Journal of the Civil Engineering Forum, September 2024, 10(3):267-278
DOI 10.22146/jcef.12569
Available Online at https://jurnal.ugm.ac.id/v3/jcef/issue/archive

Airline Choice Decision for Jakarta-Denpasar Route During the COVID-19 Pandemic

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SUBMITTED 14 March 2024 **REVISED** 29 June 2024 **ACCEPTED** 08 July 2024

ABSTRACT As one of the most popular destinations in Indonesia, Bali has experienced growth in its domestic passenger arrivals over the last few years. Travel restrictions during COVID-19 have reduced airline passenger numbers on the Jakarta-Denpasar route. The travel restriction has loosened, and the economy is starting to recover in January 2022. However, the number of domestic passengers arriving in Denpasar has not returned to its former state. This research aims to understand the influential factors in the airline decision-making of domestic passengers on the Jakarta-Denpasar route. We started the research with an exploratory study to find the influential factors in which we obtained five attributes. The attributes include airfare, flight schedule, transit number, travel time, and HEPA filter. We conducted a stated choice experiment with five alternatives: Foreign private LCC, Private FSC, Private LCC, Flag LCC, and Flag FSC. The questionnaire was designed with a D-efficient design. We obtained 256 respondents, and there are 2048 observations for the Mixed Multinomial Logit Model estimation. From the estimation, we found that airfare, number of transits, travel time, and HEPA filter are all significant with expected signs. We also found that the flight schedule is not significant. Several socio-demographic variables, such as Gender, Age (except for Flag FSC), and income (also except for Flag FSC), are insignificant in airline choice decisions. We also presented the calculation of elasticity as well as the willingness to pay. Further, we propose that all airlines increase their direct flights for the Jakarta-Denpasar route since respondents prefer less transit. As people are more concerned about public transport's hygiene, stating that HEPA filters' availability in airline promotion is also recommended to gain more trust. Finally, our paper offers recommendations for airlines to improve their services and passenger satisfaction after the pandemic recovery period.

KEYWORDS Airline Choice Decision; Exploratory Study; Jakarta-Denpasar Route; Stated Choice Experiment; Mixed Multinomial Logit

1 INTRODUCTION

There have been many travel restrictions on international and domestic flights during COVID-19. Many governments issued these regulations to push down the spread of the virus. As the borders slowly open up and travel restrictions loosens, airlines implement health protocols on their flight. Since the beginning of 2021, the Ministry of Transportation of the Republic of Indonesia has explained that physical distancing does not need to be implemented as long as airlines and airports strictly implement health protocols (Yanwardhana, 2021). As a result, airlines practice health protocols before, during, and after each flight to maintain hygiene. Several airplanes are also equipped with High-Efficiency Particulate Air (HEPA) filters. HEPA filters effectively capture more than 99.7% of particles while air filtering (Bhuvan et al., 2021). However, only modern and large commercial airplanes use HEPA filters.

The Indonesian aviation sector immediately felt the effect of COVID-19. From January to March 2020, 14,000 domestic flight that were canceled. Meanwhile, international flight cancelation totaled 4,300 flights (Hartomo, 2020). The number of domestic passengers also fell in 2020. The most significant decrease was in May 2020, when the Indonesian government started implementing the "Pembatasan Sosial Berskala Besar" (travel restriction) and limiting flights to several destinations. The total number of domestic passengers in 2020 was around 35.3 million. Compared to the previous year, when the total number of domestic passengers was 79.5 million, this represents a 55% decrease (BPS, 2021).

According to BPS (2022) data, the total domestic passenger arrival at I Gusti Ngurah Rai International Airport (Denpasar, Bali Airport) relatively increased from 2015 until 2019. During those six years, the highest number was in 2018, with 5.6 million passengers. Unfortunately, the number decreased sharply in 2020 to 1.7 million passengers. It is a 64% decrease from the previous year. The extreme decline in 2020 resulted from the COVID-19 pandemic in Indonesia in early March 2020. Fortunately, the number of passengers is

increasing again in 2022.

In May 2021, I Gusti Ngurah Rai International Airport, served more than 268,540 domestic and international passengers (Yusuf, 2021). The most popular route was Jakarta-Denpasar-Jakarta, with 138,200 passengers, followed by the Surabaya-Denpasar-Surabaya route with 39,812 passengers, and in third place was Bandung-Denpasar-Bandung with 14,093 total passengers. This situation was triggered by the public interest in traveling during the adaptation to the new normal, the ease of travel requirements to Bali, and the Bali tourist attractions reopening for domestic tourists on July 31, 2020 (Prakoso, 2020). The three airlines with the most passengers across all routes in May 2021 were Citilink Indonesia, a flag low-cost carrier (Flag LCC), with 86,866 passengers; Lion Air, a private LCC with 60,023 total passengers; and Garuda Indonesia, a flag full-service carrier (Flag FSC), with 46,194 passengers (Yusuf, 2021).

The Jakarta-Denpasar route has been a favorite route before and during the pandemic. It shows that Bali is a top-rated and in-demand destination. As the travel restrictions have loosened and the economy is recovering, the number of domestic passengers who arrived in Denpasar in January 2022 increased by 80% compared to January 2021 (CNN Indonesia, 2022). However, in 2022, the number of passengers has not returned to the number before the pandemic. Therefore, this research aims to understand attributes that significantly affect passengers in choosing an airline for the Jakarta-Denpasar route. Note that in this study, Denpasar and Bali will be used interchangeably.

The structure of the paper is as follows: after the introduction, we discuss previous studies on airline choice decisions. In the 3rd section, we discuss the research method, which starts from exploratory data to the stated choice experiments, followed by the mixed multinomial logit estimation method. We also add elasticity and willingness-to-pay calculation methods. In the 4th section, we discuss the survey results and model estimation results. Finally, in the last section, we conclude and propose recommendations.

2 LITERATURE REVIEW

Several studies have been conducted to understand airline choice decisions. Cantillo et al. (2021) found that, in Colombia's case, passengers are highly sensitive to airfares, travel time, and departure time (expected and actual time). According to Sotomayor-Castillo et al. (2021), most respondents (75.6%) felt 'somewhat' to 'extremely concerned' about contracting an infectious disease on an airplane. Most respondents, the majority from Australia, agreed airlines should provide in-flight complimentary hand sanitizers (86.8%), sanitary

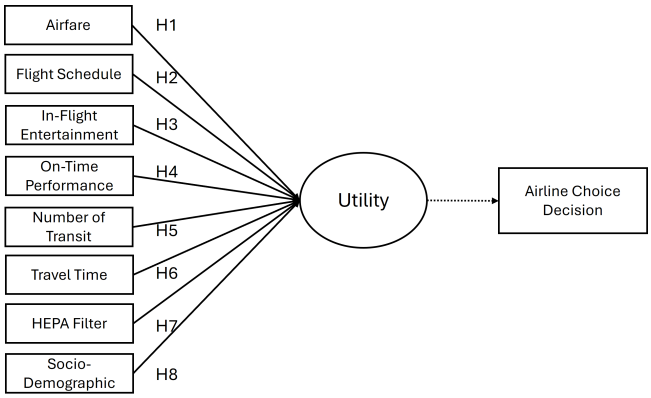

Figure 1 Initial Conceptual Framework

wipes (82.9%), and masks (64.4%), as well as more information about preventing the spread of infections (90.7%), which would make the majority feel safer to fly. Through latent class modeling results, Zhou et al. (2020) found that the key determinant attributes affecting Australian regional travelers' mode choice among car, bus, and airlines are travel cost, journey time, seat comfort, and service frequency.

In contrast, the importance of access time may depend on the market groups or study areas. For example, Medina-Muñoz et al. (2018) found that the most important categories for Spain passengers were safety and punctuality, ticket price, and attention and service during the customer journey. In addition, air travel frequency positively influenced passengers' attachment to safety and punctuality, flight schedules and connections, and in-flight space.

Kim and Park (2017) asked aviation experts in Korea to analyze important attributes of FSC and LCC. For FSCs, they found that safety, flight schedule, cabin interior, and fast check-in processes are significant attributes. Meanwhile, for LCCs, they found that airfare level, flight safety, the convenience of air ticket purchasing procedures, and additional charges were considered important selection attributes. Chen and Chao (2015) studied factors influencing passengers in Taiwan in choosing airlines from 22 influential factors. The top 5 factors are safety and reliability, punctuality, efficiency in passengers' problem-solving, service attitude of flight attendants, and reliability and safety in baggage handling. Interestingly, the price is in the 13th place out of 22 factors.

Milioti et al. (2015) research shows that based on travelers' perceptions, fare, safety and reliability, and the airline's image are considered significant factors in choosing an airline. Jung and Yoo (2014) found that fare, access time, and journey time are crucial to passenger choice. Reducing access time is more important than lowering journey time for short-hour domestic travelers. The conclusion is that it is extremely important for airline planners or local authorities to in-

vest in relatively fast access modes to increase their local market share. Ong and Tan (2010) found that consumers' socio-demographics (ethnicity and education level) and behavioral choices (schedules, airfares, routes, booking methods, and purpose of journey) are essential factors that influence airline choice.

According to Wiarti et al. (2017), transportation price is the second most important factor for travel, followed by guide service and food and beverage. However, airfares tend to increase as the departure date approaches in most cases. It is one of the strategies for airlines to differentiate their passengers into leisure and business passengers (Mantin and Koo, 2010). In other approaches, FSC offers several cabin types with different airfares for different target passengers to compete with LCC. Meanwhile, LCC stands with low airfares to secure market demand (Ko, 2019). In Indonesia, the Ministry of Transportation issued new regulations regarding airfare. It regulates the price floor and ceiling up to 35%. With the new Trans Java Toll Road, it has been found that inter-city passengers are more likely to switch to land transportation due to the increase in airfares (Irawan et al., 2020).

According to Proussaloglou and Koppelman (1999), the passengers' activity at the destination affects the flight schedule preference. In other words, the passengers' scheduled activities determine the passengers' preferred departure and arrival time. Thus, airlines aim to provide flight schedules that best accommodate passengers' activities. From the business perspective, airlines tend to schedule their flights closely with their competitor to take advantage of the high-demand route and draw more passengers from the nearby flight (Sun, 2015).

Digitalization plays a vital role in improving productivity and customer satisfaction in the aviation industry. In-flight entertainment (IFE) is one of the strategies (Shah et al., 2020). To support the argument, a survey from Panasonic in 2019 found that more than 19% of passengers will be more attracted to choose a specific airline based on their high quality of IFE (Avionics, 2019). The use of IFE will boost the airline's service, image, and brand to the passengers' point of view (Alamdari, 1999).

On-time performance is a relevant measurement in the transportation industry. Airline departure or arrival is considered on time if the departure or arrival is within 15 minutes of the scheduled time (Yimga, 2021). Unfortunately, numerous factors affect the on-time departure or arrival, such as visibility, wind, congestion, incidents, and airport performance (de Oliveira et al., 2021). Meanwhile, passengers are sensitive to on-time performance because they bear a loss due to the flight delay (Yimga, 2020). Therefore, airlines should pay attention and effort to increase their on-time performance rate.

Hess et al. (2007) showed airfare as the most significant variable. They also found that the number of connections (transit) passengers must take to reach their final destination influences airline choice decisions (Hess et al., 2007). According to Kim and Park (2017), flight schedule, flight frequency, and the number of transits are highly associated with the core service of an airline. However, business travelers consider less transit an important factor (Milioti et al., 2015). Moreover, business travelers are more willing to pay a premium for a direct flight (Hess et al., 2007).

The total travel time includes flying time and the transit duration to arrive at the destination (Cantillo et al., 2021). Usually, travel time indicates a punctual and uncongested travel scenario. But in reality, random fluctuations caused by delays and other incidents might occur (Gardner et al., 2021). Based on travel purposes, it is found that most business travelers are more sensitive to travel time due to their time inflexibility, resulting in business travelers generally being willing to pay more for faster travel time (Cantillo et al., 2021; Jung and Yoo, 2014; Xiao et al., 2008). On the contrary, leisure travelers are less sensitive to travel time and choose lower prices among acceptable flight choices.

Air filtration in numerous implementations has become essential in managing the spread of COVID-19 (Bielecki et al., 2020), especially in public transport, including airplanes, where the density and risk of spreading increase by aerosol particles and droplets (Zhen et al., 2020). Thus, airlines improved their ventilation and filtration systems to enhance air filtration performance and keep passengers safer (Christopherson et al., 2020). Technically, 60% of the air circulating inside the airplane is drawn from outside, while 40% is filtered via the high-efficiency particulate air (HEPA) filter and re-circulated. However, HEPA filter is less frequent in small airplanes (less than 100 passengers) due to the high cost (Bhuvan et al., 2021). According to Lin et al. (2022), the use of HEPA filters and efficient ventilation in airplanes result in the lowest particulate matter (PM) levels compared to other public transportation assessed (car, bus, subway, inter-city bus, and high-speed train).

Socio-demographic characteristics significantly affect travel behavior (Lu and Pas, 1999). To be more specific, socio-demographic characteristics strongly correlate with people's travel behavior, especially the number of trips taken (Ma et al., 2014). People with different ages, gender, and income characteristics have different preferences, lifestyles, and attitudes, which could lead to varying travel behavior patterns (Ha et al., 2020). People who come from the same age tend to have shared experiences, affecting their preferences (Longe, 2021). Monthly income is the most frequently

used characteristic and strongly correlates with travelers' choices. If the cost is different across options, the choice decision will depend on the size of the travelers' income. However, if the price is similar, the dependence on income will be less (Can, 2013).

The previous studies above show that airfare, flight schedule, in-flight entertainment (IFE), on-time performance (OTP), transit number, travel time, and HEPA filters are important attributes of airline choice decisions. In addition, socio-demographic characteristics are also important determinants. The author formed hypotheses H1, H2, H3, H4, H5, H6, H7, and H8, as can be seen in Figure 1. Those factors are the independent variables, while the choice decision is the dependent variable. The rectangles represent observed variables. Those variables construct the utility that will affect the choice decision. The black arrow indicates the research objectives where airfare, number of transits, in-flight entertainment (IFE), on-time performance (OTP), number of transits, travel time, HEPA filters, and socio-demographic characteristics influence airline choice decisions. The dashed arrow indicates that the utility constructed the choice decision.

3 DATA COLLECTION

3.1 Exploratory Study

In order to have a better understanding of factors that influence the airline choice decision, the author conducted short exploratory research through an online survey. Of 39 respondents in the survey, 77% had traveled from Jakarta to Denpasar during COVID-19. According to the survey, no one chose in-flight entertainment as their concern on the Jakarta-Denpasar route. Therefore, the in-flight entertainment was omitted from the hypothesis. However, more than 20 respondents chose the six factors: airfare, flight schedule, on-time performance, number of transits, travel time, and HEPA filter. The use of a HEPA filter was chosen by 28% of the respondents. Since we did not obtain enough information on the actual value of each airline's on-time performance, we omitted the attribute from the analysis. Note that, other than attributes listed in Figure 1, we also asked respondents to fill in whatever factors that they thought important in airline choice decisions.

After the exploratory research, we developed a final conceptual framework for this research, shown in Figure 2. The final attributes for this research are airfare (H1), flight schedule (H2), number of transits (H3), travel time (H4), HEPA filter (H5), and socio-demographic characteristics (H6). The black arrow indicates the relation of observed attributes to airline choice decisions. The dashed arrow indicates that the utility constructs the choice decision. We hypothesize

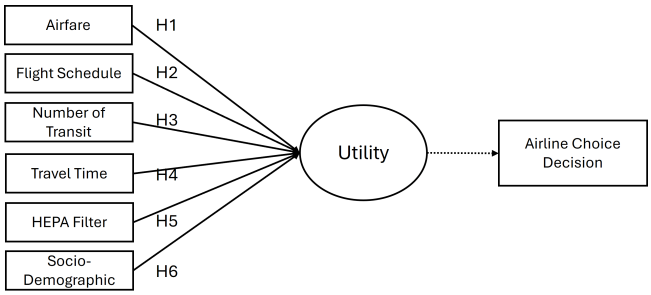

Figure 2 Final Conceptual Framework

that all of those seven variables influence airline choice decisions.

3.2 Stated Choice Experiment and Data Collection

For designing the stated choice experiment, we decided on the number of alternatives. At the time of the study, four airlines had the highest market share. Garuda Indonesia (The Flag FSC), Citilink (Flag LCC), Lion Air (Private LCC), and others. These three airlines are included in the choice experiments. As for others, we divided it into two airlines with high market share in Indonesia: Air Asia (Foreign private LCC) and Batik Air (Private FSC). For the choice experiment design and subsequent discussion, we refer to those alternatives as FSC and LCC. Interestingly, each airline brand represents each category. No category is filled with two airline brands.

The five attributes of alternatives for the research consist of airfare, flight schedule, transit number, travel time, and HEPA filter. Each attribute has up to three levels for each alternative, except for the flight schedule and HEPA filter, as shown in Table 1. We determined the value (the actual value) for airfare, flight schedule, number of transits, and travel time from Sky Scanner, a travel website for flights, hotels, and car rental booking at the time of the research, December 2021. The HEPA filter value was obtained from the airline's official website.

Specifically for airfare, we collected the cheapest, the middle value, and the most expensive ticket prices for each airline for a week. The first level of airfare is for a direct non-peak hour flight. The second level for airfare is for one transit non-peak hour flight and a direct peak hour flight. Meanwhile, the third level is for the two transit flights. The number of transits values presents the direct flight, one transit flight, and two transit flights. The first value is for direct flight, the second is for one transit flight, and the third is for two transit flights. Meanwhile, the travel time is written in minutes. Travel time also includes direct and transit flights. For example, the longest travel time might also mean the most transit.

Table 1. Attribute of Alternatives

Attributes	Foreign private LCC	Private FSC	Private LCC	Flag LCC	Flag FSC
Airfare (in IDR 1K)*	500, 803, 2355	635, 1504, 2909	550, 881, 2350	536, 919, 2434	1147, 1523, 2076
Flight Schedule	0, 1	0, 1	0, 1	0, 1	0, 1
Number of Transit	0, 1, 2	0, 1, 2	0, 1, 2	0, 1, 2	0, 1, 2
Travel Time (min)	115, 220, 350	110, 275, 515	110, 454, 681	115, 170, 1425	125, 215, 420
HEPA Filter	0, 1	0, 1	0, 1	0, 1	0, 1

Note: USD 1 is approximately IDR 15K

The value for the HEPA filter is represented by 0 and 1. Zero indicates that the airline does not use a HEPA filter, while one indicates that the airline has a HEPA filter in the aircraft. The flight schedule is divided into peak-hour flights and non-peak-hour flights. The peak hour flight is the flight with a departure time between 07.00 and 12.00, symbolized by 1. Meanwhile, the non-peak hour flight departs between 13.00 and 17.00, represented by 0. Note that there was no nighttime flight schedule when we conducted this information search. Also, the peak hour was obtained from the previous historical flight between Jakarta and Denpasar.

We need to determine the number of choice tasks to design the stated choice experiments with five alternatives and five attributes. According to Rose and Bliemer (2013), the number of choice tasks (S) should follow the Equation 1:

$$(J-1)S \geq K \tag{1}$$

With the number of alternatives (J) of 5 and the number of alternative specific parameters (K) of 29 (25 attributes and four alternative specific constants), the minimum number of choice tasks (S) is 8 (integer). To improve the identification of parameter estimates, increasing the degree of freedom by 2 or 3 times is recommended (Bliemer and Rose, 2014). Thus, for this study, we decided to increase the degree of freedom by four times to 32 choice tasks. We used the D-efficient design (Bliemer et al., 2009) in Ngene (ChoiceMetrics, 2018) to obtain the choice task. Since the number of choice tasks is too large to show to one respondent, we blocked the design into four smaller parts to reduce the response burden. With that, we made four questionnaires where each respondent must do eight choice tasks.

Each questionnaire consists of three parts. The first part is the screening questions. We only ask respondents who have traveled from Jakarta to Denpasar using an airline in the past and respondents who have an intention to travel from Jakarta to Denpasar using an airline. The second part is the stated choice experiment parts. We presented the respondents with five airline alternatives and their attributes. Note that in the questionnaire, we do not use the term "private/public FSC/LCC," but we use the actual brand of the airplane. Airfare is presented fully in Indonesian Rupiah (IDR). The flight schedule is represented by "departure time between 07:00 WIB – 12:00 WIB (Western Indonesia time)" or "departure time between 13:00 – 17:00 WIB. Transit is represented by "direct flight," "transit in Surabaya," and "transit in Surabaya and Makassar." Travel time is presented by hour and minute, for example, "3 hours and 40 minutes." For the HEPA filter, we presented "HEPA filter available" or "HEPA filter unavailable." We also explained in our questionnaire what a HEPA filter is so that our respondents understood prior to filling the questionnaire. Finally, we asked several questions regarding their socio-demographic characteristics for the third part of the questionnaire.

For the respondents' selection, we focused on domestic tourists. The respondents are chosen based on their domicile location. Since our chosen route for the experiment is the Jakarta – Denpasar route, we chose Banten, DKI Jakarta, and West Java as the geographical basis because the nearest airport for those cities is located in Jakarta. Although Bandung has direct flights to Denpasar, several West Java cities are nearer to Jakarta. Therefore, we included West Java in this research. We distributed the questionnaire online, and since we have four questionnaire types, we made sure that all the questionnaires were filled proportionately.

3.3 Mixed Multinomial logit Model Estimation

To estimate the parameters, we conducted mixed multinomial logit model (MMNL) estimation (Train, 2009). In MMNL, the probability of individual n choosing alternative i over alternative j on choice task t is when the utility U of alternative i is greater than alternative j, as shown in Equation 2. Where C_{nt} is the feasible choice set, which in this study includes Foreign private LCC (i = 1), Private FSC (i = 2), Private LCC (i = 3), Flag LCC (i = 4), and Flag FSC (i = 5).

$$P_{\text{int}} = Pr(U_{\text{int}} > U_{\text{jnt}}, \forall\, j \in C_{\text{nt}}, j \neq i) \tag{2}$$

Alternative-specific constants are estimated for all alternatives except for Flag LCC as the reference category. For the alternatives, we estimate all five attributes: Airfare, Flight Schedule, Number of Transits, Travel Time,

Table 2. Socio-demographic

Variable	Value	Sample size	Sample Percentage
Age	A: Generation X (42-56)	38	14.84%
	B: Generation Y (26-41)	32	12.50%
	C: Generation Z (18-25)	186	72.66%
Gender	Female	162	63.28%
	Male	94	36.72%
Monthly Income	A: <IDR 5,000,000 (approximately USD 322)	175	68.36%
	B: IDR 5,000,001- IDR10,000,000 (USD 322 – 645)	35	13.67%
	C: >IDR10,000,000 (USD 645)	46	17.97%

and HEPA Filter. These parameters are estimated as random generic parameters. We also estimated socio-demographic characteristics, which are age (A: Generation X; B: Generation Y; and C: Generation Z), gender (male, female), and income (A: < IDR 5 M; B: IDR 5-10 M, and C: > IDR 10 M). The reference categories for the socio-demographic characteristics are age C, male, and income A for Flag LCC.

We estimated the model using maximum likelihood estimation with 1000 MLHS draws using Apollo (Hess and Palma, 2019). Furthermore, we calculated the elasticity of airfare and the elasticity of travel time. We did not calculate the elasticity of the number of transits, flight schedule, and HEPA filters as it has no meaning of an increase of 1% of the nominal category. Finally, we calculated the willingness to pay (WTP) for travel time and number of transits. The calculation of WTP for travel time means the travel time parameter divided by the airfare parameter. Since the parameter of airfare is random, there is a possibility that the WTP does not exist if the parameter is zero (Daly et al., 2012). Therefore, we use the WTP space for the WTP calculation (Train and Weeks, 2005).

4 RESULT AND DISCUSSION

4.1 Descriptive Statistics

We obtained 256 responses in total. This means there are 2048 observations for the MMNL model. The socio-demographic table can be seen in Table 2. Most of the respondents are from Generation Z, 18-25 years old, with a total of 186 people, or 72.66% of the total respondents. The second largest group of the respondents are from Generation X, 42-56 years old, comprising 14.84% of the total respondents. Lastly, Generation Y, 26-42 years old, accounts for only 12.5% of the total respondents with 32 respondents.

The majority of our respondents are female, at around 63.28%. Most of the respondents earn below IDR 5,000,000 monthly income, with a total of 175 respondents. Furthermore, the range IDR 5,000,001 – 10,000,000 is in the second place in terms of the greatest number of respondents with 13.67% or equal to 35 people.

We also checked the number of non-trading behavior in our observations. Non-traders are those who, for whatever the situation, will always choose the same alternative. The number of non-traders in total is less than 10%. The detail is as follows: Foreign private LCC, 0%; Private FSC, 0.78%; Private LCC, 0.39%; Flag LCC, 1.17%; and Flag FSC, 3.13%. This means most of our respondents are not loyal to one particular category/brand. This indicates that attributes of alternatives matters in the decision to choose a particular airline category.

4.2 MMNL Model Results

The MMNL model results can be seen in Table 3. Looking at the model fit, particularly the rho square of 0.3, we can say that it is a decent model fit, representing R2 of approximately 0.6 if it is a linear regression model (Hensher et al., 2005). The alternative specific constant (ASC) for Foreign private LCC is insignificant. It means that in the ceteris paribus, there is no significant difference between choosing Foreign private LCC and Flag LCC. ASC private FSC, Private LCC, and Flag FSC are significant with negative signs. It indicates that all else being equal, the respondents are less likely to choose those airlines than Flag LCC.

The mean value (μ) of airfare is significant, with an expected sign indicating that the higher the airfare, the less likely the respondents are willing to choose a particular airline. This finding aligns with the previous studies such as Cantillo et al. (2021), who demonstrated that passengers are highly sensitive to airfares, reflecting demand elasticity principles. It also aligns with Wiarti et al. (2017) and Mantin and Koo (2010) who emphasize that airfare strategies are crucial for differentiating between leisure and business travelers, with LCCs maintaining low fares to secure market demand.

Table 3. Model Estimation

Name	Beta value	Robust t-test		Name	Beta value	Robust t-test	
ASC: Foreign private LCC	-0.29	-1.48		Socio-demographic			
ASC: Private FSC	-0.63	-2.25	**	Female - Foreign private LCC	0.04	0.14	
ASC: Private LCC	-1.47	-5.19	**	Female - Private FSC	0.08	0.23	
ASC: Flag FSC	-0.91	-2.37	**	Female - Private LCC	-0.08	-0.24	
Random parameter				Female - Flag FSC	0.31	0.72	
μAirfare	-1.28	-4.88	**	Gen X - Foreign private LCC	0.11	0.17	
σAirfare	-1.76	-8.34	**	Gen X - Private FSC	-1.10	-1.36	
μFlight schedule	0.06	0.62		Gen X - Private LCC	-0.53	-0.69	
σFlight schedule	0.55	3.93	**	Gen X - Flag FSC	-1.73	-1.97	**
μnumber of transits	-1.82	-9.91	**	Gen Y - Foreign private LCC	-0.11	-0.20	
σnumber of transits	-1.74	-9.75	**	Gen Y - Private FSC	-1.35	-1.79	*
μTravel time	-0.07	-1.86	*	Gen Y - Private LCC	-0.64	-0.94	
σTravel time	0.09	1.43		Gen Y - Flag FSC	-2.10	-2.95	**
μHEPA filter	0.86	6.90	**	Inc. B - Foreign private LCC	0.10	0.23	
σHEPA filter	1.36	8.52	**	Inc. B - Private FSC	0.49	0.82	
Random error component				Inc. B - Private LCC	0.81	1.55	
σForeign private LCC	-0.81	-4.32	**	Inc. B - Flag FSC	1.76	3.18	**
σPrivate FSC	0.99	3.59	**	Inc. C - Foreign private LCC	-0.91	-1.43	
σPrivate LCC	0.87	3.07	**	Inc. C - Private FSC	0.53	0.62	
σFlag LCC	1.18	6.68	**	Inc. C - Private LCC	-0.15	-0.20	
σFlag FSC	1.96	6.43	**	Inc. C - Flag FSC	2.48	3.27	**
Model Fit							
Number of observations				2048			
Init log-likelihood:				-3296.13			
Final log-likelihood:				-2097.81			
Rho-square:				0.36			
Rho-square-bar:				0.35			

Note: ** significant at 5%; * significant at 10%

The mean value of the number of transits is significant and also with a negative sign. It indicates that the greater number of transits, the less likely the respondents will choose the particular airline. Our finding is consistent with Hess et al. (2007), who found that the number of connections influences airline choice decisions. Zhou et al. (2020) also identified travel convenience, including fewer connections, as a key determinant for Australian regional travelers.

Travel time is significant (10%) with an expected sign, indicating that the longer the travel time, the less likely an airline will be chosen. This result supports findings by Cantillo et al. (2021) and Jung and Yoo (2014), who reported that travel time significantly impacts passenger choice, particularly for business travelers who prioritize efficiency.

The HEPA filter is significant with a positive sign, indicating that respondents prefer airlines to use HEPA filters. Finally, flight schedule is insignificant for airline choice decisions. This result is consistent with Bielecki et al. (2020) and Christopherson et al. (2020), who highlighted the role of HEPA filters in managing the spread of COVID-19, making it a critical factor in airline choice during and post-pandemic.

The standard deviation (σ) for Airfare, flight schedule, Number of transits, and HEPA filter is significant, indicating taste heterogeneity across individuals regarding those attributes of alternatives. As for the random error components, all alternatives are significant, indicating a substantial amount of preference heterogeneity for each airline alternative. It means that, for example, for airfare, the high heterogeneity suggests that some passengers may consider airfare to be the most important factor when choosing an airline, prioritizing low cost above all else. These passengers are typically more price-sensitive and may include leisure travelers or those with tighter budgets. On the other hand, for other passengers, airfare may be the least important factor, with more emphasis placed on convenience, such as the number of transits, travel time, or health

Table 4. Model Estimation

Attributes	Elasticity indicators (direct and cross elasticities)				
	Foreign private LCC	Private FSC	Private LCC	Flag LCC	Flag FSC
Foreign private LCC airfare elasticity	-0.37	0.08	0.13	0.14	0.10
Private FSC airfare elasticity	0.09	-0.51	0.18	0.09	0.10
Private LCC airfare elasticity	0.08	0.09	-0.46	0.05	0.05
Flag LCC airfare elasticity	0.19	0.13	0.13	-0.42	0.14
Flag FSC airfare elasticity	0.17	0.15	0.16	0.16	-0.62
Foreign private LCC travel time elasticity	-0.04	0.01	0.02	0.02	0.01
Private FSC travel time elasticity	0.01	-0.04	0.01	0.01	0.01
Private LCC travel time elasticity	0.01	0.01	-0.07	0.01	0.01
Flag LCC travel time elasticity	0.02	0.01	0.01	-0.04	0.02
Flag FSC travel time elasticity	0.01	0.01	0.01	0.01	-0.05
Willingness to Pay					
WTP travel time (IDR)	187,908	187,908	187,908	187,908	187,908
WTP transit (IDR)	768,684	768,684	768,684	768,684	768,684

Note: For elasticity, bold represents own elasticity while others represent cross elasticity

and safety measures like HEPA filters.

For the socio-demographic variable, we can see that females are all insignificant, which means there is no difference between males and females in choosing Flag LCC over other airlines. Gen X - Flag FSC is negatively significant for the age category, indicating that Gen X, compared to Gen Z, is less likely to choose Flag FSC over Flag LCC. Similarly, Gen Y, compared to Gen Z, is less likely to choose Flag FSC over Flag LCC. Gen Y - Private FSC is significant at 10% with a negative sign. It indicates that compared to Gen Z, they are less likely to choose Private FSC over Flag LCC. We found that Inc. B - Flag FSC for income category and Inc. C - Flag FSC to be significant. These results indicate that higher-income people are more likely to choose Flag FSC over Flag LCC.

The results of elasticity and WTP can be seen in Table 4. For all alternatives, the airfare is inelastic. An increase of 1% of Foreign private LCC will contribute to a decrease of 0.37% in the probability of choosing Foreign private LCC (own elasticity). At the same time, there will be an increase of 0.08%, 0.13%, 0.14%, and 0.10% in probabilities to choose Private FSC, Private LCC, Flag LCC, and Flag FSC, respectively (cross elasticity). The highest airfare own elasticity is for Flag FSC of -0.62. This means that an increase of 1% in Flag FSC airfare will contribute to the decrease of 0.62% of the probability of choosing Flag FSC and, at the same time, will contribute to the increase of probability of choosing other airlines by at least 0.1%.

The travel time elasticity own and cross elasticities are quite small, which is less than 0.1. This is as expected since travel time is significant at a 10% level. Even an increase of 10% of the travel time of Flag FSC will only contribute to the decrease of 0.5% probability of choosing Flag FSC. Other than elasticity, we also calculated the WTP for travel time and transit. The WTP of travel time is IDR 187,908, which means that respondents are willing to pay IDR 187,908 more for a one-hour reduction in travel time. As for the number of transits, the respondents are willing to pay IDR 768,684 more to reduce one number of transits.

5 CONCLUSION

This paper aims to understand significant attributes that influence domestic passengers in choosing an airline for the Jakarta-Denpasar route. From the literature review, we found several influential factors that determine the passenger choice decision, and we confirmed those factors by doing exploratory research. With that, we conducted an experimental design to get several choice tasks for the respondents. We checked in our survey results whether there are non-trading behaviors or not. We observed that there are less than 10% non-traders, which means that the attributes of alternatives are influential on airline choice decisions.

From the MMNL results, we found that airfare, number of transits, travel time, and HEPA filter are all significant with expected signs. This confirmed our hypothesis that those attributes are influential on choice decisions. We also found that the flight schedule is not significant. Several socio-demographic variables such as gender, age (except for Flag FSC), and income (also except for Flag FSC) are insignificant in airline choice decisions.

All airlines are suggested to increase their direct flights for the Jakarta-Denpasar route since respondents prefer less transit. As people are more concerned about the hygiene of public transport, stating the HEPA filter availability in the airline promotion is also recommended to gain more trust. As a promotion idea, all airlines could explain the strict implementation of COVID-19 protocols and the use of HEPA filters in all aircraft. For example, they could make a campaign on TV and online platforms about the standard operating procedures before and after the aircraft is used to guarantee it is clean since it is always sprayed thoroughly with disinfectants.

According to the significant attributes, Flag LCC is suggested to add their direct flights for the Jakarta-Denpasar route schedule in both morning and afternoon departure times. As of March 2022, the ticket price for morning and afternoon departure times is the same; Flag LCC could slightly increase the price for the afternoon departure time since we have confirmed with the elasticity calculation that an increase of 1% in price will only decrease the probability by 0.5% of choosing Flag LCC. We discovered that older people with more buying power are more likely to choose this airline. Flag LCC is recommended to publish the campaign on both new and traditional media since Generation X consistently watches TV and leverages digital devices.

Flag FSC has a reputation of being expensive since it is a full-service carrier and a flag carrier of Indonesia. Reassuring the passengers that the airline is using HEPA filters and implementing COVID-19 protocols by showing them directly the steps of implementing COVID-19 protocols will be beneficial. Since people who choose Flag FSC at least have a middle-range monthly income, the airline should promote its complete in-flight facilities and excellent service.

The government should apply strict regulations regarding the availability and maintenance of the HEPA filter in airplanes. The passengers highly value the availability of HEPA filters to ensure their health during travel. HEPA filters also decrease the possibility of virus transmission on the airplane. Furthermore, the authorities, such as the airport management team, also need to tighten their COVID-19-related data screening procedure. Since the government does not require a COVID-19 test document if the passenger has already received the booster vaccine, the airport crew must create a validation procedure to make sure the vaccine certificate is legal.

There are several limitations to this research. This research only focuses on the Jakarta-Denpasar route during the COVID-19 pandemic. We acknowledge that different domestic routes will have different characteristics. Furthermore, this research only focuses on five airline brands, each of which falls into one distinct category: Foreign private FSC, Private FSC, Private LCC, Flag LCC, and Flag FSC. We only analyzed the factors influencing passengers in choosing an airline without considering their travel purpose and past experience. Finally, we did not incorporate the on-time performance as one of the alternative attributes due to lack of information, even though we acknowledged that on-time performance is also important from the exploratory study and previous literature.

Therefore, future studies might consider similar routes or different routes post-COVID-19 pandemic. Additional airline brands, particularly from Foreign Private FSC, might be used as choice alternatives. Future studies might also incorporate the travel purpose, past experience, and their impact on the airline choice decision. Future research can also add attitudes and perceptions towards particular airline categories, and whether it might influence the decision to use an airline or not. Also, if there is sufficient information, future research can incorporate the actual on-time performance as a consideration for airline choice decisions.

DISCLAIMER

The authors declare no conflict of interest.

ACKNOWLEDGMENTS

This research was funded personally.

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