearce, 1993). In spite of this, a handful of theoretical frameworks have been developed and applied, including 1) Maslow's hierarchy of needs, and 2) the Push and Pull Factor approach.

Maslow's hierarchy of needs is one of the most influential theories in the social sciences and has been extensively applied to travel motivation research. When engaging in tourism activities such as visiting a destination, all conscious and unconscious needs such as safety, love, self-actualization (Pearce, 1982), novelty, escape/relaxation and relationship building (Pearce and Lee, 2005) have been satisfied.

The Push and Pull Factor model is another widely applied framework (Hsu and Huang, 2008), although a universally agreed-upon conceptualization of the tourist motivation construct is still lacking (Fodness, 1994). Push factors are the intrinsic motivators or driving forces, such as the desire to escape, rest and relaxation, and self-actualization/achievement, which require the individual to take action. Pull factors, by contrast, are external appeals that entice the travelers in question to react to the attractiveness. Such attractiveness could be either destination-associated products and services with unique appeals and attributes, or marketing and promotional stimuli (Fam et al., 2019). Push factors tend to be considered as initiators to travel, while Pull factors help the travelers make decisions regarding destination choice (Bello and Etzel, 1985). The inherent desire can only be fulfilled when the external factors resonate with the individual travelers, which leads to the actual travel. Such a response to the external stimuli could be coincidental or coordinated. It is the combination of the Push and Pull factors that work jointly, resulting in the individual's action of engaging in travel.

## 2.3. Travelers' motivation during and after crises

A crisis is defined as a "low-probability, high-consequence event that develops very rapidly and involves ambiguous situations with unknown causes and effects" (Roberts et al., 2007). Common characteristics of crises tend to be that they are more related to the internal environment and thus the organization or destination has some power or influence over a crisis. A disaster can be described as an "unpredictable catastrophic change that can normally only be responded to after the event, either by deploying contingency plans already in place or through reactive response" (Prideaux et al., 2003).

Crises can be divided into immediate, emerging and sustained according to the timeline of their occurrence. Immediate crises take place instantly with little or no warning to the community and society. A volcanic eruption generating ash clouds, a tsunami, terrorist threats and attacks endangering an airline's safe operation, fatal aircraft incidents and accidents are examples. Immediate crises generally result in airlines temporarily suspending operations for safety considerations or implementing stricter safety and security procedures to minimize financial losses. For example, several thousands of flights were cancelled as a result of volcanic ash floating in several EU countries in 2011 (BBC, 2011). Emerging crises occur in one or several places discretely or simultaneously at a particular time, which tend to evolve incrementally with an unpredictable consequence. Health-associated diseases such as Dengue Fever, Malaria, Severe Acute Respiratory Syndrome (SARS), H1N1 influenza, EBOLA, and COVID-19 are examples. These health-associated diseases can be highly infectious, thus there is a concern that a transmission could take place throughout the flight journey. Social and economic crises such as the financial crisis in Southeast Asia in 1997 also fall into this category. Sustained crises are incidents or events that last for weeks, months or years, and could exert a long-time impact on the community and economy. Civil wars and military coups are examples. Airlines respond to sustained crises by suspending operations indefinitely or reducing frequencies, while international tourists perceive that sustained crises have a tremendous impact on their motivation to travel (Zahari et al., 2015).

Crises, subject to their scope, scale and length, influence tourists' behavior in numerous ways – from their travel motivation and decision-making to their activities at the destination before, during and after the crisis (Senbeto and Hon, 2020). Immediate crises such as flooding, tsunamis and earthquakes tend to impede inbound visitors, who choose to suspend or cancel their travel plans until the destination is perceived to be safe or an alternative destination is chosen (Osti and Nava, 2020). Adverse empirical evidence, however, has shown that flight bookings have surged after a disastrous event (Wayne and Carmichael, 2005) from VFR travelers, whose travel motivation was to demonstrate their solidarity and support to their families residing in the affected destination. Increased last minute bookings following disasters have been established, with travelers being quoted as saying that visiting family and relatives is the safest and most secure form of holidaying (Hystad and Keller, 2008).

Immediate crises encountered by airlines industry, such as an air crash, do not necessarily demotivate tourists. Travelers have proceeded to implement their travel plans by switching to alternative carriers or transportation modes (Shailes et al., 2001) and have been motivated to fulfill their business duty or realize their personal need to experience

their chosen destination that was not affected by the airline crash (Castillo-Manzano et al., 2012). For instance, Malaysia's international tourist arrivals from Japan, Korea, Australia and the Middle East showed a steady increase a few months after the disappearance of MH370 and the shooting down of MH17.

Emerging crises such as SARS and major financial crises can have a lingering effect on the tourism industry of the destinations, as the effect of a financial crisis is related to discretionary income that discourages traveling capability (Papatheodorou et al., 2010). The 2003 SARS outbreak led to serious fluctuations in inbound tourism to Hong Kong, which also affected the behavior of tourist arrivals in the surrounding regions (Pine and McKercher, 2004). The Asian Financial Crisis in 2008 continued to affect Hong Kong tourism in subsequent years, with tourist arrivals dropping significantly in 2009 compared with the previous year (Senbeto and Hon, 2020). It is worth noting that contradictory empirical evidence was established in the literature. For instance, the majority of international tourists perceived the emerging crisis as being temporal in nature, which could be controlled. Hence, they could resume their travel soon after the crisis (Zahari et al., 2015). A phenomenal increase in inbound travelers to Malaysia and Thailand during the 2008 Asian Financial Crises was observed, with the travel motivations identified including taking advantage of a depreciating currency, the airlines' lucrative marketing campaigns such as price cuts and holiday packages, and destination promotion packages (Lirn and Sheu, 2009).

COVID-19 broke out in late November 2019 and quickly spread to the rest of the world. In response, numerous countries imposed travel bans on international travelers, resulting in global airlines suspending more than 80 percent of their capacity. In some selective countries where the pandemic was brought under control in the early stages, airlines designed and developed innovative products and services, enabling travelers to re-feel the flying experience, despite "flying no-where". Travelers with different demographic features have demonstrated variant travel behavior during and after the crisis. For instance, research undertaken in the UK (Graham et al., 2020), India (Das and Tiwari, 2020) and the DACH region including Germany, Austria and Switzerland (Neuburger and Egger, 2021) have established that senior travelers aged over 60 perceived COVID-19 as being more severe. However, their travel intention would not be compromised and they were willing to take personal non-pharmaceutical intervention (PNPIs) measures during travel. Over 60% of British consumers over the age of 60 were likely to travel in 2021 (Graham et al., 2020).

### 2.4. Summary

The preceding literature review has revealed that the motivation and demand for air travel are interdependent and interrelated. The motivation to travel can be transformed into demand that will warrant an airline's legitimate existence. Travel motivation will become an unrealized demand when the guilt sentiment is aroused and the necessity for travel fails to be established. Studies on air travel motivation and demand are equally two independent domains, both of which deserve vigorous inquiry in their own right. Our review also shows that there is an increasing interest in investigating the motivation of travelers in tourism research. However, the focus is predominantly on the tourists' motivation associated with destination choice. The rationale that financial and health-associated crises have drawn more academic attention in the tourism literature is likely to have been due to its link with socioeconomic issues like unemployment (Papatheodorou and Pappas, 2017) and its impact on tourist flows, consumer behavior and destination image. Most studies are case-based and only examine the time when the crisis occurred, or focus on a single event and its impact on tourist volume (Senbeto and Hon, 2020). Studies examining how such crises affect air travelers, their behavior, their motivation and the airline industry are scarcely documented. While crises such as COVID will have a long-term effect on the global economy and society at large, there is a need to investigate how COVID will affect the airline industry

from different perspectives. Our literature review has also revealed that despite the motivation factors that have been identified, there has not been any inquiry to determine whether there is any association between those factors and how the Push or Pull factors affect each other. For this reason, the need to extend the research to consider the travelers' motivation to venture into the air travel sector is paramount.

## 3. Methodology

### 3.1. Research design and hypotheses development

Quantitative research methods are considered appropriate for this study, as 'factual' data will aid in answering the research questions and also allow researchers to test hypotheses to determine the relationships between the variables (Hammarberg and de Lacey, 2016). A questionnaire composed of Push and Pull factor constructs was developed by the authors, referencing the works of Katsikari et al. (2020), Kozak (2002), Ryan and Glendon (1998) and Yoon and Uysal (2005), to name just a few. Aviation product- and service-associated Push and Pull constructs were developed by the authors by taking into account the practices of COVID safe measures introduced at the airports and the marketing campaigns launched by airlines. A total of 30 statements were initially developed, half of which consisted of Push factor statements and the rest Pull factor statements.

The questionnaire was piloted with two dozen MBA and undergraduate students enrolled in a School of Business in a Taiwan University in late September 2020. The 30 statements were reduced to 26, which were then verified and confirmed by the authors. The Pull element contained 13 statements, which were then grouped into 4 clusters, i.e., Marketing and promotion incentives (5 items), Aviation-specific products attractiveness (2 items), Destination appeals (4 items), and COVID-safe safeguard measures (2 items). The Push element contained another 13 statements that were organized into 3 clusters, which included Escape (4 items), Self-realization/achievement (4 items) and Flying experience (5 items). The final version of the questionnaire contained two sections: the demographic information of the participants and the Push and Pull factor variables. A five-point Likert scale was used to measure the participants' level of motivation, where 1 indicated "strongly disagree" and 5 "strongly agree".

In order to establish whether there exists any relationship between the Pull and Push factors, the following 4 hypotheses were developed (Fig. 1):

**H1**. The Push factors have a positive influence on the Promotion and marketing deals Pull factor.

**H2**. The Push factors have a positive influence on the Safeguard measures Pull factor.

**H3**. The factors have a positive influence on the Destination Pull factor.

**H4**. The Push factors have a positive influence on the Aviation-specific products and services Pull factor.

The questionnaire was initially prepared in English, and was then translated into Chinese by the authors who are bilingual. A second piloting of the questionnaire was conducted with a group of 30 Taiwanese with different backgrounds and flight experience to ensure that the Chinese version was appropriately translated without any misleading implications or ambiguities.

### 3.2. Data collection

The data were collected in Taiwan. Air transport plays a critical role connecting the island of Taiwan with the rest of the world. Being an East Asian hub, Taiwan has 17 airports and 91 airlines, both domestic and international, which provide services connecting Taiwan to over 150
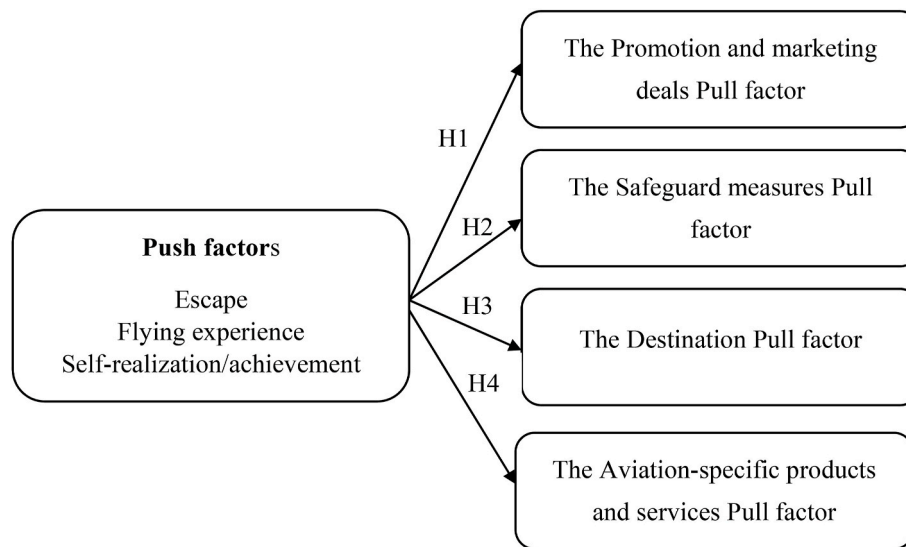
Fig. 1. Proposed conceptual model and hypotheses.

destinations in 32 countries and regions (Civil Aeronautics Administration of Taiwan , 2021). COVID-19 has had a moderate impact on Taiwan's air transport sector, thanks to the early and mostly effective prevention measures (Hasell, 2020). Fig. 2 shows the most important measures and actions introduced on the island along with a timeline to ensure the effective control of the virus spread while at the same time maintaining a considerable level of economic activities. As a consequence, Taiwanese residents were still able to fly to sun-soaked offshore and rugged east coast destinations such as Kinmen and Matsu (Wang, 2020) although most international flights were suspended. In light of the research aim, data collected from those air travelers who have personal flying experience during the COVID pandemic will serve to enhance the data's validity and reliability. To this end, participants in the survey were recruited at Taichung International Airport, on October 8 and 9, 2020 using a convenience sampling technique. Departing travelers were approached in the check-in area by a group of five students, who were adequately trained for survey data collection and were committed to abiding by the data collection protocols.

Both hard copy and e-version questionnaires via a URL link generated on Survey Cake[1] were made available to prospective participants, who had a choice to complete the questionnaire onsite using either a Chinese or English version of a hard copy or by scanning a QR code via a mobile phone, which would take the participant to the questionnaire platform. Students were able to assist with any queries to ensure that all sections were properly completed with no missing data. Krejcie and Morgan (1970) suggested that a sample size of 384 for a population of over one million would be sufficient to ensure the significance of the data at a 95% confidence level, with a 5% error margin. In 2020, a total of 10.2 million air travelers were transported by Taiwan's 19 domestic carriers, compared to 38.3 million in 2019 (Civil Aeronautics Administration of Taiwan , 2021). In light of the above, a sample size of 760 valid responses, 700 hard copies and 60 e-versions was believed to be more than sufficient to enable a valid and reliable data analysis to be performed and for the findings to be generalized.

### 3.3. Data analysis

Both descriptive and inferential statistical analyses were applied to

the data collected. Descriptive data analysis of the demographic information enabled the researchers to look for trends and distributions, while inferential analysis such as Cronbach's alpha value and ANOVA could assist in determining the internal consistency reliability of the factor clusters and establish any statistical significance between different categories of participants. Finally, regression analyses were applied to test the 4 hypotheses.

### 4. Results

#### 4.1. Descriptive statistical analysis

The demographic information presented below represents a diversified sample of participants, which satisfies the sampling principles (see Table 1 for more details). Basically, slightly over half of the participants were female travelers (56.2%). Travelers in the 21–30 age group accounted for more than a third of the overall sample (36.8%), while the age group comprising over 61 years old made up the smallest group, accounting for only 2.0%. A predominant 90.4 percent were leisure travelers, and at least three-fifths of respondents (62.1%) traveled solo rather than by joining a group tour. More than three quarters of the respondents (79.7%) traveled less than three times per annum before COVID, with only a small number of participants (4.1%) having traveled more than 10 times. The vast majority of participants (81.6%) were currently employed (76.5% full time and 5% part time), with 15.6% being unemployed and 2.9% having retired. About half of the participants (51.2%) reported a monthly income of between US$1001 and 2,000, followed by about one-third (34.8%) participants reporting a monthly income of US$1000 or less.

#### 4.2. Internal consistency reliability and validity of factor clusters and ranking of statement mean values

The Cronbach's alpha value was calculated to determine the internal consistency reliability of each factor cluster. The overall alpha coefficient score exceeded 0.76, well above the suggested threshold of 0.7 as an acceptable score of construct reliability (Nunnally, 1978). This result confirmed the validity and reliability consistency of all variables in each cluster, suggesting that there was no need for further improvement or the deletion of any variables (Table 2).

The ranking of the mean value and standard deviation of each cluster factor and individual variable is also shown in Table 2. The "Self-realization/achievement" cluster (4.09) and "Destination" cluster (3.94)
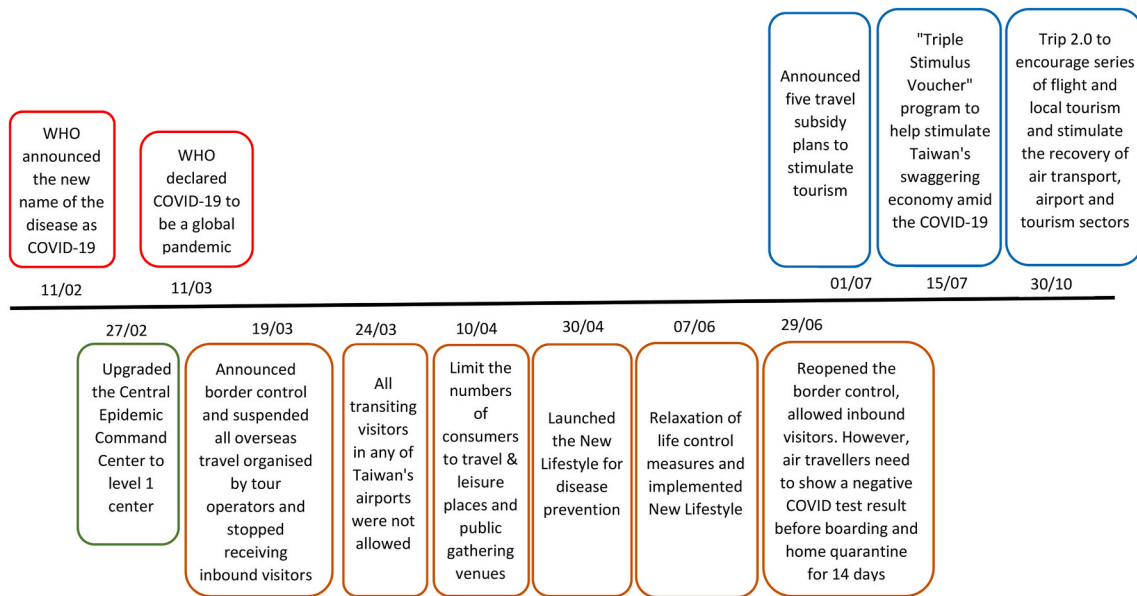
---

[1] This platform was one of the most popular online instruments in Taiwan, and was easy for mobile users to access. https://www.surveycake.com/s/wKpRo.

**Fig. 2.** The key strategies and responses to COVID-19 in 2020 in Taiwan.

**Table 1**
Demographic profiles of respondents.

| Variables | Category | Number | Percent |
|---|---|---|---|
| Gender | Male | 327 | 43.1% |
| | Female | 426 | 56.2% |
| | other, prefer not to say | 5 | 0.7% |
| Age | ≤20 | 71 | 9.4% |
| | 21–30 | 279 | 36.8% |
| | 31–40 | 214 | 28.2% |
| | 41–50 | 105 | 13.9% |
| | 51–60 | 74 | 9.8% |
| | ≥61 | 15 | 2.0% |
| The purpose of this travel | Business | 53 | 7.0% |
| | Tourism | 685 | 90.4% |
| | Other | 20 | 2.6% |
| Travel style | Group | 287 | 37.9% |
| | Individual | 471 | 62.1% |
| Frequency of traveling by air per year before COVID | ≤3 | 604 | 79.7% |
| | 4–6 | 102 | 13.5% |
| | 7–9 | 21 | 2.8% |
| | ≥10 | 31 | 4.1% |
| Employment | full time | 580 | 76.5% |
| | part-time | 38 | 5.0% |
| | retired | 22 | 2.9% |
| | unemployment | 118 | 15.6% |
| Monthly income (USD) | ≤1000 | 264 | 34.8% |
| | 1001–2000 | 388 | 51.2% |
| | 2001–3000 | 67 | 8.8% |
| | ≥3001 | 39 | 5.1% |
| Fight destination | Penghu | 453 | 59.8% |
| | Kinmen | 251 | 33.1% |
| | Matsu | 54 | 7.1% |

received the highest ranking in the Push and Pull categories respectively, while the "Flying experience" (3.69) and "Aviation-specific products and services" clusters (3.39) were ranked at the bottom in the Push and Pull categories respectively.

This result was supported by the ranking of the mean scores of individual variables in each themed cluster. The variables "I want to be free to act the way I feel" (Push 4) (4.28), and "I enjoy planning a trip and then implement it" (Push 13) (4.17), achieved the highest mean scores, both of which fell into the cluster of "Self-realization/achievement" in the Push factor category. Likewise, the variables of "During COVID, the food diversity and featured activities at the destination

attract me" (Pull 4) (4.0), and "During COVID, the scenery and themed activities at the destination attract me" (Pull 3) (3.97) were ranked as the top two, both of which were in the "Destination" cluster of the Pull factor category.

The three variables at the bottom of the mean score rankings in the Push factor category were: "I am experiencing COVID fatigue. As long as I can fly away, I do not care where the destination is" (Push 8) (3.43), in the cluster of "Escape", and "Flying allows me to interact with other people in the society" (Push 9) (3.57), and "I miss flying and just want to experience a flight" (Push 7) (3.59), both of which pertained to the "Flying experience" cluster. In the Pull category, the variables ranked lowest were "Earning more mileage points is attractive" (Pull 7) (3.35), and "Only airports have the products that I like and I can buy" (Pull 10) (3.42), both of which were contained in the "Aviation-specific products and services" Pull factor cluster.

### 4.3. Variant responses between different groups of participants

The ANOVA analyses were conducted to establish whether there existed any statistically significant differences between the means of various demographic groups with respect to two sets of Push and Pull factors. As shown in Table 3, flight frequency was found to have a significant impact on all Pull and Push factor clusters ($p < 0.05$, $p < 0.01$ and $p < 0.001$) respectively, while travel purpose, income, employment status, and age group also had an impact on selective Pull and Push factor clusters ($p < 0.05$, and $p < 0.01$) respectively, although the impact level varied among the individual clusters.

Table 4 summarizes the ANOVA results with respect to the mean values of various demographic groups with respect to both the Push and Pull factor sets. It reveals that three groups of travelers, when categorized according to different characteristics, achieved the highest mean score in all 4 Push and 3 Pull factor clusters. These three groups were: 1) participants who prefer not to specify their gender; 2) less frequent travelers; and 3) lower income travelers (with a monthly income less than US$ 1000). Other groups that achieved the highest mean value included: 1) the age group consisting of those under 20, which had the highest mean for the "Flying experience" and "Self-realization/achievement" Pull factors, and all four Push factor clusters; 2) the age group consisting of those above the age of 61, which had the highest mean for the "Escape", "Self-realization/achievement" Pull factor clusters and "Destination" Push factor cluster; and 3) the group of retirees,

**Table 2**
Cronbach's α values, ranking of factor clusters mean values and standard deviations of variables.

| Dimensions | Cronbach's α | Mean | Standard Deviation | Item | Mean | Standard Deviation |
|---|---|---|---|---|---|---|
| **Push Factor** | | | | | | |
| Self-realization/achievement | 0.75 | 4.09 | 0.618 | I want to be physically and mentally refreshed (Push 3) | 4.12 | 0.789 |
| | | | | I want to be free to act the way I feel (Push 4) | 4.28 | 0.710 |
| | | | | I want to follow all my friends who are all traveling (Push 5) | 3.81 | 0.965 |
| | | | | I enjoy planning a trip and then implement it (Push 13) | 4.17 | 0.779 |
| Escape | 0.76 | 3.83 | 0.680 | I want to escape from the busy work (Push 1) | 4.15 | 0.703 |
| | | | | I want to get away from the demands at home (Push 2) | 4.08 | 0.774 |
| | | | | I want to escape from the COVID constraints environment (Push 6) | 3.66 | 0.972 |
| | | | | I am experiencing COVID fatigue. As long as I can fly away, I do not care where the destination is (Push 8) | 3.43 | 1.083 |
| Flying experience | 0.92 | 3.69 | 0.828 | I miss flying and just want to experience a flight (Push 7) | 3.59 | 0.941 |
| | | | | Flying allows me to interact with other people in the society (Push 9) | 3.57 | 0.978 |
| | | | | Flying makes me feel excited (Push 10) | 3.73 | 0.962 |
| | | | | Flying is the one thing that makes me feel relaxed (Push 11) | 3.81 | 0.953 |
| | | | | I like the feeling of being on board an airplane and being served by the cabin crew (Push 12) | 3.76 | 0.939 |
| **Pull Factor** | | | | | | |
| Destination | 0.93 | 3.94 | 0.756 | During COVID, all types of outdoor activities at the destination attract me. (Pull 1) | 3.9 | 0.836 |
| | | | | During COVID, the cultural and heritage sites and their features at the destination attract me. (Pull 2) | 3.88 | 0.824 |
| | | | | During COVID, the scenery and themed activities at the destination attract me. (Pull 3) | 3.97 | 0.818 |
| | | | | During COVID, the food diversity and featured activities at the destination attract me. (Pull 4) | 4.00 | 0.841 |
| Safeguard measures | 0.86 | 3.83 | 0.783 | COVID-safe measures implemented by airlines are reliable and trustworthy. (Pull 8) | 3.84 | 0.833 |
| | | | | COVID safe measures implemented at the airport are reliable and trustworthy. (Pull 12) | 3.82 | 0.838 |
| Promotion and marketing deals | 0.86 | 3.64 | 0.754 | During COVID, the holiday package and promotion offered by tour operators attract me. (Pull 5) | 3.65 | 0.946 |
| | | | | During COVID, the holiday package and promotion offered by airlines attract me. (Pull 6) | 3.62 | 0.959 |
| | | | | The self service facilities attract me. (Pull 9) | 3.81 | 0.898 |
| | | | | Promotional sales at the shops inside the airport attract me. (Pull 11) | 3.42 | 0.958 |
| | | | | Incentives offered by the government, such as 2020 vouchers and rebates for travel attract me. (Pull 13) | 3.71 | 0.938 |
| Aviation-specific products and services | 0.80 | 3.39 | 0.920 | Earning more mileage points is attractive (Pull 7) | 3.35 | 1.021 |
| | | | | Only airports have products that I like and I can buy (Pull 10) | 3.42 | 0.990 |

**Table 3**
Comparisons of differences in Pull factors and Push factors by demographic characteristics.

| | Push factor | | | Pull factor | | | |
|---|---|---|---|---|---|---|---|
| | Escape | Flying experience | Self-realization/achievement | Promotion and marketing deals | Safeguard measures | Destination | Aviation-specific products and services |
| Gender | | | | | | | |
| Age | | | | | * | | ** |
| Purpose | | | * | * | | ** | |
| Mode (individual or group travel) | | | | | | * | |
| Flight Frequency | ** | *** | *** | ** | *** | * | ** |
| Employment | * | | | | | | |
| Income | | * | | | * | | * |

Remarks: *P < 0.05; **P < 0.01; ***P < 0.001.

which had the highest mean for the "Flying experience" and "Self-realization/achievement" Pull factors, and all four Push factors. These results necessitate the control of the effects of individual demographic and trip-related variables when performing the subsequent regression analyses.

### 4.4. Testing the hypotheses

Regression analyses were used to explore the relationship between 3 Push factor clusters and 4 Pull factor clusters. As shown in Table 5, all three Push factor clusters, i.e., "Escape" (β = 0.345, p < 0.001), "Flying experience" (β = 0.306, p < 0.001) and "Self-realization/achievement"

(β = 0.126, p < 0.01), were found to significantly affect the "Promotion and marketing deals" Pull factor cluster. Similarly, the three Push factor clusters were found to significantly affect the "Safeguard measures" Pull factor cluster, i.e., "Escape" (β = 0.209, p < 0.001), "Flying experience" (β = 0.272, p < 0.001), and "Self-realization/achievement" (β = 0.188, p < 0.001). Collectively, it can be concluded that these results provided support to both Hypothesis 1 and Hypothesis 2.

The regression results also showed that only two of the 4 Push factor clusters, i.e. "Escape" (β = 0.332, p < 0.001) and "Self-realization/achievement" (β = 0.282, p < 0.001) were found to significantly affect the "Destination" Pull factor cluster. The other 2 Push factor clusters, which were "Escape" (β = 0.309, p < 0.001) and "Flying experience" (β

**Table 4**
Differences of mean values in Pull factors and Push factors by demographic characteristics.

| Characteristic | Pull factor | | | Push factor | | | |
|---|---|---|---|---|---|---|---|
| | Escape | Flying experience | Self-realization/achievement | Promotion and marketing deals | Safeguard measures | Destination | Aviation-specific products and services |
| **Gender** | | | | | | | |
| Male | X | X | X | X | X | X | X |
| Female | | | | | | X | |
| other, prefer not to say | X | X | X | | X | X | X |
| **Age** | | | | | | | |
| ≦20 | | X | X | X | X | X | X |
| 21-30 | | X | | | | | |
| 31-40 | | | | X | | | X |
| 41-50 | X | | | | | | |
| 51-60 | | X | X | | | X | |
| ≧61 | X | | X | | X | X | |
| **Purpose** | | | | | | | |
| Business | X | X | X | X | X | X | X |
| Tourism | X | X | X | X | X | X | X |
| **Mode** | | | | | | | |
| Group | X | X | X | X | X | X | X |
| Individual | X | X | X | X | X | X | X |
| **Frequency** | | | | | | | |
| ≦3 | X | X | X | X | X | X | X |
| 4-6 | | | | | | | |
| 7-9 | X | X | | X | X | X | X |
| ≧10 | X | | X | | | | |
| **Employment** | | | | | | | |
| full time | | | | X | X | | |
| part time | X | X | X | | | X | X |
| retired | | X | X | X | X | X | X |
| unemployment | X | | | | | | |
| **Income** | | | | | | | |
| ≤ 1,000 | X | X | X | X | X | X | X |
| 1,001~2,000 | | | | | | | |
| 2,001~3,000 | X | | | | | X | |
| ≥ 3,001 | | X | X | X | X | | X |

Remarks: ⧗ indicates the lowest mean score, while ⧖ refers to the highest mean value

= 0.454, p < 0.001) were found to significantly affect the "Aviation-specific products and services" Pull factor cluster. This outcome demonstrated a partial support of both Hypotheses 3 and 4.

## 5. Discussion

### 5.1. Destination attractiveness is the most pivotal Pull factor cluster, despite the constraints on movement during the crisis

An abundant travelers' motivation literature has discussed the significance of the destination image in the traveler's motivation behavior (Beerli and Martín, 2004). The consensus is that destination attractiveness is one of the most pivotal factors that motivates tourists to actually

**Table 5**
Regression of Pull factors on Push factors.

| | Pull factor | | | |
|---|---|---|---|---|
| | Promotion and marketing deals | Safeguard measures | Destination | Aviation-specific products and services |
| Gender | −0.007 | −0.020 | −0.026 | −0.008 |
| Age | −0.023 | −0.061* | −0.070* | 0.018 |
| Purpose | 0.020 | 0.013 | 0.057 | −0.028 |
| Mode | −0.026 | 0.012 | −0.027 | −0.040 |
| Frequency | −0.017 | −0.027 | 0.003 | −0.018 |
| Employment | 0.028 | −0.017 | −0.027 | 0.008 |
| Income | 0.021 | −0.048 | 0.031 | −0.037 |
| Flight destination | 0.057* | 0.049 | 0.077** | 0.041 |
| **Push factor** | | | | |
| Escape | 0.345*** | 0.209*** | 0.332*** | 0.309*** |
| Flying experience | 0.306*** | 0.272*** | 0.012 | 0.454*** |
| Self-realization/ achievement | 0.126** | 0.188*** | 0.282*** | −0.034 |
| F-value | 69.706*** | 40.656*** | 37.159*** | 64.303*** |
| Adj $R^2$ | 0.499 | 0.365 | 0.344 | 0.478 |
| $R^2$ | 0.506 | 0.374 | 0.353 | 0.486 |
| Durbin-Watson | 2 | 1.961 | 2.005 | 1.836 |

Remarks: *$P < 0.05$; **$P < 0.01$; ***$P < 0.001$.

decide to travel to a chosen destination, regardless of how the destination is measured: whether by the attributes relevant to its resources and attractions, or the travelers' personal sentiment and attachment to the destination. The safe, secure and welcome image of a destination posited to the travel public during and after any crisis plays a catalytic role in attracting tourists back to rejuvenate the community (Zahari et al., 2015). Our research has confirmed this finding, that is, the destination image remains one of the top considerations that motivates air travelers, as shown in the ANOVA and regression analyses.

This proposition was also proved by the variable "As long as I can fly away, I do not care where the destination is" (Push 8) (3.43), which received the lowest mean score among all statements. It demonstrated that air travelers would not trade off their destination choice during the crisis, although they might have very limited flexibility of movement and were relatively constrained in destination selection. As Taiwanese enjoyed relatively more freedom of movement until early 2021, they have not encountered the so-called lock-down fatigue. The life-as-usual rendered them to exercise more power in personal choices in their travel behavior. Taiwanese carriers were also able to divert up to 80% of their capacity to offshore destinations, which facilitated the consumers to eventuate their travel.

### 5.2. Promotion and marketing deals Pull factor cluster has not stimulated the travellers to the extent as it was anticipated

Marketing literature claim that consumers react to marketing and promotion stimuli to satisfy their personal needs (Fam et al., 2019). When border was closed in order to contain pandemic, numerous marketing campaigns were launched by Taiwanese airlines and airports, and vouchers and rebates for travel were issued to incentivise consumers' spending to stimulate economic activities. However, the presumption that air travellers would optimise the best deals and take advantage of incentive schemes proved to be invalid, as evidenced by the lower mean score for the "Promotion and marketing deal" Pull factor cluster (3.64). It is apparent that the sampled participants were not motivated to travel by redeeming the vouchers, nor were they impressed with the promotional packages offered by the airlines, tour operators, or airports.

While it is beyond the scope of this research to establish and determine the effectiveness of corporate marketing campaigns and the

government's economic stimulus schemes targeting individual consumers, it is worth investigating further to understand whether and to what extent the airlines and airports have collaborated with destination marketing organizations to jointly promote both air travel and destination choice, and how such campaigns could be aligned with the destination image. Since the literature has documented the need for targeted marketing campaigns for the travel public both during and after the crisis to restore the destination image and to stimulate the travelers' desire for travel, it would be worth extending the inquiry to measure the effectiveness of the marketing campaigns developed by the airlines and airports, as well as the economic measures proposed by the government.

### 5.3. The aviation-specific products and services Pull factor was not as effective as other Pull factor clusters in inspiring air travelers

Airlines tend to market their augmented products such as "Frequent Flyer Program", "access to lounge", and "enhanced flying experience" to air travelers, in addition to selling a seat to entice them to fly. Researchers such as Suzuki (2007) and Espino et al. (2008) have established that price and frequent flyer programs are two of the key factors determining the air travelers' airline choice or loyalty. Dolnicar et al. (2011) further observed that loyalty programs are strongly associated with behavioral loyalty for business and frequent travelers, but not for casual and leisure travelers.

Our research confirmed the claim of Dolnicar et al. (2011) by stating that earning mileage, which is one of the prominent benefits of joining a frequent flyer program, is not an effective selling point to leisure and casual travelers. While this study does not generate any empirical evidence to justify the rationale as to why aviation-specific products such as earning mileage during a crisis are not comparable to other factors as a travel motivator, the following observations could aid in explaining the considerations. Firstly, the very short-haul offshore domestic flight of less than 50 minutes, would not earn them much mileage anyway, and hence they would not be bothered. Secondly, the mileage as an augmented product is not as attractive as other core products that could be traded off by leisure short-haul travelers.

### 5.4. The safeguard measures cluster is a moderate Pull factor

The mean score of this factor cluster (3.83), which was just below that of the Destination image (3.94), showed that sampled participants accepted the existence of the safeguard measures introduced by both airports and airlines during COVID. While independent studies by Harvard researchers demonstrate that the airflow design onboard an aircraft is effective in removing contaminants to such a degree that flying remains safe or is even safer than routine daily activities, such as going to the grocery store (Muntean and Wallace, 2020), most empirical evidence showed that air travelers were quite concerned about the spread of the virus on board or on the ground (Sun et al., 2021). Regardless, there are no studies to date that investigate the confidence of air travelers in the effectiveness of COVID-safe measures. The literature has, however, established the existence of a segment of travelers who are resistant to external or internal crisis events, by demonstrating high levels of risk propensity and resistance to change (Hajibaba et al., 2015; Lamb et al., 2020).

### 5.5. The desire for self-realization/achievement Push factor cluster should be satisfied as a priority despite the crisis

Self-realization/achievement is extensively recognized in the tourism literature as one of the most important Push variables to motivate the tourists. Consumers, through engaging in tourism activities, experience self-realization which is regarded as achieving their life goal (Sheldon, 2020). Our research also confirms this claim. It demonstrates that self-realization is a primary goal that every consumer wants to achieve, as long as the opportunity still exists. While traveling is one

means of facilitating the self-realization, there might be other avenues that the travel and tourism community could explore to make it easier for travelers to achieve this life goal.

### 5.6. Flying experience is not yet a powerful selling point during crises

Flying experience has been one of the hottest topics recently. Both airlines and airports have been working tirelessly to invest in improved and new technologies, deploying new facilities, introducing new processes, and improving operational procedures in order to enhance travelers' flying experience. Anecdotal evidence that commercial airlines' "sightseeing flight to no-where" tickets were sold in 8 minutes sparked speculation as to whether a sightseeing flight provided by a regular public air transport operator is a tangible product and service that can be marketed to the traveling public. Nevertheless, this result showed that this proposition still needs more empirical evidence for its validation.

A sightseeing flight is generally provided by general aviation (GA) operators, such as helicopter operators, or other smaller aircraft operators. The flight is exercised above the scenic spot, allowing an exciting flight experience in a different type of aircraft. The selling point of these operators is the sightseeing from the air and flight experience. When a destination, and self-realization/achievement, is associated with travel decision-making, the flying experience itself is not sufficient to stimulate travelers to take action regarding air travel. Flying experience perhaps cannot yet be marketed as an independent aviation product to be provided by regular public air transport providers.

### 5.7. The needs of travelers with specific demographic features should be satisfied during a crisis

Our ANOVA results also showed that air travelers with certain demographic features were more inclined to respond to both Push and Pull motives. These travelers were: 1) travelers under the age of 20 and above 61, 2) retirees, 3) less frequent flyers with an average of less than 3 flights per annum, and 4) those whose annual income was less than US $ 1000. Travelers under the age of 20 achieved higher average scores in 2 Pull factor and all 4 Push factor clusters, with the exception of one Pull factor cluster: "Escape". This can be interpreted as meaning that this group of travelers, who are Generation Z, are more likely to be motivated to travel by air during a crisis, provided that the promotional campaigns, destinations and other safeguarding measures are designed effectively to address their needs and requirements. Our study is one of the first to establish that those belonging to Generation Z are equally likely to be motivated to engage in air travel during a crisis.

Those aged above 61 also showed a strong desire to Escape and fly to a destination, as evidenced by the higher average scores for these factors in the ANOVA tests. In Taiwan, those who are above 60 are generally retired or semi-retired. They have sufficient time and adequate financial reserves that allow them to self-realize and do things of their own volition (Wong and Musa, 2017). They choose to fly to their chosen destination during a crisis in order to escape from their busy lives and the high demands of work. This finding lends support to that of Ritti-chainuwat (2007) and Walters et al. (2015) who observed that seniors are more likely to be motivated by perceived values following a disaster. The literature has also established that the age group consisting of retirees has the strongest desire for air travel, thanks to their abundant time availability, adequate financial wellbeing, and desire to enrich their retired life (Wong and Musa, 2017). Airlines have seen steady growth in travel demand from this group of consumers (Han et al., 2019) and have collaborated with tour operators to design some tailor-made travel packages to suit their needs.

Our finding provides more convincing empirical evidence that these two age groups have the greatest potential to purchase air travel products even during a crisis. Those in Generation Z are keener, more dynamic, and more curious to step out of their comfort zone, while seniors

are more mature in every sense with the capacity to deal with prospective contingencies. Their desire to travel is not dampened during a crisis, but they are instead committed to planning or executing their travel plans. This result indicates that more targeted travel products could be developed to better suit and satisfy their needs.

The other two groups of travelers, i.e., those who traveled less than 3 times per annum before COVID and those whose monthly income is less than US$ 1,000, have achieved higher average scores than the rest of the respondents in all 7 factor clusters, indicating that all Pull and Push factors have a very positive influence on their travel motivation. This implies that these groups of travelers have a strong travel desire, which could not be satisfied during the crisis-free time, due to their financial constraints. When circumstances change where a more affordable travel product is available, they will take advantage to satisfy their travel needs. While understanding the travel needs of lower income consumers is beyond the scope of this research, it is an issue worth investigating further in future studies in order to have a better understanding of the needs of these segments of the market.

### 5.8. Relationship between Push and Pull factors

The incumbent literature has provided little discussion on the association between the Push and Pull factors, which is one of the knowledge gaps that this research has aimed to address. Our regression analyses reveal that there is a significant relationship between all 4 Pull factor clusters and the "Escape" Push factor. Particularly worth noting is that three of the Pull factors, which include: 1) "Promotion and marketing deals", 2) "Safeguard measures", and 3) "Aviation-specific products and services", are significantly associated with the "Flying experience" Push factor. Among them, "Aviation-specific products and services" has the most significant influence on the "Flying experience" Push factor.

This finding indicates that travelers will align aviation-specific products and services with their flying experience. Such an interpretation of "Flying experience" implies that travelers will go to aviation service providers to determine and justify to what extent the products and services they receive will affect their travel experience. This result indirectly proves that travelers will have a great flying experience when they perceive the high quality of aviation-specific products and services. It implies a need for the aviation service providers to develop a better understanding of the air travelers' perception of the flying experience to ensure that a seamless and hassle-free flying experience can be made available to travelers.

Last but not least, three of the Pull factor clusters, which are 1) "Promotion and marketing deals", 2) "Safeguard measures", and 3) "Destination", are significantly associated with the "Self-realization/achievement" Push factor. Among them the "Destination" Pull cluster has the strongest influence. This result reinforces one of the findings of this paper revealed by the ranking of the mean value, as well as other researchers such as Lu et al. (2016) in that consumers engage in travel and tourism activities in an attempt to demonstrate their self-realization and achievement. Destination image, reputation and associated features significantly affect travelers' perception and judgment of their self-realization/achievement.

## 6. Conclusion, theoretical contribution and implications for industry

This paper has sought to investigate travelers' motivation during a crisis by applying a Push and Pull factor model. It has aimed to identify the factors that would motivate consumers to engage in air travel during crises such as COVID, and further determine which factors are more influential. It has also attempted to establish whether there exist any variations among travelers with different demographic features when responding to Push and Pull motives and further determine whether the Push factors have any influence on the Pull factors. 760 valid responses were collected in Taichung International Airport in late October 2020

with Cronbach alpha value, ANOVA and regression analyses being conducted. Some of our findings reinforce the propositions already documented in the literature while others shed new light and make a novel theoretical contribution to the literature.

### 6.1. Theoretical contribution

Firstly, we have applied the Push and Pull factor model to the air travel motivation scenario, which has not so far appeared in the existing literature. In this endeavor, new constructs associated with aviation-specific products and services, marketing promotions and government-initiated stimulus schemes have been developed in the context of COVID-19, which have then been tested accordingly. The efforts have theoretically advanced the Push and Pull factor model, which could be replicated and further tested in future studies that aim to investigate air travelers' motivation. Secondly, the relationship between the Push and Pull factors has been tested, which is the first attempt of its kind in academic research in the domain of travel and tourism motivation. The establishment of the relationship between the Push and Pull factors will assist in explaining how the external stimuli exert an impact on consumers, and how consumers' internal desires and needs will respond to the external forces. The established relationship also serves as empirical evidence that demonstrates that travel motivation can be transformed into travel demand, which is the foundation of the legitimate existence of the airline industry. Thirdly, we have produced more empirical evidence to understand the travel motivation of consumers during a crisis that has affected the global aviation industry. This has filled a void in the current literature which predominately focuses on tourism motivation with a crisis affecting the destination. Hence, we are extending travel motivation during a crisis to the aviation context.

### 6.2. Implications for industry

Our findings have the following implications for the industry.

1) Travelers with special demographic features such as those who belong to Generation Z, seniors, and low-income or less frequent travelers have a stronger desire for air travel, which is not necessarily satisfied in crisis-free circumstances. In the event that the destination image is perceived to be safe, the air travel is more affordable, and the safeguard measures are in place and effective, these groups of travelers will be motivated to action to realize their travel dream. Airlines, airports and destination organizations need to pay more attention to the travel needs of these segments, and to act either collaboratively and/or individually in designing and developing tailor-made travel products and services to stimulate and satisfy their needs.

2) "Aviation-specific services and products" are closely associated with the perception of "flying experience". This requires both airlines and airports to review their service provisions to determine what improvements can be made and at what point in the air travel process.

3) "Promotion and marketing deals" launched by airlines and airports during a crisis need to be tailor-designed to motivate travelers to engage in air travel. Further market research is needed to establish the specific needs of segments and determine to what extent they can work collaboratively with destination organizations to promote both their services and destinations.

4) Stimulus packages such as coupons, vouchers, and rebates for travel introduced by government agencies are not effective in stimulating consumers to use them for air travel. Since the pandemic, the vouchers and rebates for travel provided by various Taiwanese businesses have only been available online, rather than the hard-copy coupons which are more tangible and easier to redeem, with the exception of promotion by airlines and those related to hotel accommodation. The majority of Taiwanese consumers prefer having hard-copy coupons instead of merely resorting to online redemption.

This raises an interesting question for airlines and airports: Do they need to work more closely with government agencies to design enticing deals to allow the use of coupons? Do they need to consider providing hard-copy coupons instead of an online redemption scheme to invite consumers to engage in air travel? Or do they need to provide more tailor-made incentives to stimulate the demand for air travel?

### 6.3. Future research opportunities

We suggest the following future research opportunities. The first area of interest is to look at the travel motivation (Push element) of those consumers with special demographic features, for example, Generation Z, who have grown up with technology and are much younger than Generation Y, as well as low-income consumers and less frequent travelers. Much attention has been paid to frequent flyers and business travelers, and some attention needs to be directed to these segments. A second area of research interest is to investigate the effectiveness of marketing and promotion deals (the Pull element) launched by airlines and airports during a crisis, provided that air travel is operational. While a vast amount of literature has discussed the effectiveness of marketing strategies and promotions by airlines and airports in a non-crisis operational environment, there is little empirical evidence to discuss the marketing and promotion work and how effective they are during a crisis. This can be further expanded to investigate the prospects and effectiveness of collaborative marketing initiatives (the Pull element) between airlines, airports and destination businesses during a crisis when air travel is accessible, in order to determine how travelers can be motivated by a combination of marketing forces.

A third area is to assess the effectiveness of government policies designed to stimulate consumer spending on air travel and tourism at large (a Pull element). During the recent pandemic, a wide array of stimulus schemes in different formats have been introduced by governments, with a view to encouraging consumers to fly with airlines to engage in tourism activities and boost the economy. However, it has yet to be established whether such policy initiatives have been effective. More empirical evidence will help the government make informed public policy decisions. Last, but not least, studies can be conducted in other markets to test the Push and Pull variables that this research has identified and further establish the association between the Push and Pull factors. These prospective studies could in turn help test the propositions and preliminary findings that travel motivation could be transformed into travel demand, but could be subject to different conditions in different markets.

**CRediT authorship contribution statement**

**Yi-Hsin Lin:** Contribution to this article, Conceptualization, Writing – original draft, Writing – review & editing, Formal analysis. **Chrystal Zhang:** Contribution to this article, Conceptualization, Writing – original draft, Writing – review & editing, Formal analysis.

**Acknowledgments**

**Appendix A. Supplementary data**

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jairtraman.2021.102138.

# References

Abate, M., Christidis, P., Purwanto, A.J., 2020. Government support to airlines in the aftermath of the COVID-19 pandemic. J. Air Transport. Manag. 89, 101931. https://doi: 10.1016/j.jairtraman.2020.101931.

Amadeus, 2015. Future traveller tribes 2030: understanding tomorrow's traveller. http://www.amadeus.com/documents/future-traveller-tribes-2030/travel-infographic-future-traveller-tribes-2030.png. (Accessed 13 December 2020) accessed.

Baker, D., Merkert, R., Kamruzzaman, M., 2015. Regional aviation and economic growth: cointegration and causality analysis in Australia. J TRANSP GEOGR 43, 140–150. https://doi.org/10.1016/j.jtrangeo.2015.02.001.

Bauer, L.B., Bloch, D., Merkert, R., 2020. Ultra Long-Haul: an emerging business model accelerated by COVID-19. J. Air Transport. Manag. 89, 101901. https://doi.org/10.1016/j.jairtraman.2020.101901.

BBC, 2011. Thousands Hit by Volcanic Ash Cloud Flight Delays. https://www.bbc.com/news/uk-13513981. (Accessed 13 December 2020). accessed.

Beerli, A., Martín, J.D., 2004. Factors influencing destination image. Ann. Tourism Res. 31, 657–681. https://doi.org/10.1016/j.annals.2004.01.010.

Bello, D.C., Etzel, M.J., 1985. The rate of novelty in pleasure travel experiences. J TRAVEL RES 24 (1), 20–26. https://doi.org/10.1177/004728758502400104.

Castillo-Manzano, J., Pedregal, D.J., Pozo-Barajas, R., 2012. Assessing fear of flying after a plane crash. The "Rainman" effect – myth or reality? J AIR TRANSP MANAG 20, 20–22. https://doi.org/10.1016/j.jairtraman.2011.10.006.

Civil Aeronautics Administration of Taiwan (CAA), 2021. The passengers load factor of domestic flights in Taiwan. https://www.caa.gov.tw/article.aspx?a=1739&lang=1. (Accessed 27 April 2021) accessed.

Cockburn, P., 2020. Qantas Scenic flight to nowhere could be fastest selling flight in airline's history. https://www.abc.net.au/news/2020-09-18/qantas-flight-to-nowhere-sells-out-in-10-minutes/12676570. (Accessed 13 December 2020) accessed.

Czerny, A.I., Fu, X., Zheng, L., Oum, T.H., 2021. Post pandemic aviation market recovery: experience and lessons from China. J AIR TRANSP MANAG 90, 101971. https://doi.org/10.1016/j.jairtraman.2020.101971.

Das, S.S., Tiwari, A.K., 2020. Understanding international and domestic travel intention of Indian travellers during COVID-19 using a Bayesian approach. Tour. Recreat. Res. 7, 228–244. https://doi.org/10.1080/02508281.2020.1830341.

Dolnicar, S., Grabler, K., Grünig, B., Kulnig, A., 2011. Key drivers of airline loyalty. Tourism Manag. 5, 1020–1026. https://doi.org/10.1016/j.tourman.2010.08.014.

Espino, R., Martín, J.C., Román, C., 2008. Analyzing the effect of preference heterogeneity on willingness to pay for improving service quality in an airline choice context. TRANSPORT RES E-LOG. 44 (4), 593–606. https://doi.org/10.1016/j.tre.2007.05.007.

ET today, 2021. Off shore destinations become hot spots, Penghu, Mastu and Kinmen ranked top in 2020 destination search. https://finance.ettoday.net/news/1884426. (Accessed 13 April 2021) accessed.

European Commission, 2020. Coronavirus: Commission recommends partial and gradual lifting of travel restrictions to the EU after 30 June, based on common coordinated approach. https://ec.europa.eu/commission/presscorner/detail/en/ip_20_1035. (Accessed 13 December 2020) accessed.

Fall, L.T., Massey, J.E., 2006. The significance of crisis communication in the aftermath of 9/11: a national investigation of how tourism managers have re-tooled their promotional campaigns. J. Trav. Tourism Market. 19 (2–3), 77–90. https://doi.org/10.1300/J073v19n02_07.

Fam, K.S., Brito, P.Q., Gadekar, M., Richard, J.E., Jargal, U., Liu, W., 2019. Consumer attitude towards sales promotion techniques: a multi-country study. Asia Pac. J. Market. Logist. 31 (2), 437–463. https://doi.org/10.1108/APJML-01-2018-0005.

Fodness, D., 1994. Measuring tourist motivation. Ann. Tourism Res. 21, 555–581. https://doi.org/10.1016/0160-7383(94)90120-1.

Gleday, J., Snape, J., 2021. Half-price Flights on Offer as Government Asks Australians to Holiday for Cheap at Home. ABC News. https://www.abc.net.au/news/2021-03-10/tourism-coronavirus-pandemic-assistance-package-cheap-flights/13235432. (Accessed 4 April 2021) accessed.

Gössling, S., Hanna, P., Higham, J., Cohen, S., Hopkins, D., 2019. Can we fly less? Evaluating the 'necessity' of air travel. J AIR TRANSP MANAG 81. https://doi.org/10.1016/j.jairtraman.2019.101722.

Graham, A., Kremarik, F., Kruse, W., 2020. Attitudes of ageing passengers to air travel since the coronavirus pandemic. J AIR TRANSP MANAG 87, 101865. https://doi.org/10.1016/j.jairtraman.2020.101865.

Hajibaba, H., Gretzel, U., Leisch, F., Dolnicar, S., 2015. Crisis-resistant tourists. Ann. Tourism Res. 53, 46–60. https://doi.org/10.1016/j.annals.2015.04.001.

Hammarberg, K., Kirkman, M., de Lacey, S., 2016. Qualitative research methods: when to use them and how to judge them. Hum. Reprod. 31 (3), 498–501. https://doi.org/10.1093/humrep/dev334.

Han, H., Yu, J., Kim, W., 2019. Investigating airline customers' decision-making process for emerging environmentally-responsible electric airplanes: influence of gender and age. TOUR MANAG PERSPECT 31, 85–94. https://doi.org/10.1016/j.tmp.2019.03.013.

Hasell, J., 2020. Which Countries Have Protected Both Health and the Economy in the Pandemic? https://ourworldindata.org/covid-health-economy. (Accessed 4 April 2021). accessed.

Hsu, C.H.C., Huang, S., 2008. Travel motivation: a critical review of the concept's development. In: Woodside, A.G., Martin, D. (Eds.), Tourism Management: Analysis, Behaviour and Strategy. CABI. https://www.cabi.org/cabebooks/ebook/20083075447.

Husemann, M., Schäfer, K., Stumpf, E., 2018. Flexibility within flight operations as an evaluation criterion for preliminary aircraft design. J AIR TRANSP MANAG 71, 201–214. https://doi.org/10.1016/j.jairtraman.2018.04.007.

Hystad, P., Keller, P., 2008. Towards a destination tourism disaster management framework: longterm lessons from a forest fire disaster. Tourism Manag. 29 (1), 151–162. https://doi.org/10.1016/j.tourman.2007.02.017.

IATA, 2020a. Slow recovery needs confidence boosting measures. https://www.iata.org/en/pressroom/pr/2020-04-21-01/. (Accessed 13 December 2020) accessed.

IATA, 2020b. ACI and IATA call for urgent financial assistance to protect jobs and operations. https://www.iata.org/en/pressroom/pr/2020-04-30-01/. (Accessed 23 April 2021) accessed.

ICAO, 2003. Government intervention in air transport in the European union. https://www.icao.int/sustainability/CaseStudies/StatesReplies/EuropeanIntervention_En.pdf. (Accessed 22 April 2021) accessed.

ICAO, 2021. Effects of novel coronavirus (COVID-19) on Civil aviation: economic impact analysis. https://www.icao.int/sustainability/Documents/Covid-19/ICAO_coronavirus_Econ_Impact.pdf. (Accessed 23 January 2021) accessed.

Jenkins, O.H., 1999. Understanding and measuring tourist destination images. J TOURISM RES 1 (1), 1–15. https://doi.org/10.1002/(SICI)1522-1970(199901/02)1:1<1::AID-JTR143>3.0.CO;2-L.

Karl, M., Muskat, B., Richie, B.W., 2020. Which travel risks are more salient for destination choice? An examination of the tourist's decision-making process. J DESTIN MARK MANAGE 18, 1–11. https://doi.org/10.1016/j.jdmm.2020.100487.

Katsikari, C., Hatzithomasm, L., Fotiadis, T., Folinas, D., 2020. Push and pull travel motivation: segmentation of the Greek market for social media marketing in tourism. Sustainability 12 (11), 4470. https://doi.org/10.3390/su12114770.

Kozak, M., 2002. Comparative analysis of tourist motivations by nationality and destinations. Tour. OR Manag. 23 (2), 221–232. https://doi.org/10.1016/S0261-5177(01)00090-5.

Krejcie, R.V., Morgan, D.W., 1970. Determining sample size for research activities. Educ. Psychol. Meas. 30 (3) https://doi.org/10.1177/001316447003000308, 670-610.

Lamb, T.L., Winter, S.R., Rice, S., Ruskin, K.J., Vaughn, A., 2020. Factors that predict passengers willingness to fly during and after the COVID-19 pandemic. J AIR TRANSP MANAG 89, 101897. https://doi.org/10.1016/j.jairtraman.2020.101897.

Lee, H.D., 2020. Pretending to Travel Overseas, Exponential Increase in Outbound Travel- Release of the Hottest Destination 2020 Summer off Island Travel. https://www.setn.com/News.aspx?NewsID=798030. (Accessed 13 December 2020). accessed.

Lirn, T.C., Sheu, J.B., 2009. The impacts of an air-crash on students' transportation choice behaviour: an empirical study undertaken in Taiwan. TRANSPORTATION RES F 19, 404–416. https://doi.org/10.1016/j.trf.2009.06.001.

Lu, J., Hung, K., Wang, L., Schuett, M.A., Hu, L., 2016. Do perceptions of time affect outbound-travel motivations and intention? An investigation among Chinese seniors. Tourism Manag. 53, 1–12. https://doi.org/10.1016/j.tourman.2015.09.003.

Mair, J., Ritchie, B.W., Walters, G., 2016. Towards a research agenda for post-disaster and post-crisis recovery strategies for tourist destinations: a narrative review. CURR ISSUES TOUR 19 (1), 1–26. https://doi.org/10.1080/13683500.2014.932758.

McKercher, B., Hui, E.L.L., 2004. Terrorism, economic uncertainty and outbound travel from Hong Kong. J. Trav. Tourism Market. 15 (2–3), 99–115. https://doi.org/10.1300/J073v15n02_06.

Morrison, S., McCormack, M., Tehan, D., 2021. Treasury Portfolio Ministers. https://ministers.treasury.gov.au/ministers/josh-frydenberg-2018/media-releases/tourism-and-aviations-flight-path-recovery. (Accessed 13 April 2021). accessed.

Mullins, L., 2016. Management and Organisational Behaviour, eleventh ed. Pearson, New York.

Muntean, P., Wallace, G., 2020. Flying Can be Safer than Grocery Shopping, Harvard Study Asserts. CNN Travel. https://edition.cnn.com/travel/article/flying-covid-19-harvard-study-wellness/index.html. (Accessed 13 April 2021). accessed.

Neuburger, L., Egger, R., 2021. Travel risk perception and travel behaviour during the COVID-19 pandemic 2020: a case study of the DACH region. CURR ISSUES TOUR 24 (7), 1003–1016. https://doi.org/10.1080/13683500.2020.1803807.

Nunnally, J.C., 1978. Psychometric Theory, second ed. McGraw-Hill, New York.

Osti, L., Nava, C.R., 2020. LOYAL: TO WHAT EXTENT? A shift in destination preference due to the COVID-19 pandemic. Annals of Tourism Research Empirical Insights 1. https://doi.org/10.1016/j.annale.2020.100004.

Papatheodorou, A., Pappas, N., 2017. Economic recession, job vulnerability, and tourism decision making: a qualitative comparative analysis. J TRAVEL RES 56 (5), 663–677. https://doi.org/10.1177/0047287516651334.

Papatheodorou, A., Rosselló, J., Xiao, H., 2010. Global economic crisis and tourism: consequences and perspectives. J TRAVEL RES 49 (1), 39–45. https://doi.org/10.1177/0047287509355327.

Pearce, P.L., 1982. The Social Psychology of Tourist Behavior. Pergamon Press, Oxford.

Pearce, P.L., 1993. Fundamentals of tourist motivation. In: Pearce, D.G., Butler, R.W. (Eds.), Tourism Research: Critiques and Challenges. Routledge, London.

Pearce, P.L., Lee, U., 2005. Developing the travel career approach to tourist motivation. J TRAVEL RES 43 (3), 226–237. https://doi.org/10.1177/0047287504272020.

Piccinelli, S., Moro, S., Rita, P., 2021. Air-travelers' concerns emerging from online comments during the COVID-19 outbreak. Tourism Manag. 85, 104313. https://doi.org/10.1016/j.tourman.2021.104313.

Pine, R., McKercher, B., 2004. The impact of SARS on Hong Kong's tourism industry. INT J CONTEMP HOSP M 16 (2), 139–143. https://doi.org/10.1108/09596110410520034.

Prideaux, B., Laws, E., Faulkner, B., 2003. Events in Indonesia: exploring the limits to formal tourism trends forecasting methods in complex crisis situations. Tourism Manag. 24 (4), 475–487. https://doi.org/10.1016/S0261-5177(02)00115-2.

Rittichainuwat, N., 2007. Responding to disaster: Thai and Scandinavian tourists' motivation to visit Phuket, Thailand. J TRAVEL RES 46 (4), 422–432. https://doi.org/10.1177/0047287507308323.

Roberts, K.H., Madsen, P., Desai, V., 2007. Organizational sensemaking during crisis. In: Pearson, C.M., Roux-Dufort, C., Clair, J.A. (Eds.), International Handbook of Organizational Crisis Management. Sage. https://doi.org/10.4135/9781412982757.

Ryan, C., Glendon, I., 1998. Application of leisure motivation scale to tourism. Ann. Tourism Res. 25 (1), 169–184. https://doi.org/10.1016/S0160-7383(97)00066-2.

Senbeto, D.L., Hon, A.H.Y., 2020. The impacts of social and economic crises on tourist behaviour and expenditure: an evolutionary approach. CURR ISSUES TOUR 23 (6), 740–755. https://doi.org/10.1080/13683500.2018.1546674.

Shailes, A., Senior, M.L., Andrew, B.P., 2001. Tourists' travel behaviour in response to congestion: the case of car trips to Cornwall, United Kingdom. J TRANSP GEOGR 9, 49–60. https://doi.org/10.1016/S0966-6923(00)00033-8.

Shankar, A.C., 2020. Govt cash injection into Malaysia Airlines warrants strict monitoring of management — nufam. THE EDGE MARKETS. https://www.theedge markets.com/article/govt-cash-injection-malaysia-airlines-warrants-strict-monitorin g-management-%E2%80%94-nufam. (Accessed 13 April 2021) accessed.

Sheldon, P.J., 2020. Designing tourism experiences for inner transformation. Ann. Tourism Res. 83, 102935. https://doi.org/10.1016/j.annals.2020.102935.

Siri, R., Kennon, L., Josiam, B., Spears, D., 2012. Exploring Indian tourists' motivation and perception of Bangkok. Tourism 7 (1), 61–79.

State Government of Victoria (VIC), 2021. Regional Travel Voucher Scheme. http s://www.vic.gov.au/regional-travel-voucher-scheme. (Accessed 13 April 2021). accessed.

Sun, X., Wandelt, S., Zheng, C., Zhang, A., 2021. COVID-19 pandemic and air transportation: successfully navigating the paper hurricane. J AIR TRANSP MANAG 94, 102062. https://doi.org/10.1016/j.jairtraman.2021.102062.

Suzuki, Y., 2007. Modeling and testing the "two-step" decision process of travellers in airport and airline choices. TRANSPORT RES E-LOG. 43 (1), 1–20. https://doi.org/10.1016/j.tre.2005.05.005.

Taiwan Ministry of Economic Affairs, 2020. Triples Stimulus Vouchers. https://3000. gov.tw/EN/News_Toggle.aspx?n=40&sms=9068. (Accessed 13 April 2021). accessed.

Taiwan News, 2020. Domestic Tourism Sees Boost as Pandemic Eases in Taiwan. https://www.taiwannews.com.tw/en/news/3947774. (Accessed 13 December 2020). accessed.

Walters, G., Mair, J., Ritchie, B., 2015. Understanding the tourist's response to natural disasters: the case of the 2011 Queensland floods. J. Vacat. Mark. 21 (1), 101–113. https://doi.org/10.1177/1356766714528933.

Wang, A., 2020. Check in but Never Leave: Taiwan Offers Fake Flights for Travel-Starved Tourists. REUTERS News. https://www.reuters.com/article/us-health-coronavirus -taiwan-airport-idUSKBN2430RV. (Accessed 13 December 2020). accessed.

Wayne, W., Carmichael, B., 2005. Canadian seasonality and domestic travel patterns: regularities and dislocations as a result of the events of 9/11. J. Trav. Tourism Market. 19 (2–3), 61–76. https://doi.org/10.1300/J073v19n02_06.

Witt, C.A., Wright, P., 1992. Tourist motivation: life after Maslow. In: Johnson, P., Thomas, B. (Eds.), Choice and Demand in Tourism. Mansell, London.

Wong, B.K.M., Musa, G., 2017. Malaysia My Second Home (MM2H): retirees' demographic profile and spending dynamics. Tourism Manag. 18, 42–46. https://doi.org/10.1016/j.tourman.2016.11.012.

Yoon, Y., Uysal, M., 2005. An examination of the effects of motivation and satisfaction on destination loyalty a structural model. Tourism Manag. 26, 45–56. https://doi.org/10.1016/j.tourman.2003.08.016.

Zahari, M.S.M., Dusi, D.D., Hanafiah, M.H., 2015. Do crises impede the international tourists travel motivation. Tourismos 11 (2), 22–49.

Zhang, Y., Zhang, A., Wang, J., 2021. Exploring the roles of high-speed train, air and coach services in the spread of COVID-19 in China. Transport Pol. 94, 34–42. https://doi.org/10.1016/j.tranpol.2020.05.012.

Zhu, Z., Zhang, A., Zhang, Y., 2018. Connectivity of intercity passenger transportation in China: a multi-modal and network approach. J TRANSP GEOGR 71, 263–276. https://doi.org/10.1016/j.jtrangeo.2017.05.009.