



Travel Behaviour and Perceptions of Malaysian Airline Passengers during Endemic COVID-19

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Abstract

The study examines Malaysian airline passengers' travel behaviour and perceptions during the endemic Covid-19 after Malaysia re-opened the border. People are free to do an activity, especially travelling by aeroplane. Data were collected through an online platform in 2023. 390 data were obtained and used for the analysis. Findings reveal that 86.15% of Malaysian have travelled by aeroplane since the endemic, and 14.10% have travelled more than five times. 54.44% strongly agree they will avoid travelling with aircraft because of a few personal issues. In addition, results revealed a significant change in passengers' behaviour and perception when travelling after the hit of Covid-19 worldwide.

Keywords: Willingness to pay; Travel Behavior; Malaysian airline; Voluntary carbon offsets

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1.0 Introduction

Climate change is getting worse because air travel has been overgrown. More and more people are paying attention to the main things that cause climate change, like contrails, fuel use, aviation emissions, etc. (Xue, Ng & Hsu, 2020). Although air travel is essential for international and domestic tourism, business travel and leisure, it significantly impacts the environment. Various measures have been implemented to control or reduce aviation emissions, such as changing aircraft engine design, improving air traffic management, and increasing operational efficiency (Lu & Shon, 2012; Hares, Dickinson & Wilkes, 2010). The aviation industry contributes to the emission of greenhouse gases. Simultaneously, a few initiatives were developed to reduce emissions and combat climate change, such as using new technology to set more efficient flight paths, using sustainable lower-carbon fuels, and using more efficient aeroplanes. However, implementing carbon offset is another way to reduce carbon emissions. A carbon offset is a reduction in carbon emissions or other greenhouse gases made by individuals to invest in environmental projects such as tree replanting, reforestation, support for renewable energy use, and use of energy-efficient products.

In early 2020, our world was shocked by the largest pandemic; Covid-19 became a global pandemic on 11 March 2020 after a declaration by World Health Organization due to its spread across the nation and high infectious rate (WHO, 2020). The increasing

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number of infections and the massive impact of the pandemic have led to an exponential rise in research outputs across nations among scientists around the globe, with Malaysia being a player in this.

About 2.5% of the world's Carbon dioxide (CO₂) emissions come from aviation, but its overall effect on climate change is more significant, and it is one of the fastest-growing polluters. This is because flying does not just release CO₂, but it also affects the climate in a lot of other ways. Before the COVID-19 pandemic, about 2.8% of the world's carbon dioxide (CO₂) emissions came from aviation (Berger et al. 2022 and Le Quéré et al. 2020). 20.4% of all carbon emissions in Malaysia come from the transportation sector (Worldmeters, 2023), as seen in Figure 1. Although transport is the third largest contributor to producing fossil carbon emissions, it is estimated it could lead the emissions to triple by 2050.

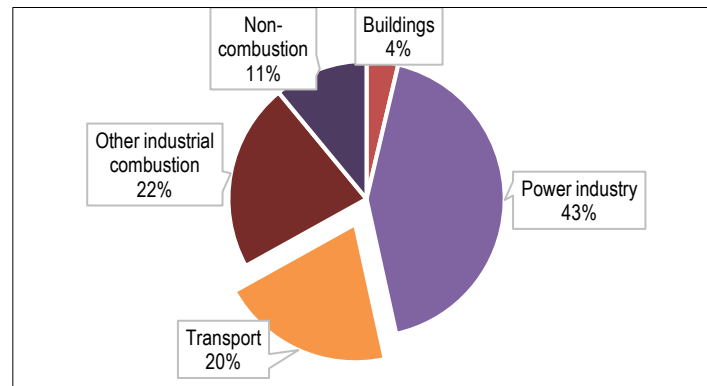


Fig. 1: Fossil CO₂ emissions by sector
(Source:worldometer.com)

Figure 2 shows the emission of carbon emissions created by air transportation from 2014 until 2022 for domestic and international flights. The emission produced by international flights is higher than domestic, which can be related to the aeroplane's size and the distance travelled. From 2014 until 2019, air transport carbon emissions increased for domestic and international flights. However, after the COVID-19 pandemic hit the world in early 2020, the emission pollution by air transport decreased from 2020 to 2021 and increased back in 2022.

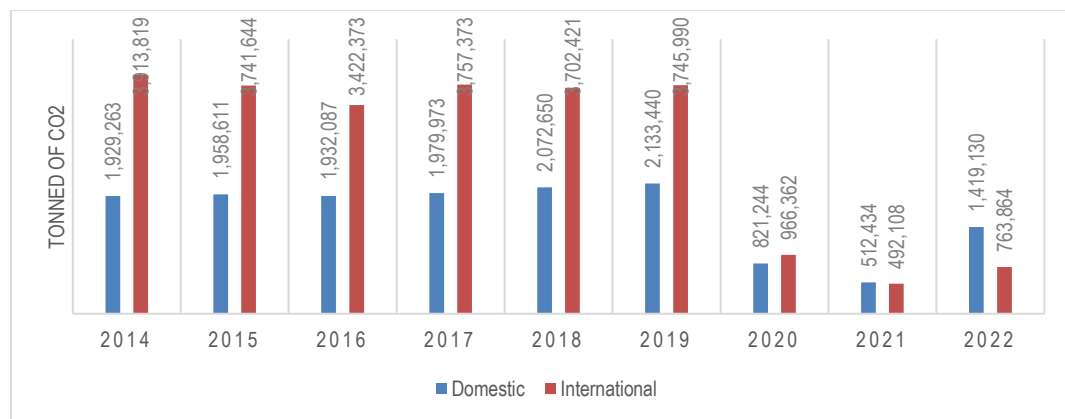


Fig. 2: Air transport CO₂ emissions
(Source:OECD.stat.com)

The first quarter of 2020 shows that air passenger movements dropped by 9.1 million from 2019 (Figure 3). However, in quarter 2, after the Movement Control Order (MCO) set by the Malaysian government and the rest of the world because of COVID-19 hardly hit the emotion and scared people because of the large number of deaths reported, the number of air passenger movement in Malaysia dropped to 0.8 million only. This number was the smallest since 2018. MCO has caused a change in Malaysian travel behaviour not only when travelling by air transportation but also by any public transport required in cramped and crowded situations (Shaari et al. 2022). After almost two years, Malaysians were locked out from any group activities; finally, as of 1 April 2022, Malaysia has entered the transition to an Endemic phase due to the success of public health prevention and control measures, such as the Covid-19 immunisation programme. As reported in Figure 3, the number of air passenger movements in Malaysia started to increase back in quarter 1 2022 to 8.7 million after the lowest rate in quarter 2 2020.

Since Covid-19, only a few researchers have been able to study the effect of Covid-19 on the aviation industry, especially by looking at the passenger's behaviour on travelling and how passengers react to carbon emissions polluted when flying. It is believed that the demand for air transportation has been growing significantly since the endemic phase in Malaysia when Malaysia re-opened the border for visiting and travelling. Thus, it is essential to study Malaysian travel behaviour, especially during the endemic phase, since only a few determine passengers' willingness to pay for a carbon offset before Covid-19 (Shaari et al., 2021; Shaari et al., 2020; Fatimah &

Rahim, 2017), and only a few issued by comparing passengers' choice before and after Covid-19 (Shaari et al., 2022; Shaari et al., 2022) and none of it examines after Covid-19 outbreak, or during the endemic phase. Therefore, this study aims to identify Malaysian airline passengers' travel behaviour and perceptions when travelling by air transportation, simultaneously estimating the value of willingness to pay to reduce the emission from their flights. This study's finding is novel and contributes to the body of literature for the field of study and quantifies the willingness to pay for carbon offset and passengers' travel behaviour to be suggested to the airline industry for better improvement and implication.

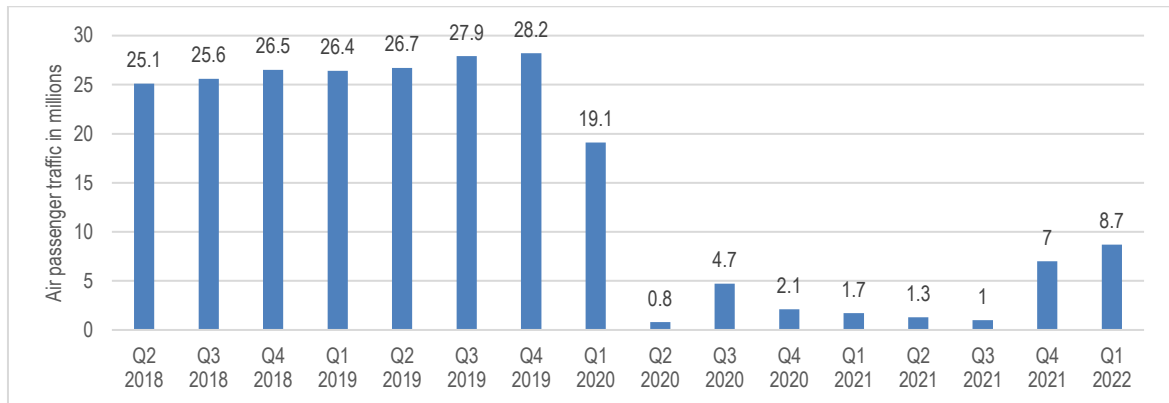


Fig. 3: Air passenger movements in Malaysia Q2 2018-Q1 2022
(Source: Statista.com)

2.0 Methodology

The results from this research are based on the questionnaire survey, in which key questions are asked in accordance with the contingent valuation method (CVM). We use CVM to elicit Malaysian passengers' preferences for carbon offsets and willingness to pay to reduce the emission from flights. The survey was collected with 390 respondents from March 2022 to November 2022. The survey is created in Google Forms and distributed via social media platforms such as Facebook, Instagram, and Twitter, as well as messaging apps Whatsapp and Telegram. The data collection took almost eight months because of the difficulty in obtaining the complete questionnaire from the respondent. One of the main constraints is the online distribution of the questionnaire, which makes it difficult for respondents to understand the requirements of the questionnaire. The researcher used a convenience sample, and the first question asked in the survey was, "have you ever travelled by air transport?" If the respondent answered "no," they were removed from the survey immediately. This strategy ensures that the correct respondent has the required characteristic 'of ever boarded an aeroplane. The actual data collected is 409; however, after data cleaning, only 390 surveys were completed and valid for data analysis, based on the table for determining sample size from Krejcie and Morgan (1970).

2.1 The questionnaire

The questionnaire is divided into four sections. The first section asked about sociodemographic characteristics (gender, age, race, education level, marital status, and occupation). The second section inquires about passengers' travel habits, such as the frequency and purpose of travel before and after the COVID-19 pandemic, as proposed by Shaari et al. 2022 and Shaari et al. 2022. The third section is designed to assess passengers' understanding of carbon emissions and airline carbon offsets, in line with the methodology proposed by Shaari et al. (2022), Shaari et al. (2022), Shaari et al. (2021), Choi (2015), Choi and Ritchie (2014) and Brouwer et al. (2008). The researcher chose the values of the voluntary extra payment on top of airfare to be proposed during the experiment as a reference value, which increases either RM5, RM10, RM15, RM20, or RM25 per trip. The value used by the researcher was suggested in a previous study on Malaysian airline passengers' willingness to pay for emissions offsets in 2018. Using IBM SPSS 26®, the first and third sections are analysed with descriptive statistics. A series of Contingent Value (CV) questions assesses passengers' willingness to pay for carbon offsets after COVID-19. The researchers used a double-bounded dichotomous choice question format to assess passengers' willingness to pay. If passengers disagree with the value requested in double-bounded, they are given an open-ended dichotomous choice.

2.2 Contingent Valuation Method

C Contingent Valuation Method (CVM) is widely used in many economic fields, including environmental and resource economics and health economics. This method has been used to calculate the economic values of non-market goods and services for over 30 years. CVM can calculate the precise number of the WTP, which is more of the good, or the willingness to accept (WTA) having less. CVM is the most commonly used valuation method at the moment. It is one of several methods for putting a monetary value on the use and non-use of environmental services. An econometric model is presented based on the hypothetical scenario presented to the respondents.

B1 denotes the money (Malaysian Ringgit) in the first valuation question start bid. If the answer to B1 is affirmative ("yes"), the second valuation question, denoted by B2, will be asked. If the answer is "no," the question is followed by a lower-priced offer, B3. As a result, the response probabilities for each outcome are as follows (Carson & Hanemann, 2005):

$$\begin{aligned} P(\text{yes, yes}) &= Pr(B2 \leq WTP) & (1) \\ P(\text{yes, no}) &= Pr(B1 \leq WTP < B2) & (2) \\ P(\text{no, yes}) &= Pr(B3 \leq WTP < B1) & (3) \\ P(\text{no, no}) &= Pr(WTP < B3) & (4) \end{aligned}$$

WTP is the true value that passengers are willing to pay to offset carbon emissions when flying. The actual value of willingness to pay is represented by a double-bounded dichotomous choice. The bidding value for CV questions B1, B2, and B3 is determined by modifying (Shaari et al. 2021, and Fatimah & Rahim 2017). The researcher presents the scenario that occurred when travelling by air transportation (how much emissions will be generated by their air travel, and the payment vehicle for cost offsets that will be charged to compensate for the emissions) at the beginning of the CV questions. A linear function in (5) is used to obtain the exact value of willingness to pay:

$$WTP = \beta X + \varepsilon \quad (5)$$

Where WTP denotes the actual value that cannot be directly detected; X denotes the variables used in the study that are related to respondents; β is a coefficient that denotes the parameter of variables; and ε denotes other error terms that follow a normal distribution. The value for WTP is reported as the mean of the mid-values for the lower and upper bounds of respondents' WTP using the estimation model by Cameron (1988) in (6).

$$WTP_i = - \left(\frac{\alpha_0}{\beta_1} + \frac{\beta_2}{\beta_1} (X_{2i}) + \dots + \frac{\beta_n}{\beta_1} (X_{ni}) \right) \quad (6)$$

where:

wtp	= willingness to pay
α_0	= intercept associated with the model
β_1	= parameter of the bid vector amounts
β_2 to β_n	= coefficients of the parameters X_2 to X_n

3.0 Result and discussion

3.1 Respondent travel frequency

Based on Figure 4, the data analysis on respondent travel frequency during the endemic phase shows that most respondents travelled only 1 to 2 times using air transportation (41.79%), and 13.85% chose not to travel by air transportation even after the announcement of the endemic phase. This can best describe where most passengers still feel unsafe when flying in an aeroplane because passengers come from different places with different background of medical. Covid-19 can quickly spread among people without protection (use hand sanitiser and facemasks as protection). Since endemic, people do not need to wear a facemask as protection.

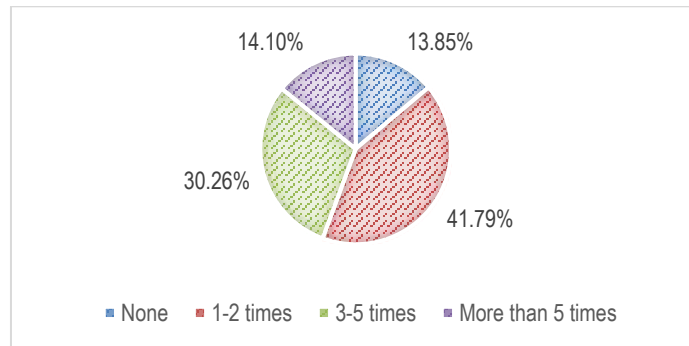


Fig. 4: Malaysian airline passenger traveling frequency during endemic
(Source: Self-survey)

3.2 Passengers' travel behaviors during endemic phase

Section B of the questionnaire required respondents to answer about their travel behaviour during the endemic phase. Passengers needed to answer the question based on their behaviour, not influenced by other people. The question prepared is adopted and adapted from Neuburger & Egger (2021). Among 390 respondents, 76.9% agreed that a vaccine certificate (fully vaccinated) among passengers

would make them feel safer during the entire journey. Only 17% choose in-flight cleaning, guaranteeing a safer journey, and some passengers think it would be better to deny boarding if passengers do not pass a medical check.

Table 1. Passengers' travel behavior

Travel Behavior	Strongly disagree	Disagree	(%)		
			Unsure	Agree	Strongly agree
My travel behavior is likely to change due to coronavirus	3.07	3.59	14.10	25.64	53.60
If I travel to another country depends on how the media is reporting about that country	10.38	11.67	25.13	22.05	30.77
Currently, I would cancel travel plans to countries with reported cases of coronavirus	10.00	10.26	22.56	20.00	37.18
Currently, I would cancel travel plans to countries with no reported cases of coronavirus	10.51	10.26	22.05	25.13	32.05
Currently, I would avoid trips by airplane	3.00	7.18	15.38	20.00	54.44
Currently, I would avoid domestic travel	8.72	14.62	25.12	22.05	29.49
Currently, I would avoid big events	9.74	13.85	26.92	19.49	30.00
I would avoid tourist attractions in my hometown	8.72	5.64	22.82	30.26	32.56
I would avoid any contact with tourists in my hometown	6.17	4.10	15.89	22.56	51.28

(Source: Self-survey)

Based on Table 1, the researcher asked the respondent to vote from 1 (strongly disagree) to 5 (strongly agree) on their behaviour when travelling during the endemic. 54.44% of respondents strongly agree that currently, they would avoid trips by aeroplane, and 53.6% will likely change their travel behaviour due to the coronavirus. Besides, respondents also strongly agree that they will avoid any contact with tourists in their hometown, especially tourists from China, since the first case of Covid-19 is from China. Thus, the result obtained from Table 1 identifying the travel behavior and perceptions of Malaysian airline passengers when travelling during Endemic Covid-19. Airline industries can make a prediction about Malaysian's travelling behavior to prepare a comfortable and safe flying trip.

3.3 Respondents' willingness to pay

The mean willingness to pay (WTP) among 390 respondents was calculated using STATA software version 16, and the value of WTP is presented in Ringgit Malaysia. The calculated mean WTP ranges from RM46 to RM120 within a 95% confidence interval. This value is acceptable because it is higher than the bidding value, RM5 to RM25. It can be concluded that respondents understand the situation and are mostly aware of the future problem if we cannot control or reduce the amount of carbon emission released into the atmosphere.

4.0 Conclusion and recommendation

The COVID-19 pandemic has stressed the world's health care, social, and economic systems. The COVID-19 outbreak has hurt the airline industry more than any other. The endemic phase of Covid-19 in Malaysia allows Malaysian to start travelling activities, thus improving Malaysia's economy, especially the airline industry. The number of air passengers has increased, and Malaysia-based carriers are targeting to return to profitability in the current financial year after slipping into the red in 2019. Based on travel behaviour and perceptions of Malaysian travellers, the findings reveal that Malaysian air travellers are willing to pay between RM46 and RM120 per passenger to offset the amount of pollution the passenger emits when travelling. The willingness to pay the fee is different for each flight. Even though the COVID-19 outbreak made people change how they travelled, our results show that Malaysian air travellers are still willing to pay for carbon offsets. People think this study will add to the body of knowledge by helping to figure out how much people are willing to pay for air travel after the COVID-19 outbreak (endemic phase).

This study's results can help policymakers develop policies that help the airline industry and passengers. The study's findings can be used to reorganise the market's needs. If the policymaker wants to implement the carbon offset, they can talk to the aviation industry about it. The burden of offsetting should not be borne only by one side (passenger) but must include aviation itself. Also, managers and policymakers need to set a new flying trend for the airline market to return after the pandemic. There is a must for the aviation industry to prepare for any risk management in future ahead. A backup plan is needed if the same pandemic suddenly hits the world again. At the same time, it can teach and create awareness among people about how important it is to protect the environment from things like climate change and global warming.

Every study has some kind of problem, and this one is no different. Even though the researcher collected more than the minimum data needed, which is 384 respondents based on Krejcie and Morgan sample table, the information or answer obtained from the respondent is doubtful, especially from section 4 of the questionnaire (contingent valuation willingness to pay). This section required an explanation from the researcher because people often need help understanding the question when they read it online without help from a trained enumerator or researcher. This is especially true for the "willingness to pay" section. For future research, the survey could be done in person, and the researcher could hire more enumerators to help people fill out the survey. The respondent will know more about carbon offsets and explain the contingent valuation scenario. The following research requires the researcher and trained enumerator to collect data in the actual field (face-to-face) to get a more accurate result. It is also advisable for the following research that the researcher

needs to apply or conduct a survey question using the mean willingness to pay based on the finding obtained from this research to discover whether the mean value of willingness to pay can be a new starting value for the subsequent estimation.

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Paper Contribution to Related Field of Study

This research paper contributes to the field of Environmental Economics and consumer pro-environmental behavioral.

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