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Confidence and Resilience of Air Travel under the Shadow of COVID-19: The Singapore Case

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Abstract: COVID-19 has shaken travellers' confidence in air travel. This paper seeks to measure how confident air travellers are in air travel under the shadow of COVID-19, and to analyse how air travel resilience post lifting of travel restrictions is associated with the confidence in air travel. A survey of 409 responses were collected. Confidence in personal overseas air travel is found correlated with travel resilience, which is reflected in terms of travel intention, travel frequency, and air travel resumption. Travellers with stronger confident are found to be unlikely to change their travel intention and travel frequency and will resume air travel faster. A model is constructed to illustrate the correlations between confidence in air travel and resilience of personal overseas air travel. However, the same associations cannot be concluded in the case of overseas air travel for work. Overseas travel for work is considered a duty, which is not an individual's choice based on the traveller's confidence, rather companies' decisions based on corporate travel policy. Though the research result suggested that overseas travel for work will resume faster than personal overseas travel, some business overseas traffic may be lost to virtual meeting platforms after travel restrictions are lifted.

Keywords: Air travel, Covid-19, travel confidence; travel intention; travel resilience.

1. Introduction

Since the outbreak of COVID-19, the global travel industry has been widely affected. The international tourist arrivals were forecasted to plunge by 78% in 2020 compared to 2019 (UNWTO 2020a). Before the outbreak, 59% of the international trips were travelled by air (UNWTO 2020b). As a result, the prolonged and unprecedented crisis in the air transport industry has kicked off. IATA survey (Pearce 2020) in February and April 2020 revealed that 33% and 40% of passengers respectively would wait for 6 months or more before they would resume travel after the containment announcement; 22% would not wait at all in February while the percentage dropped to 14% in April. The percentage of passengers who would wait longer before returning to travel increased along with the increasing number of COVID-19 cases all over the world. At the end of February 2020, there were 85,000 COVID-19 cases worldwide; it increased to above 3.1 million at the end of April 2020 (Our World in Data 2020). COVID-19 is notorious for its high contagiousness, which makes air passengers hesitant about travelling. Tourist behaviour follows Maslow's hierarchy of needs

(Maslow 1943). The importance of safety and security is manifested when the tourists feel that they might be exposed to risk. This study assumes the possible risk of exposure to the virus of COVID-19 imposed a negative impact on the confidence in travelling by air, which will eventually affect their air travel intention. Whether the travellers are confident in returning to air travel is a crucial question for the air transport industry. In order to rebuild the confidence in travelling by air, the purpose of this research study is to investigate to what extent the COVID-19 pandemic is affecting the flying public. The research objectives include (1) measuring how confident the travellers are in air travel considering the threat of COVID-19; and (2) analysing the association between confidence in air travel and air travel resilience. The purpose of business travellers flying overseas is to fulfil official duties, their travel resilience might not be affected by their confidence in air travel as the travellers who fly for personal reasons. Meanwhile, virtual meetings have been adopted widely as a substitute for physical travel since the outbreak of COVID-19. This will affect the air travel resilience of business travellers too. Therefore, this study will analyze the air travel resilience of business and personal travellers separately. Singapore was chosen as the context for this study. This is because Singapore is an island country, and the most common means of transportation for overseas travel is air transport.

The first COVID-19 case in Singapore was discovered on 23rd January 2020 (Yong 2020). Along with the increasing number of imported COVID-19 cases into Singapore, the government announced on 29th January 2020 that travellers who had recently travelled to Hubei, China were not allowed to enter or transit through Singapore. On 1st February 2020, the same restriction was imposed on travellers who had travelled to China; then extended to Iran, Northern Italy and South Korea on 2nd March 2020. On 18th March 2020, the Singapore government advised all Singapore residents to defer all overseas travel. And finally, on 23rd March 2020, all international travellers were barred from entering or transiting through Singapore (Toh 2020). As shown in Table 1, passenger movements in Singapore Changi Airport (Changiairport.com 2020) dropped from approximately 5.95 million in January 2020 to 48,200 passengers in June 2020. Compared to June 2019, passenger movements in June 2020 dropped by 99.2%. In total, the passenger movements in Singapore had dropped more than 99% since the start of COVID-19.

Table 1 Passenger movements in Singapore Changi Airport

Month	2020	2019	YoY Changes
January	5.95 million	5.66 million	5.12%
February	3.45 million	5.13 million	-32.7%
March	1.65 million	5.63 million	-70.7%
April	25,200	5.58 million	-99.5%
May	24,500	5.41 million	-99.5%
June	48,200	5.82 million	-99.2%

2. Literature Review and Conceptual Framework

2.1 Perceived Risk and Confidence

Lau et al. (2020) suggested a significant correlation between the number of flight routes and the spread of COVID-19; and between total passenger volume and the spread of the virus. Altinay Ozdemir and Yildiz (2020) reported that 35.5% of the respondents perceived travel and holiday negatively due to COVID-19. 14.5% and 9.7% of the respondents delayed and cancelled their holiday plans respectively. The respondents stated that they are fearful of and feel anxiety about travelling. They feel that staying at home is safer while travelling makes them feel at risk and in danger. Tourists' travel intention and travel decisions are likely based on their risk perception of travelling (Floyd et al. 2004; George 2010; Lepp et al. 2011; Sonmez & Graefe 1998) and their perceived risk of a destination (Kozak et al. 2007; Wu & Walter 2016). Four major perceived risks related to tourism include war and political instability (Mansfeld, 1996; Richter, 1996; Pitts, 1996); health concerns (Carter, 1998; Lawton & Page, 1997); crime (Brunt et al. 2000; Pizam, 1999); and terrorism (Leslie, 1999; Sonmez et al. 1999). Infection disease is the most significant perceived risk which leads the tourists to change their travel plans or change their destination choices (Kozak et al., 2007; Sharifpour et at. 2014). For example, the 2003 Severe Acute Respiratory Syndrome (SARS) outbreak led to a significant decline in tourist arrivals to Hong Kong, Singapore, Vietnam, etc.(Zhang et al., 2005). When a pandemic like COVID-19 attacks the whole world and with the perceived linkage between air travel and the spread of the virus, it will inevitably affect tourists' intention to travel by air. The reactions of tourists after travel restrictions are lifted could be extreme; ranging from avoiding air travel altogether to not changing their air travel patterns at all. How air travellers react might depend on how confident they are, as lack of confidence is one of the hindering factors of travelling(Dickman, 2003). Negative events, crises and risks are likely to be more influential on the tourists who lack confidence (Valencia & Crouch, 2008).

2.2 Travel intention and resilience

Passengers' travel intention will be affected by their perceived risk of the pandemic, their capacity and their perception of air transport service providers' capacity to deal with the risks associated with the pandemic. Chon (1990) and Sarman et al. (2016) suggested that travellers' intention to travel depends on the perceived level of security, instead of the real level of security. Their intention to travel also depends on how much they can manage the perceived risk (Jonas et al., 2011). The travellers, who perceived the risk of COVID-19 as manageable with their capacity and with the perceived capacity of air transport service providers, will be more confident, less affected in terms of travel intention or will be more resilient. Individual resilience is defined as the capacity to appropriately function despite high risk, stress or trauma (Egelan et al. 1993). Veréb et al. (2020) defined it as retaining one's core values and continuing to act

on them in the face of adversity. Hajibaba et al. (2015) identified crisis-resistant tourists as those who would carry out the planned travel during or shortly after the crisis happen. Based on these definitions, air travel resilience in this study is defined as resuming one's air travel, maintaining travel intention and travel frequency after the travel restrictions are lifted despite the effect of COVID-19. Previous studies suggested that travellers who are male, older, with overseas travel experience, and travelling for business are normally more resilient (Kozak et al. 2007; Wu & Walters 2016). Altinay Ozdemir and Yildiz (2020) revealed that 38.7% of the respondents will only resume travel six months after the outbreak effects of COVID-19 have ended while 30.6% will resume travel one year after. Wachyuni and Kusumaningrum (2020) found a comparatively optimistic result:65% of the respondents stated that they will resume travel in 0-6 months after the pandemic is declared over while the mean value of travel intention is higher than that of travel anxiety.

2.3 Conceptual Framework

This article is to analyze the association between confidence in air travel and air travel resilience. Based on the literature review, air travel resilience is proposed to be measured by the willingness to resume air travel as soon as the travel restrictions are lifted, and whether the travellers change their travel intention and travel frequency due to COVID-19. According to the discussions of the literature, this article proposed a conceptual framework as shown in Figure 1. This research paper proposed five hypotheses:

H1: A positive correlation between confidence in air travel and air travel intention.

H2: A positive correlation between confidence in air travel and air travel frequency.

H3: A positive correlation between confidence in air travel and resumption of air travel.

H4: A positive correlation between air travel intention and air travel frequency.

H5: A positive correlation between air travel intention and resumption of air travel

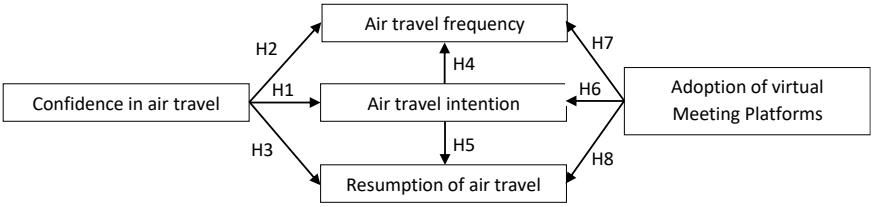


Figure 1 Conceptual framework of confidence in air travel and travel resilience

Though business travel was found to be more resilient (Wu & Walters, 2016), business travel is considered a duty that travellers must carry out for their

companies. Their resilience might not be affected by their confidence in air travel. Since the outbreak of COVID-19, virtual meeting platforms, such as Zoom, Microsoft Teams, etc. and Webinars have gained popularity, and are used as substitutes for traditional face-to-face meetings. This research study will measure how likely business travellers will replace business air travel with virtual meeting platforms, and how it will affect the resilience of business travel. Hence three additional hypotheses for the business air travellers:

H6: A negative correlation between adoption of virtual meeting platforms and air travel intention.

H7: A negative correlation between adoption of virtual meeting platforms and air travel frequency.

H8: A negative correlation between adoption of virtual meeting platforms and resumption of air travel.

3. Methodology

This study has adopted a quantitative approach. A questionnaire was designed as the data collection tool which consisted of four sections, i.e. screening questions, confidence in and resilience of travel, travel pattern, and demographic. Screening questions were used to ensure the respondents fulfilled the screening criteria. In the section on confidence in and resilience of travel, the respondents were asked if they were still planning for work or personal air trips after the travel restriction are lifted; to rate their confidence in air travel after travel restrictions are lifted in a 5-points Likert scale; and whether COVID-19 would affect their travel frequency after travel restrictions are lifted. The third section is to collect data about respondents' travel patterns of their business and personal trip. The questions include, how soon the respondents will resume travelling by air; the likelihood of replacing business trips with virtual meetings; the travel purpose of their first personal trip after travel restrictions are lifted; and their travel frequency in the last 12 months. Demographic data, including gender, age, and income were collected in the final section.

The data for this study was collected through an online questionnaire survey. A pilot study had been conducted to ensure the readability and understandability of the questionnaire. The revised questionnaire for the main survey was sent to potential respondents via email from 13th to 25th May 2020. Snowball sampling was applied to the data collection. 643 questionnaires were collected with 409 valid samples. The respondents were screened based on three criteria, (1) they are Singapore residents; (2) they are above 18 years old; and (3) they had planned for business or leisure travel in 2020 before the outbreak of COVID-19.

Table 2 presents the respondent profile. Among the 409 samples, 55% are female while 45% are male. The majority, 34% are from the age group of 41-50 and 25% are drawing a monthly salary of $4,000-$5,999. 27% of the respondents need to travel by air for work purposes after the travel restrictions are lifted while 73% indicated that they do not have such need. Among those who would

travel for work, the majority, 39% had made more than six trips. Among those on personal travels, the majority, 69% had undertaken 1-3 trips. 73% of the respondents on personal trips stated that leisure is their key travel purpose.

SPSS Version 23 was used to analyze the data. Chi-square test of independence, One way ANOVA, Independent t-test and Pearson correlation were applied to analyze the data in this study.

4. Findings and Discussion

4.1 Confidence Level

The mean score of the confidence in air travel is 3.03/5. Independent t-test shows a significant difference between male (M=3.28, SD=1.24) and female (M=2.81, SD=1.16); $t(407)=-3.975$, $p=.00$, and between those who need to travel overseas for work (M=3.27, SD=1.26) and those who do not have such need (M=2.94, SD=1.21); $t(417)=2.483$, $p=.013$. These statistical results suggested that males as well as those who need to travel overseas for work are more confident in air travel. No significant difference in confidence has been found across different age groups; different income groups; groups with different overseas work travel experiences; different personal overseas travel experiences, and different key travel purposes for the first personal trip after travel restrictions are lifted.

4.2 Travel Resilience

4.2.1 Travel Intention

One of the screening criteria of this survey was the respondents must have had overseas travel plans for 2020 before the outbreak of COVID-19. In order to examine if the respondents have changed their travel intention due to COVID-19, the respondents were given three options, (1) still planning to travel overseas; (2) become unsure about their overseas travel plan; (3) stopped planning for overseas travel for business and/or personal purposes after the lifting of travel restrictions. 50% of the respondents were 'still planning' overseas trips for the year 2020, while 36% and 14% became 'unsure' and 'stop planning' respectively. Chi-square test of independence suggested a significant relationship between change in travel intention and gender, $X^2=(2, N=409)=21.452$, $p=.005$; and between change in travel intention and need to travel for work, $X^2=(2, N=409)=13.669$, $p=.001$. According to the statistical result, male travellers are less likely to change their travel intention due to COVID-19. 112(60.5%) of the male travellers are 'still planning' their overseas trips while only 89(39.7%) of the female travellers indicated the same. Meanwhile, only 14(7.6%) of the male travellers 'stopped planning' and 59(31.9%) became 'unsure'; 44(19.6%) of the female travellers 'stopped planning' while 91(40.6%) became 'unsure'.

Table 2 Profile of respondents

n = 409		**%**
Gender		
Female		55
Male		45
Age		
< 21		1
21 - 30		22
31 - 40		21
41 - 50		34
51 - 60		19
> 60		4
Income (SGD)		
< 2,000		12
2,000 - 3,999		18
4,000 - 5,999		25
6,000 - 7,999		12
8,000 - 9,999		9
10,000 - 11,999		9
12,000 - 13,999		5
14,000 - 15,999		2
16,000 - 17,999		3
18,000 - 19,999		1
> 20,000		4
Need to travel for work		
Yes		27
No		73
Travel experience in the last 12 months before COVID-19	**Travel for work %**	**Travel for personal reasons %**
0	0	5
1- 3 trips	32	69
4 - 6 trips	29	19
More than 6 trips	39	7
Travel purpose (Personal trips)		
Leisure		73
VFR		24
Education		0.7
Health		0.3
Others		2

The ‘travel for work’ respondents appear to be less likely to change their travel plans. 70(64.2%) of the ‘travel for work’ respondents are ‘still planning’ their work travel while 131(43.7%) of the ‘personal travel’ respondents are ‘still planning’ their overseas trips. 12(11%) of the ‘travel for work’ respondents have ‘stopped planning’ while 27(24.8%) became ‘unsure’. 46(15.3%) of the ‘personal travel’ respondents have ‘stopped planning’ while 123(41%) became ‘unsure’. No significant association has been found between change in travel intention and age; income; overseas work travel experiences; overseas personal travel experiences; and key travel purposes of the first personal trips after travel restrictions are lifted.

4.2.1.1 Confidence in air travel &air travel intention

a. Overall

One way ANOVA [$F(2, 406)=87.481, p=.00$] showed a statistically significant difference in confidence in air travel among the three groups with different changes in travel intention, i.e. 'still planning', 'unsure', and 'stopped planning', at the $p<.01$ level. A Tukey post hoc test showed that the 'still planning' group (mean score of confidence=3.65) is significantly more confident in air travel post-COVID-19 than the 'unsure' (mean=2.63; $p=.00$) and 'stopped planning' (mean=1.84; $p=.00$) groups. The 'unsure' group is significantly more confident ($p=.00$) than the 'stopped planning' group. This result suggested that confidence in air travel is associated with changes in travel intention. Travellers with stronger confidence tend not to change their travel intention. The confidence in air travel of the 'personal travel' and 'travel for work' groups is further analyzed in the next two sections according to their change in travel intention.

b. Personal overseas travel

Within the group of 'personal travel', One way ANOVA [$F(2, 300)=35.582, p=.00$] showed a statistically significant difference in confidence in air travel between 'still planning', 'unsure', and 'stopped planning' groups at $p<.01$. A Tukey post hoc test showed that the 'still planning' group (mean score of confidence=3.73) is significantly more confident in air travel than 'unsure' (mean=2.82; $p=.00$) and 'stopped planning' (mean=2.20; $p=.00$) groups. The 'unsure' group is significantly more confident ($p=.00$) than the 'stopped planning' group. The statistical results showed that the 'personal travel' respondents with stronger confidence tend to maintain their travel intention.

c. Overseas work travel

Within the group of 'travel for work', One way ANOVA [$F(2, 106)=14.004, p=.00$] showed a statistically significant difference in confidence in air travel among the three groups, i.e. 'still planning', 'unsure' and 'stopped planning', at $p<.01$. A Tukey post hoc test showed that the 'still planning' group (mean score of confidence=3.67) is significantly more confident in air travel than 'unsure' (mean=2.7; $p=.01$) and 'stopped planning' (mean=2.17; $p=.00$) groups. However, there was no significant difference ($p=.35$) found between the 'unsure' and 'stopped planning' groups. Hence, H1 is supported in both cases of 'personal travel' and 'travel for work'.

4.2.2 Air Travel Frequency

The respondents were asked how COVID-19 will affect their travel frequency after travel restrictions are lifted, 40.6% of the respondents indicated that their travel frequency will "remain unchanged" while 59.4% will "travel less" by air. A Chi-square test of independence showed that there is a significant association between gender and change in travel frequency, $X^2(1, N=409)=10.366, p=.001$. 91(49.2%) male and 75(33.5%) female travellers

respectively indicated that travel frequency will 'remain unchanged'. 94(50.8%) of the male and 149(66.5%) of female respondents will "travel less". Though more respondents from both genders indicated that they would travel less, male travellers tend to maintain their travel frequency compared to their female counterparts. The change in travel frequency does not show a statistically significant association with age; income; overseas work travel experiences; personal overseas travel experiences; key purposes of the first personal trip and need to travel for work.

4.2.2.1 Confidence in air travel &air travel frequency

a. Overall

The Independent t-test showed a significant difference in confidence in air travel between the 'remain unchanged' (M=3.8, SD=0.938) and 'travel less' groups of all respondents (M=2.49, SD=1.104); t(407)=12.433, p=.00. This statistical result suggests that the travellers with stronger confidence tend to remain their travel frequency unchanged.

b. Personal overseas travel

Among the 'personal travel' respondents, the Independent t-test showed a significant difference in confidence between the 'remain unchanged' (M=3.87, SD=.908) and 'travel less' groups (M=2.79, SD=1.107); t(301)=9.257, p=.00. The statistical result suggests that those 'personal travel' respondents with stronger confidence tend to remain their travel frequency unchanged.

c. Overseas work travel

Among the group of 'travel for work', the Independent t-test showed a significant difference in confidence between the 'remain unchanged' (M=4.08, SD=.829) and 'travel less' groups (M=2.58, SD=1.102); t(107)=7.932, p=.00. These results suggested that confidence in air travel might have an impact on air travel frequency. Travellers, both 'travel for work' and 'personal travel' groups, with stronger confidence in air travel tend to remain their frequency of air travel unchanged. Therefore, H2 is supported in both cases of 'travel for work' and 'personal travel'.

4.2.2.2 Air travel intention and air travel frequency

a. Overall

A Chi-square test of independence showed a significant association between change in travel intention and change in travel frequency of all respondents, $X^{2=}$(2, N=409)=65.959, p=.00. 120(59.7%) of the 'still planning' respondents; 41(27.3%) of the 'unsure' respondents; and 5(8.6%) of the 'stopped planning' respondents indicated that their future travel frequency would remain unchanged. 81(40.3%) of the 'still planning' respondents; 109(72.2%) of the 'unsure' respondents; 53(91.4%) of the 'stopped planning' respondents would travel less by air. The result suggested that the air travellers who maintain their travel intention tend to keep their future travel frequency unchanged after the travel

restrictions are lifted. The 'unsure' or 'stopped planning' air travellers would tend to travel less by air after the travel restrictions are lifted.

b. Personal overseas travel

Among the 'personal travel' respondents, the Chi-square test of independence showed a significant association between change in travel intention and change in travel frequency, $X^2=(2, N=303)=27.905, p=.00$. 114(62.6%) of the 'still planning' respondents; 36(34%) of the 'unsure' respondents; and 3(20%; expected count=7.6) of the 'stopped planning' respondents indicated that they would remain their travel frequency unchanged after the travel restrictions are lifted. 68(37.4%) of the 'still planning' respondents; 70(66%) of the 'unsure' respondents; and 12(80%) of the 'stopped planning' respondents will travel less after the travel restrictions are lifted. The statistical results suggested that the travellers who keep their personal overseas travel intention unchanged also tend to maintain their travel frequency.

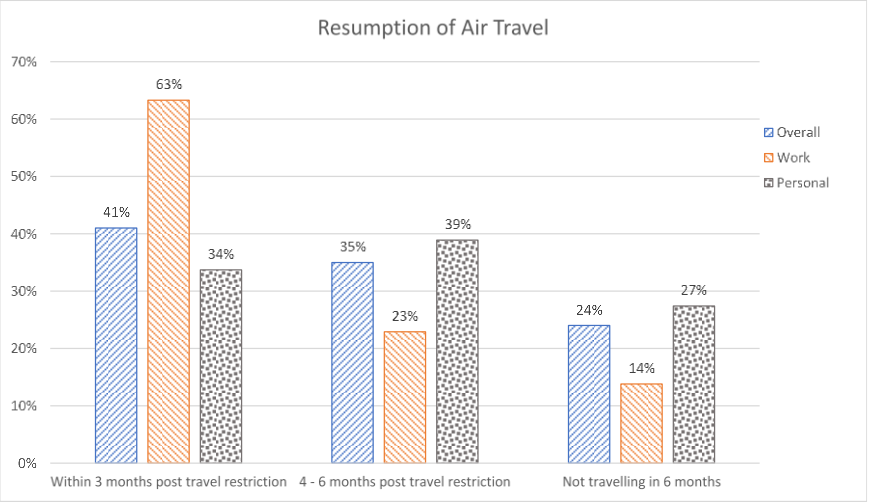
c. Overseas work travel

Among the 'travel for work' respondents, the Chi-square test of independence also showed a significant association between change in travel intention and change in travel frequency, $X^2=(2, N=109)=7.705, p=.021$. 39(55.7%) of the 'still planning'; 8(26.9%) of the 'unsure'; and 3(25%; expected count=5.5) of the 'stopped planning' respondents will remain their future work travel frequency unchanged. 31(44.3%) of the 'still planning'; 19(70.4%) of the 'unsure'; and 9(75%) of the 'stopped planning' respondents would travel less. The overseas work travel group illustrated the same pattern as the personal overseas travel group. The travellers who maintain their intention to travel overseas for work would also tend to maintain their travel frequency. As a result, H4 is supported in both cases of 'travel for work' and 'personal travel'.

4.2.3 Resumption of Air Travel

The respondents were asked to indicate how soon they would resume overseas work travel and personal overseas travel respectively. As shown in Figure 2, 41% and 35% of all respondents indicated that they would resume air travel within three months after travel restrictions are lifted and 4–6 months respectively, while 24% of them would not resume air travel within six months. 63% of the 'travel for work' and 34% of the 'personal travel' respondents indicated that they would resume air travel within three months after the travel bans are lifted. 39% of the 'personal travel' and 23% of the 'travel for work' respondents will resume air travel in 4-6 months. 27% of the 'personal travel' while 14% of the 'travel for work' respondents indicated that they will not resume air travel in six months after the travel restrictions are lifted. A Chi-square test of independence also showed a significant association between air travel resumption and overseas travel purpose, i.e. travel overseas for work or personal reasons, $X^2=(2, N=409)=29.148, p=.00$. This statistical result suggested that the 'travel for work' respondents would resume air travel at a faster pace than the 'personal travel' respondents.

Figure 2 Comparison of resumption of air travel between work and personal trip



4.2.3.1 Personal overseas travel.

A Chi-square test of independence suggested a significant association between how soon personal overseas travel would resume and gender, $X^2=(2, N=303)=25.875, p=.00$. 70(47%) of the male while 32(20.8%) of the female respondents would resume personal overseas travel within three months after the travel restrictions are lifted. 52(34.9%) of the male and 66(42.9%) of the female respondents would resume personal overseas travel in 4-6 months after travel restrictions are lifted. 27(18.1%) of the male and 56(36.4%) of the female respondents would not resume travel within 6 months after the travel restrictions are lifted. This result suggests that male travellers resume personal overseas travel faster than female travellers.

A Chi-square test of independence (8.3% of the cells have expected counts<5; minimum expected count=4.38) suggested a significant association between how soon personal overseas travel would resume and personal overseas travel experience, $X^2=(6, N=303)=25.768, p=.00$. 16(76.2%) of those who had travelled overseas by air for more than seven trips in the 12 months before COVID-19; 24(42.1%) of those who had made 4-6 trips; 59(28.2%) of those who had made 1-3 trips; and 3(18.8%, expected count=5.4) of those who had made zero overseas trips indicated that they would resume air travel within three months after the travel restrictions are lifted. 4(19%, expected count=8.2) of those who travelled overseas by air more than seven times; 23(40.4%) of those who had made 4-6 trips; 83(39.7%) of those who had made 1-3 trips; and 8(6.8%) of those who had not travelled overseas at all in the 12 months before COVID-19 indicated that they would resume air travel in 4-6 months. 1(4.8%, expected count=5.8) of those who had made more than seven trips; 10(17.5%) of those who had made 4-6 trips; 67(32.1%) of those who had made 1-3 trips; and

5(31.3%) of those who had made zero overseas trips indicated that they would not resume air travel within six months after the travel restrictions are lifted. This result suggested that travellers with more personal overseas travel experience tend to resume personal travel faster than those with less experience. There was no association found between how soon personal overseas travel would resume with age; income; and key purpose of first personal trips.

a. Confidence in air travel and resumption of air travel

The confidence in air travel of the group which will resume personal overseas air trips within three months after the travel restrictions are lifted was 3.90; 3.28 for the group which will resume in 4-6 months; and 2.72 for the group which will not resume in six months. One way ANOVA analysis suggested a statistically significant difference in confidence between these three groups $[F(2, 300)=29.078, p=.00]$ at the $p<.01$ level. The 'within three months' group is significantly more confident in air travel than the '4-6 months' ($p=.001$) and 'not within 6 months' ($p=.00$) groups. The '4-6 months' group is also significantly more confident in air travel than the 'not within 6 months' group ($p=.001$). The statistical results suggested that how soon the personal overseas travel would resume is correlated with confidence in air travel. The stronger the confidence, the sooner the resumption of personal air travel. As a result, H3 is supported in the case of 'personal travel'.

b. Air travel intention and resumption of air travel

A Chi-square test of independence (11.1% of the cells have expected counts<5, minimum expected count=4.11) suggested a significant association between travel intention and resumption of air travel, $X^2=(4, N=303)=51.238, p=.00$. 85(46.7%) of the 'still planning'; 16(15.1%) of the 'unsure'; and 1(6.7%; expected count=5) of the 'stopped planning' respondents would resume air travel within three months after the travel restrictions are lifted. 67(36.8%) of the 'still planning'; 48(45.3%) of the 'unsure'; and 3(20%; expected count=5.8) of the 'stopped planning' respondents would resume air travel in 4-6 months. 30(16.5%) 'still planning'; 42(39.6%) of the 'unsure'; and 11(73.3%) of the 'stopped planning' respondents would not resume air travel within six months. The statistical results suggested that the 'still planning' respondents tend to resume air travel faster than the 'unsure' and 'stopped planning' respondents while 'unsure' respondents tend to resume air travel faster than the 'stopped planning' respondents. As a result, H5 is supported in the case of 'personal travel'.

4.2.3.2 Overseas work travel

a. Confidence in air travel & resumption of air travel

One way ANOVA analysis suggested a statistical difference in confidence between the 'within three months' and '4-6 months' groups ($p=.005$), no statistical difference in confidence in air travel were found between the 'within three months' and 'not within six months' groups; and between the '4-6 months' and 'not within six months' groups. The findings are not strong enough to

suggest a correlation between confidence in air travel and how soon the travellers would resume overseas work travel after travel restrictions are lifted. Overseas work travel is considered a duty, the resumption of overseas work travel might not be an individual's choice, but rather companies' decisions. This might explain why no correlation between confidence in air travel and air travel resumption for work has been found. Hence, H3 is not supported in the case of 'travel for work'.

b. Air travel intention & resumption of air travel

Unlike the case of personal overseas travel, no association has been found between change in air travel intention and how soon air travel for work would resume. Hence, H5 is not supported in the case of 'travel for work'.

c. Likelihood of replacing future business trips with virtual meeting platforms

The respondents who travel overseas for work were also asked to rate how likely they will replace their future business trips with virtual meetings. The mean score was 3.26/5 with 1 being extremely unlikely while 5 being extremely likely. Table 3 showed the distribution of the responses. The majority, 27.4%, of the respondents rated the likelihood as 3. In total 45.2% of the respondents rated 4 and 5 while 27.4% of the respondents rated 1 and 2. This might suggest that travellers are becoming accustomed to virtual meetings.

Table 3 Replace business trips with virtual meetings

Likelihood	Percentage
1	15.0%
2	12.4%
3	27.4%
4	22.2%
5	23.0%
Total	100%

- *Confidence in air travel & Virtual meeting platforms*

A Pearson correlation showed a significant, negative correlation between confidence in air travel and likelihood of replacing future business trips with virtual meetings (r=-.48, n=109, p=.00). The negative correlation suggested that the less confidence in air travel, the more likelihood to replace future business trips with virtual meetings, vice versa. Although work travel is a company decision, the findings might suggest travellers with lower confidence in air travel leaning towards virtual meetings. With technological advancement, more handy and affordable virtual meeting platforms are available. Even though the overseas work travel would resume sooner than the personal travel, some business travel in the future might be lost to virtual meeting platforms.

- *Air travel intention and Virtual meeting platforms*

One way ANOVA analysis suggested a statistically difference in the likelihood of replacing future business overseas trips with virtual meeting

platforms among different groups of travel intention ($F(2, 106)=6.5, p=.002$). A Tukey post hoc test showed that the 'unsure' group was statistically significantly having a higher likelihood to replace future business travel with virtual platforms than the 'still planning' group ($p=.003$). There was no statistical difference found between 'still planning' and 'stopped planning' groups ($p=.142$); and between 'unsure' and 'stopped planning' group ($p=.873$). Hence, H6 is supported.

- *Air travel frequency and Virtual meeting platforms*

The Independent t-test showed a significant difference in the likelihood of replacing future business overseas trips with virtual meeting platforms between the 'remain unchanged' group ($M=2.48$, $SD=1.216$) and 'travel less' group ($M=3.86$, $SD=1.121$); $t(107) =-6.178, p=.00$). The statistical results indicated that the 'remain unchanged' group have a lower likelihood than the 'travel less' group to replace their future business travel with virtual meeting platforms. Hence, H7 is supported.

- *Resumption of air travel and Virtual meeting platforms*

One way ANOVA showed no statistically significant difference in the likelihood of replacing future business overseas trips with virtual meeting platforms between the groups of how soon they resume overseas work travel [$F(2, 106)=2.2, p=.117$]. This could be because some activities in the destinations cannot be replaced by virtual meeting platforms, while some of these overseas activities might need to be resumed as soon as possible after a prolonged implementation of travel restrictions. Hence, H8 is not supported.

4.2.4 Discussion of the Conceptual Framework

4.2.4.1 Personal overseas air travel

The statistical results supported all five hypotheses as shown in Figure 2 in the case of personal overseas air travel in the context of Singapore. The research findings and analysis suggested a correlation between confidence in air travel and the resilience of personal travel, which is reflected in travel intention, travel frequency and travel resumption.

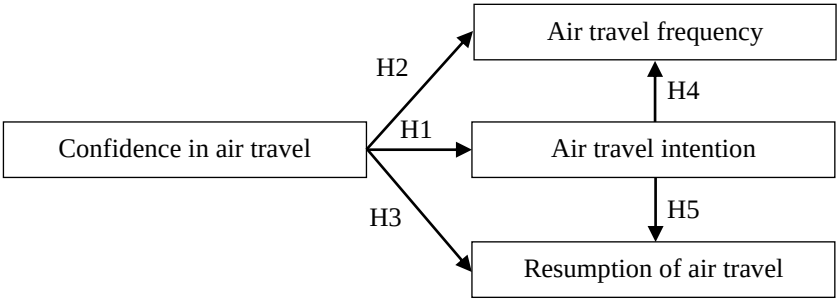


Figure 2 Conceptual model of confidence in air travel and travel resilience for personal overseas air travel

Those with stronger confidence tend to maintain their travel planning; maintain their usual travel frequency; and resume personal air travel sooner. The research findings also suggested that travel intention is correlated with travel frequency and travel resumption. Those who maintain travel plans tend to maintain their usual travel frequency and resume personal air travel sooner.

4.2.4.2 Overseas work travel by air

The statistical results showed that there is a correlation between confidence in air travel with air travel frequency and air travel intention for work. The travellers with stronger confidence tend to remain their work travel frequency and work travel plans unchanged after the travel restrictions are lifted. The adoption of virtual meeting platforms is also found affecting the air travel frequency and air travel intention negatively. However, the statistical evidence is not supporting the correlation between confidence in air travel and resilience of overseas work travel by air as suggested in Figure 1. The statistical findings rejected all the hypotheses, i.e., H3, H5 and H8, related to resumption of air travel for work travel. This could be because how soon the respondents need to resume overseas work travel by air depends on how urgent the matters have to be handled in the overseas destinations, rather than depends on how confident and how strong the intention is. Some business purposes might need to be achieved by the respondents physically in the overseas destination. Since the air travel from Singapore has been halted, a pent-up demand of this type of business overseas trip is expected. As a result, virtual meeting platforms might not be able to affect how soon the respondents need to resume work travel by air.

5. Industry Implications and Further Studies

5.1 Rebuilding Confidence of Personal Overseas Travel

Personal overseas air travel is found to have a lower level of confidence and resilience than overseas travel for work. Travellers take a longer time to resume air travel for personal overseas trips compared to business trips. Personal air travellers with stronger confidence are found to be unlikely to change their travel intention and travel frequency, and they will also resume air travel faster. Therefore, rebuilding travellers' confidence should be the top priority for industry practitioners. There is an urgent need to conduct further studies on what travellers are worried about air travel and ways to rebuild their confidence. Travellers with more personal overseas travel experience indicated that they will resume air travel sooner. Assuming that travellers clock each and every of their trips, this may imply that more efforts be aimed at enticing frequent flyers to travel again when the travel restrictions are lifted.

5.2 Competition from virtual meeting platforms

There are full of uncertainties in the future of the business air travel segment. There is no doubt that overseas travel for work will resume faster than personal overseas travel. However, near half of the respondents who travel overseas for

work indicated that they are likely to replace future trips with virtual meeting platforms. This suggests that a portion of business overseas air travel may be lost to virtual meeting platforms. The question is which types of business trips would be replaced by virtual meeting platforms. Those business trips involving pure meetings or exchange of information could probably be replaced by virtual meeting platforms, while those business trips involving site inspections or other activities that require the travellers to be in the destinations physically will be irreplaceable by the virtual meeting. The research findings suggested that the business air travellers who will reduce their travel frequency tend to replace travels with virtual meeting platforms. A further question that needs to be answered is to what extent the business traffic volume will be lost to virtual meeting platforms.

5.3 Other Further studies

The research findings suggested that there is no correlation between confidence in air travel and resilience of overseas work travel. This could be because work travel is a duty. The travel decisions are made by companies, rather than individual business travellers. A further study about how companies would change their corporate travel policy and business traffic volume due to COVID-19 shall be conducted in order to examine its influences on the business travel market.

The number of COVID-19 cases during the data collection period ranged between 305cases/day and 752cases/day while the average number of cases was 561cases/day (covidsitrep.moh.gov.sg, 2020). The daily number of cases fluctuated during the data collection period. It should be mindful that the respondents' confidence in air travel might fluctuate along with the undulation of the daily number of cases. A future similar study is suggested to be conducted again when the number of daily COVID-19 cases dropped to minimal to examine if a different result could be obtained.

6. Conclusion

This paper seeks to measure how confident travellers are in air travel given the influence of COVID-19, and to analyze how air travel resilience post lifting of travel restrictions is associated with confidence in air travel. Confidence in air travel was found correlated with overseas travel resilience in personal travel, but not supported in overseas business travel. A conceptual framework has been constructed to illustrate the correlations between confidence in air travel and the resilience of personal overseas travel. Those with stronger confidence tend to maintain travel intention and air travel frequency and resume personal overseas air travel faster. Those who are still planning for personal overseas air travel after the outbreak of COVID-19 tend to maintain their overseas travel frequency by air unchanged and resume overseas personal travel faster. Those who maintain their usual overseas travel frequency tend to resume personal overseas travel faster. Overseas air business travel appeared to resume faster than overseas

air personal travel. However, those with less confidence in air travel have a higher likelihood to replace overseas work travel with virtual meetings. Overseas air business travel appeared as a more resilient market compared to overseas air personal travel. However, airlines and corporate travel managers must be prepared to lose some business travel markets to virtual meeting platforms. Further studies on what air travellers are worried about air travel and ways to rebuild travellers' confidence are needed urgently. The extent to which the recovery of business traffic volume will be inevitably affected by the rising of virtual meeting platforms. Further studies on types and volume of business travel would be lost to virtual meeting platforms; how companies will revise their corporate travel policy in response to COVID-19 and how business traffic volume will be affected are also suggested. Though the past crises, such as 1997 Asian Financial Crisis; 2002-2004 SARS; 2007-2008 Global Financial Crisis, had shown that the changes in international travel patterns were not permanent, the breadth and depth of the influences are not comparable with COVID-19. Periodic studies on changes in confidence, the effectiveness of ways to rebuild travellers' confidence and changes in travel pattern and volume are needed under the shadow of COVID-19.

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